

Matsumoto & Kishi Fuller

Evidence for Universality and Cultural Variation of Differential Emotion Response Patterning

Klaus R. Scherer and Harald G. Wallbott

The major controversy concerning psychobiological universality of differential emotion patterning versus cultural relativity of emotional experience is briefly reviewed. Data from a series of cross-cultural questionnaire studies in 37 countries on 5 continents are reported and used to evaluate the respective claims of the proponents in the debate. Results show highly significant main effects and strong effect sizes for the response differences across 7 major emotions (joy, fear, anger, sadness, disgust, shame, and guilt). Profiles of cross-culturally stable differences among the emotions with respect to subjective feeling, physiological symptoms, and expressive behavior are also reported. The empirical evidence is interpreted as supporting theories that postulate both a high degree of universality of differential emotion patterning and important cultural differences in emotion elicitation, regulation, symbolic representation, and social sharing.

Most ancient philosophers and many early psychologists seem to have been convinced that emotions are universally elicited by appropriate situational contexts and accompanied by characteristic, emotion-specific patterns of bodily changes and

feeling states (see Gardiner, Clark-Metcalf, & Beebe-Center, 1937/1980). This view received strong endorsement when Charles Darwin (1872/1965) published his treatise on "The Expression of the Emotions in Man and Animals." He suggested that emotions have important adaptational functions and that specific expressions and physiological response patterns are rudiments of appropriate behaviors. Darwin's fundamental assumption of the phylogenetic continuity of the biologically based emotion mechanism clearly implies intercultural universality of the emotion process, a notion he attempted to prove by obtaining reports on emotional expression from correspondents in different parts of the world.

Klaus R. Scherer, Department of Psychology, University of Geneva, Geneva, Switzerland; Harald G. Wallbott, Department of Psychology, University of Giessen, Giessen, Germany.

The data set reported here is the result of a massive effort of many collaborators over several years. The many difficulties encountered in data collection included having to smuggle questionnaires in a diplomatic pouch out of a South American country. The following collaborators in the intercultural studies reported in this article have conducted the research in the respective countries. They have also contributed important suggestions to the overall design of the research program and must be considered as co-authors. They are, listed in alphabetical order with their university affiliations, Elisha Babad, Hebrew University of Jerusalem, Jerusalem, Israel; Eva Baenninger-Huber, University of Zurich, Zurich, Switzerland; Cleve Barlow, University of Auckland, Auckland, New Zealand; Marek Cielecki, University of Warsaw, Warsaw, Poland; Cindy Gallois, University of Queensland, Brisbane, Australia; Jo Kleiven, Oppland Regional College, Oppland, Norway; Jacques Cosnier, University II of Lyon, Lyon, France, and Monique Alles-Jardel, University of the Provence, Aix-en-Provence, France; Britt-Marie Drott, University of Gothenburg, Gothenburg, Sweden; Heiner Ellgring, University of Würzburg, Würzburg, Germany; Alfonso Jimenez-Fernandez and Jose Miguel Fernandez-Dols, Autonoma University of Madrid, Madrid, Spain (Jose Miguel Fernandez-Dols especially for his help in collecting the data in Costa Rica, Honduras, Mexico, Guatemala, Venezuela, Chile, and El Salvador: Within these countries we extend our thanks to Mirta Gonzalez, Costa Rica; Otto E. Gilbert, Guatemala; Isabel de Villanueva, Honduras; Rolando Diaz-Loving, Mexico; Ignacio Martin, El Salvador; Angelica Gonzalez and Gonzalo Zaror, Chile; and Pedro R. Rodriguez, Venezuela); Isutomu Kudoh, University of Osaka, Osaka, Japan; Hing-Keung Ma, Chinese University of Hong Kong, Hong Kong; David Matsumoto, University of California, Berkeley; Silvia Maurer-Lane and Silvia Friedman, Catholic University of Sao Paulo, Sao Paulo, Brazil; Gerold Mikula, University of Graz, Graz, Austria; Alastair Mundy-Castle, University of Lagos, Lagos, Ni-

Following these pioneers, many psychologists working on emotion have embraced both of these positions: (a) universalism, which posits that emotion, just like perception, cognition, or learning, is a basic mechanism of human functioning that is

geria; Rauni Myllyniemi, University of Helsinki, Helsinki, Finland; Usha S. Naidu, Tata Institute of Social Sciences, Bombay, India; Vladimir Nestic, University of Nis, Nis, Yugoslavia; S. Nyandia-Bundy and R. P. Bundy, University of Zimbabwe, Harare, Zimbabwe; Robert F. Norton, American University of Beirut, Beirut, Lebanon; Dimitra Papadopoulou and D. Markoulis, University of Thessaloniki, Thessaloniki, Greece; Karl Peltzer, University of Malawi, Lilongwe, Malawi; Catherine Peng, University of Oxford, Oxford, England, who collected the data in the People's Republic of China; Pio Ricci-Bitti and Dino Giovannini, University of Bologna, Bologna, Italy; Luis Soczka and Constanza Paul, University of Porto, Porto, Portugal; Velina Topalova, Bulgarian Academy of Sciences, Sofia, Bulgaria; Ad Vingerhoets and J. Hendriksen, Catholic University of Nijmegen, Nijmegen, The Netherlands; and C. Westenholz-Bless, University of Zambia, Lusaka, Zambia.

We thank Ursula Hess, Rainer Banse, Arvid Kappas, Anthony Manstead, Robert Rosenthal, Ursula Scherer, and five anonymous reviewers for helpful comments and suggestions concerning data analysis and manuscript preparation.

Correspondence concerning this article should be addressed to Klaus R. Scherer, F.P.S.E., Section Psychologie, Université de Genève, 9, route de Drize, CH-1227 Carouge-Genève, Switzerland.

relatively invariant over races and cultures, and (b) differentialism, which posits, on the basis of phenomenal evidence and the assumption of psychobiological functionalism, that the emotions, as identified by different language labels, are differentiated with respect to physiological symptoms, expressive behavior, motivation, and subjective feeling. In consequence, many early working models of emotion have endorsed both universality and differential patterning. It is important to note that the proponents of this position have not negated the existence of cultural differences in the expression and experience of emotion; on the contrary, the importance of social conventions prescribing particular forms of emotion displays has been highlighted by several theorists (e.g., Ekman, 1982; Wundt, 1905, p. 85).

Challenges to Universalist and Differentialist Assumptions

In recent decades both of these positions have come under increasing attack. The notion of universality has been challenged by anthropological and sociological claims of major cultural differences in emotional experience and behavior. The controversy that has ensued—especially with respect to the issue of the universality of the facial expression of different emotions (Boucher, 1979; Ekman, 1973, 1984; Heelas, 1984; Mead, 1975)—is far from being resolved (see Mesquita & Frijda, 1992, for a review). More recently, with the development of a social constructivist movement in psychology (Gergen, 1985), the relativist view has been complemented by the notion that emotions are socially constructed (see Averill, 1980; Greenwood, 1992; Harré, 1986). Extreme versions of this position, denying any biological reality of the emotions, ensure lively controversy. Differentialism, the assumption of emotion-specific response patterning, has also been called into question (e.g., Duffy, 1941; Rimé, Philippot, & Cisamolo, 1990; Schachter & Singer, 1962). In consequence, the psychology of emotion is regularly animated by controversies concerning the existence and the nature of the response differences between various emotions. Two major arguments tend to be leveled against the differentialist position.

The first argument claims that the variously labeled emotions differ fundamentally only with respect to their position on various dimensions. Depending on the respective theory—one (arousal-activation; see Duffy, 1941), two (arousal plus valence-hedonic tone; see Russell, 1980), or three continuous dimensions (arousal, valence, and a varying third dimension, such as potency, attention, or strain-relaxation; see Schlosberg, 1954; Wundt, 1905) are postulated. Although critics of the differentialist position differ widely with respect to their assumptions, many negate the existence of emotion-specific patterning in the respective response domains or reduce the differences to changes in degree (e.g., of arousal), the cognitive interpretation of the situation (e.g., Mandler, 1984; Schachter & Singer, 1962), or the existence of social schemata for specific emotions (Averill, 1980; Harré, 1986; Rimé et al., 1990).

There can be little doubt that different aspects of emotional experience can be represented in a dimensional space. Because it has been amply demonstrated that virtually all lexical entries

in a language can be mapped onto two or three dimensions (valence, activity, and possibly potency; Osgood, Suci, & Tannenbaum, 1957), it is not surprising that the same is true for verbal emotion terms (Davitz, 1969; Russell, 1980). This, in itself, does not argue against differential patterning. Similarly, the fact that photographs of posed facial expressions can be consistently positioned in a valence-arousal space (Schlosberg, 1952; for reviews see Frijda, 1986; Plutchik, 1980) is not surprising given that positive and negative emotions can be posed with different degrees of intensity or implied arousal. Neither of these data sets provides evidence against the assumption that the emotions are differentially patterned with respect to their antecedent cognitive evaluations, physiological and expressive reactions, and subjective feeling states.

The second argument is that there is no convincing empirical evidence for differential patterning (cf. Stemmler, 1989; Rimé et al., 1990). This claim loses much of its punch, however, in view of the negligible number of studies in which strong emotions, naturally occurring or experimentally induced, have been assessed. It can be reasonably argued that many studies failing to find differential patterning have also failed to induce real emotions.

Of course, the absence of negative evidence does not constitute positive evidence. Yet, a case for differential patterning, although far from established, can be made on the basis of the existing evidence. Data suggest emotion-specific response patterning with respect to facial expression (Ekman, 1982, 1992; Ekman & Oster, 1979; Izard, 1971), vocal expression (Scherer, 1986; Scherer, Banse, Wallbott, & Goldbeck, 1991), and psychophysiological symptoms (see review by Levenson, 1992). Unless we can obtain empirical evidence that is accepted by both camps, however, there is little hope that the debate will advance.

The case for cultural relativism rests mainly on the field reports of anthropologists who tend to use "native informants" for in-depth interviews about emotional experiences in non-Western cultures (Levy, 1984; Lutz, 1982, 1988; Lutz & White, 1986; see Mesquita & Frijda, 1992, for a review). However, this approach is beset by a number of conceptual and methodological shortcomings that make it less than optimal as a tool for comparative psychological analysis of the emotion process. First, anthropologists tend to choose one single culture and work there for a number of years. Thus, there is a serious confound between the particular approach chosen by a particular anthropologist and the culture studied. It is easy to understand that many anthropologists prefer to work in rather exotic cultures that are maximally different from Western industrialized cultures. However, this may result in an undue emphasis on the more attention-drawing differences, to the detriment of discovering communalities in emotional experience across cultures. Standard cognitive heuristics, such as representativeness, availability, or simulation (Sherman & Corty, 1984; Tversky & Kahneman, 1974), may conceivably induce fallacies in generalizing from these case studies to the cultural relativity of the emotion process (see also Foschi & Hales, 1979; Jahoda, 1980).

Second, mainly because of the use of informants and the nature of the interviewing process, many of these studies focus almost exclusively on the labeling of emotional experience and

on the role emotion labels play in the semantic fields of a particular language. Differences in linguistic and semantic structure tend to be seen as indicative of different types of social representations and ways of experiencing emotion. Although few anthropologists are likely to subscribe to an extreme emotion version of the Whorfian linguistic relativity hypothesis (Whorf, 1956), such as "if there is no word for a particular emotion in a language it does not exist in the culture," there is a tendency to lean toward a social constructivist point of view and to highlight the cultural relativity of the cognitive representation of emotion concepts. As a result, studies in this tradition tend to focus on the social discourse surrounding emotion rather than on the psychological and physiological nature of the emotional experience (see Greenwood, 1992; Harré, 1986; Hochschild, 1983). There can be no doubt about the important role of the social constitution of emotion representation. Yet, the study of the universality or relativity of emotional experience must go beyond issues of representation and labeling.

Conversely, the case for universality has not yet been made either, because emotions have not been studied systematically and in a representative fashion across many different cultures. This is partly because it is difficult to study naturally occurring emotions even within a single culture. This problem is related to the manifold restrictions in terms of ethics, decorum, feasibility, cost, and opportunity to study emotion, basically a very private phenomenon, either in real life or in an experimental setting (see reviews in Wallbott & Scherer, 1985, 1989). If it is difficult to study real emotions, using experimental or observational methods, in a few subjects under restricted conditions within a particular setting in a particular culture, it is close to impossible to study real emotions for many different subjects in different settings and in several different cultures. As a consequence of the ethical and practical difficulties in studying actual emotion experiences across many cultures, and of the limitations of using much of the representation-oriented anthropological work, researchers actually suffer from a severe lack of normative data that could be used to seriously address the issue of emotion relativity or universality.

Consequently, the debate concerning the existence of differential patterning and universality does not seem to advance, mostly because of lack of evidence. As is often the case in psychology, there is an inverse relationship between the acrimony of the debate and the amount of empirical evidence available. In this article, we use data from questionnaire studies on self-reported emotion experiences in an attempt to advance the debate on the controversies described above.

Questionnaire techniques have been used with some success in the area of emotion research (see reviews in Averill, 1982; Scherer, Wallbott, & Summerfield, 1986). This method, like any other, has both advantages and disadvantages (see Wallbott & Scherer, 1989, for a review). Two major arguments justify the use of questionnaires in this area: (a) Rather than not studying emotion episodes in real life at all, it is preferable to have access to real, and often intimate, emotions through verbal report on recalled emotion experiences in anonymous questionnaires (even though some of the reports might be biased). (b) Two important components of the total emotion process, cognitive ap-

praisal of emotion-antecedent situations and subjective feeling state, are accessible only through self-report.

In an earlier study, Scherer and his associates developed an emotional experience questionnaire based on open-ended questions concerning the characteristics of the emotion-eliciting situation, the subjective feeling evoked, perceived physiological symptoms, and verbal-nonverbal expressions as well as control attempts (see Scherer et al., 1986, chap. 1-2 and Appendix B). This questionnaire was used in a cross-culturally comparative study of anger, fear, sadness, and joy with 779 student respondents in eight European countries (including Israel). The results showed clear-cut differences between the four emotions but few dramatic differences between the countries studied (Scherer et al., 1986, chap. 5-12; Appendixes A1-A8).

To assess the possibility that the European cultures studied were too similar to allow the assessment of cultural differences in emotional experience, the study was extended to Japan and the United States. As one might have expected, the comparison with the European results did indeed reveal more important cultural differences than had been the case in comparing European countries among each other (Scherer, Wallbott, Matsu-moto, & Kudoh, 1988). The emotional experiences of Japanese students, in particular, differed in many cases quite markedly from their European and American counterparts. However, again, the overall results revealed strong universal patterns of characteristic differences in the nature of the elicitation and the type of reactions among the four emotions studied.

The data from these two studies gave rise to specific hypotheses concerning the experiential differences (based on self-report) among anger, fear, joy, and sadness (see Scherer, 1988b, pp. 26-28, 33-37). The predictions that were tested in the research reported here are shown in Table 1. These predictions are presented in the form of rank orderings of the four emotions with respect to their relative position on several variables in the domains of subjective feeling, physiological symptoms, and expressive behavior.

For the subjective feeling domain, predictions were made for the dimensions of intensity and duration of the affective state, attempts at controlling the state, as well as how long ago the event happened (which is considered as a possible index of the frequency of particular emotions, because one can argue that respondents have to go back further into the past to find instances of less frequent emotions; see Scherer et al., 1986). Because similar scales were used, the hypotheses listed in Table 1 correspond directly to those published as conclusions in the earlier studies reviewed above.

With respect to aspects of the emotional experience that concern the psychophysiological symptoms, the nonverbal reactions, and the speech behaviors that were shown, respondents were mostly asked to report individual reactions or symptoms that they recall as having experienced. For these variables, prototypical, that is, frequently reported, types of reactions and symptoms were predicted on the basis of earlier data (see Wallbott & Scherer, 1986b/1988). To reduce the total number of individual variables and predictions and to link the hypotheses more closely to established theoretical concepts, we decided to group the physiological symptoms into three categories, using the notion of ergotropic and trophotropic systems as proposed

Table 1
*Predictions for Significant Emotion Differences Concerning Subjective Feeling,
 Physiological Symptoms, and Expressive Behaviors*

| Measure | Prediction |
|--|------------------------------|
| Subjective feeling | |
| Time distance (long ago–recently) | Sadness = fear < joy = anger |
| Intensity (weaker–stronger) | Anger = fear < sadness = joy |
| Duration (shorter–longer) | Fear < anger < joy = sadness |
| Control attempts (weaker–stronger) | Joy < fear = sadness = anger |
| Physiological symptoms | |
| Ergotropic arousal (weaker–stronger) | Sadness = joy < anger < fear |
| Trophotropic arousal (weaker–stronger) | Joy < fear = anger < sadness |
| Felt temperature (colder–warmer) | Fear < sadness < joy < anger |
| Expressive behavior | |
| Approach/withdrawal (away–toward) | Fear = sadness = anger < joy |
| Nonverbal behavior (little–much) | Fear < sadness < joy = anger |
| Paralinguistic behavior (little–much) | No predictions made |
| Verbal behavior (little–much) | Fear = sadness < joy = anger |

Note. < indicates that a significant difference will be found between the groups of emotions at either side of the sign; = indicates that no significant differences are expected.

by Gellhorn (1970; comparable with a sympathetic–parasympathetic distinction) and adding a group of felt temperature symptoms. Because the predictions published in the two earlier studies were based on individual symptoms, planned comparisons for the contrast analyses were extrapolated from the hypotheses on the basis of individual symptoms. In particular, with respect to earlier publications (Scherer et al., 1986; in particular Table 2.1 in Scherer et al., 1988), cardiovascular (heart-rate and blood pressure changes), muscle symptoms (striated muscle tone), and perspiration predictions were translated into ergotropic arousal predictions for the purpose of the present analysis. For stomach symptoms (gastric disturbance), lump in throat, and crying/sobbing predictions were interpreted in terms of trophotropic arousal (i.e., trophotropic dominance). Similarly, the expressive behavior variables were grouped into movement, nonverbal–nonvocal, paralinguistic, and speech behavior, and the hypotheses listed in Table 1 were extrapolated from published predictions on the basis of individual expressive behavior variables.

The cross-cultural research reported in this article was conducted to allow a large-scale test of these hypotheses on emotion differentiation as well as a more extensive investigation of the relative importance of biological factors (making for universality) and socio-cultural factors (making for cultural relativity of emotional experience). Two logically related questions were addressed on the basis of questionnaire data on emotional experience: What is the relative importance of universal biopsychological patterning compared with country-specific socio-cultural factors in shaping emotional experience? If there are consistent and universal emotion differences, what is the evidence for specific, differentiated reaction patterns—subjective feeling, physiological symptoms, verbal and nonverbal expression for the major emotions—and do these patterns correspond to prior predictions?

As in the earlier research reviewed above (see also Edelman et al., 1987; Scherer & Tannenbaum, 1986), the basic approach

consisted of asking respondents to report on actually experienced emotion episodes in a questionnaire format. Four major features of the approach were modified, however: the number of emotions studied (adding shame, guilt, and disgust to joy, sadness, fear, and anger), the emotion process components investigated (including cognitive appraisal characteristics together with the response domain), the number of countries included in the study (from 8 European countries plus Japan and the United States to 37 countries on all continents), and the format of the questionnaire (from free-response to precoded-response format).

Method

Choice of Emotions Studied

Disgust, shame, and guilt were added to the four “basic” emotions investigated in the earlier work (joy, anger, fear, and sadness). Disgust was included because it is often considered to be a rather basic, “biological” emotion that seems to be present in many species. The self-reflexive emotions of shame and guilt were added because they are often considered to be essentially limited to the human species, to occur rather late in ontogenetic development (and to thus be strongly shaped by learning and socialization processes), and to be powerfully affected by socio-cultural factors (Borg, Staufienbiel, & Scherer, 1988; Piers & Singer, 1971).

Choice of Emotion Components Investigated

Few emotion researchers question the constitutive role of motor expression, physiological symptoms, and subjective feeling as components of emotional experience. Consequently, respondents were asked, as in most research in this area, to report on these components. In light of the important role of cognitive appraisal theories for the explanation of emotion elicitation and differentiation (see Scherer, 1988a), an attempt was made to obtain gross estimates of the evaluations the respondent had made of the eliciting situation by asking a series of questions based

*from
 1st
 study*

on the stimulus evaluation checks proposed by Scherer (1981, 1984a, 1984b, 1986, 1988a) as predictors of emotion differentiation.

Choice of Questionnaire Format

Yes!
 In the previous studies, open-ended questions were used because there was not enough reliable information on the range of possible responses to permit the use of precoded answer alternatives. This format yields rich information but makes quantitative analysis difficult, costly, and time-consuming. Because more emotions and many countries were to be studied, the questionnaire had to be simple enough to be translated into many languages, easy to administer—even in countries with little tradition of questionnaire use, and allow straightforward coding and extensive statistical analysis for a large number of respondents. In addition, it seemed methodologically preferable, for comparative purposes, to present all respondents with the same set of answer alternatives as stimuli for the retrieval of relevant information about the emotion episode from memory. Therefore, precoded answer alternatives based on the patterns of responses to the open-ended questionnaire in the Scherer et al. (1986; Scherer et al., 1988) studies (representing the categories most frequently found) were used.

Questionnaire Design

The questionnaire consisted of a one-page general instruction and seven two-page sections, one for each of the seven emotions studied (joy, anger, fear, sadness, disgust, shame, and guilt). The instruction asked the respondent to recall a situation in which he or she had recently experienced a strong emotion of the kind indicated on top of the first page of each of the seven questionnaire sections and for which they vividly remember the circumstances and their reactions. They were assured of total anonymity and asked to reply to each of the questions with respect to the situation and the emotional experience generated by the latter. Finally, an example for the circling of the response alternatives was provided.

The two-page questionnaire section for each of the seven emotions consisted of four parts. (a) Situation description: Space was provided for a free verbal description of the situation. In addition, a precoded question asked about when the situation happened (days, weeks, months, or years ago). (b) Subjective feeling state: The duration (few minutes, an hour, several hours, or a day or more) and intensity (not very, moderately, intense, or very intense) of the feeling was requested. We also asked whether the event changed the relationships with other people (negatively, not at all, positively, or not applicable). (c) Physiological symptoms and expressive reactions: Separate checklists were provided for (a) 11 bodily symptoms (lump in throat, change in breathing, stomach troubles, feeling cold/shivering, feeling warm/pleasant, feeling hot/cheeks burning, heart beating faster, muscles tensing/trembling, muscles relaxing/restful, perspiring/moist hands, and other symptoms), (b) 11 nonverbal expressive reactions (laughing/smiling, crying/sobbing, other changes in facial expression, screaming/yelling, other changes in voice, change in gesturing, abrupt bodily movements, moving toward people or things, withdrawing from people or things, moving against people or things/aggression, and other expressive reactions), and (c) 8 types of verbal reactions (silence, short utterance, one or two sentences, lengthy utterance, speech melody change, speech disturbances, speech tempo changes, and other verbal reactions). The respondent was asked to check each symptom or reaction experienced in the situation. In each case, a special category for "do not remember" was provided. Then, the respondent was asked to indicate whether he or she tried to control or hide the feeling (not at all, a little, very much, or not applicable). (d) Appraisal: Nine questions on novelty/expectation, pleasantness, goal conduciveness, fairness, responsibility/causation, coping ability, immorality, and relationship to self-concept (see Scherer, 1984b) were posed

(with precoded answer alternatives appropriate to the respective question).

The sequence of the seven target emotions was randomized over respondents to control for order effects. At the end of the booklet respondents were asked to complete a personal background questionnaire containing questions concerning gender, age, field of study, religion, language, country of origin, and parents' education and occupation.¹

Choice of Countries to Be Studied

To be able to go beyond common-sense speculations on cultural specificities of a particular country, such as Japan, that have characterized earlier attempts to explain the cultural differences found (Scherer et al., 1988), a sufficiently large number of countries were to be studied to allow a quantitative analysis of the role of some major dimensions on which countries vary—geographical, climatic, economic, and socio-cultural factors. Because there is no consensus on "culture variables" that could help in the systematic choice of strategic culture areas to be investigated in cross-cultural comparison (e.g., Gudykunst & Ting-Toomey, 1988; Hofstede, 1984; Hofstede & Bond, 1984; Triandis et al., 1986), and because this research was conducted essentially without any extramural funds, it depended on finding colleagues in different countries who were interested and able to participate without funding. Because we could not rely on being able to recruit respondents in specific target countries, it was decided to include respondents from as many different language groups, religions, racial origins, social structures, and cultural value systems as we could over a relatively long period of time. The appropriate choice of cultures depends on the purpose of the study. As Lonner and Berry (1986, p. 89) pointed out, representativeness of cultures per se is not necessary if the aim is to examine systematic covariation among cultural and behavioral variables. What is important in this case is the sufficient range of variability of the independent variable—in our case the different characteristics of countries or cultures.

Translation

The translation of research material between languages is a complex problem (see Brislin, 1980, for a comprehensive discussion). We opted for the "pragmatic" type of translation, which emphasizes the accuracy of the information meant to be conveyed in the source language form (in our case English). As is now routinely required in cross-cultural research, a back-translation procedure was performed: Following translation into the target language the material is translated back into the source language by competent bilingual speakers. The differences detected in the comparison of the two versions are then discussed between translators and researchers, and a final version is developed with the aim of maximizing the accuracy of the intended information.

The emotion questionnaire was translated into the language spoken in each of the participating countries by the local collaborator and his or her associates. They received the original English version as a model, together with detailed instructions on the translation process, particularly the procedures to follow for back translation. The principal investigators checked a large number of these translations but were obviously unable to verify the accuracy in all cases, particularly in the case of the more exotic languages. However, personal contacts with the local collaborators and several small conferences involving a large number of collaborators from different countries helped to settle difficulties and to check the standardization in translation and administration of the questionnaire. In one case, where a translation error was detected after the data were collected (the translation of *disgust* into Portuguese), the

¹ A complete version of the questionnaire in English and Spanish is reproduced as Appendix A in Scherer (1988b).

Portuguese data for *disgust* were all declared as "missing value" for the statistical analyses. Any remaining errors or imprecisions should bias the data against finding universality and boost the error variance or the cultural differences.

Subjects and Sampling

The appropriate sampling of subjects is a particular concern in cross-cultural comparison. Lonner and Berry (1986) stated two basic rules:

Rule 1 is that drawing a truly representative sample may be possible only when the population is extremely homogeneous and some type of accurate and current list or registry can be used as a sampling framework. (p. 86)

Because this is almost never the case in developing countries most researchers abide by Rule 2:

The best samples in cross-cultural research are those that result from the most careful attempts that the circumstances permit to approximate the kind of sample needed to permit the proper execution of research. (p. 86)

Consequently, nonrandom samples are much more common than random samples in cross-cultural research (Lonner & Berry, 1986, p. 87). One of the most important conditions in the present study is the comparability of the behavioral variables—in this case emotional reactions. Clearly, this requires a direct comparison of the subgroups that are studied within the different cultures. Even within many countries there are enormous differences among farmers, manual workers, white-collar employees, and so forth. Among cultures one would expect even greater differences in value systems and lifestyles of many different occupational or demographic groups. Because for practical reasons it is nearly impossible to carry out stratified sampling to take all the regional, occupational, and social class factors into account, the only solution is to choose comparable subgroups of respondents in all cultures. Given the large number of cultures studied, we decided that for reasons of comparability and of practicability groups of students in major city universities were to be used in each country, resulting in a mixture of judgmental, bunch, and convenience sampling (Lonner & Berry, 1986; see also Wallbott & Scherer, 1985). As a consequence, the generalizability of the data to be reported is limited to "modern mass societies." The choice of respondent populations also implies a fairly high degree of "westernization" in many of the countries studied, which may well reduce the chances to find cultural differences.

It can be argued, however, that this potential limitation of the generalizability of the data is less serious than the problems raised by choosing other groups of respondents. First, increasing urbanization and westernization seem to be rather universal aspects of the development in many societies, and it may well be more informative to base intercultural comparison on contemporary society than on exotic ethnic groups in remote areas of the world. Second, most of the empirical studies in psychology, including those on emotion, are based on college students. Consequently, intercultural data on real-life experiences of strong emotions could not possibly be compared with the existing data sets without choosing similar groups of respondents.

Administration

The collaborators who administered the questionnaire in each of the sites were asked to recruit about 100 students, trying to obtain about half men and half women. In addition, they were to attempt to obtain a sample composed of whenever possible, about 50% psychology students and 50% nonpsychology students from different fields of study. Foreign students were to be excluded as much as possible, and age range con-

straints (18–35 years) were to be observed. The questionnaire was to be administered to groups of students in class, under conditions that would guarantee complete anonymity to each respondent. Again, given the large number of collaborators and wide divergence of administration conditions, the principal investigators were not able to verify that this procedure was adopted in every case. However, given the high standard of methodological training of all collaborators in this project, there is little likelihood of grave infractions having occurred.

Table 2 provides the relevant information on the total sample, including the number of respondents per country, gender ratio, mean age, and the percentage of psychology students in the sample.

Data Coding and Analysis

The collaborators and their associates in each of the participating countries transferred the data from the questionnaires to data-coding sheets and translated the text of the situation descriptions into English. Central data processing and analysis were performed by the principal investigators at the University of Giessen, Giessen, Germany, and the University of Geneva, Geneva, Switzerland. All cases where age fell outside of the predetermined range and where the country of origin (as indicated on the background questionnaire) did not correspond to the country in which the questionnaire had been administered were excluded.

Variable Coding

Most of the variables represent the level of the answer categories provided for the responses, and in many cases these constitute clear interval scaling. In other cases, where only three categories are provided or where the intervals between categories (in terms of their meaning) are not equal, the data may be closer to ordinal scale level. To allow the use of parametric statistical techniques, responses were recoded. This was particularly necessary for the symptom and reaction checklists. Recoding was performed by counting the number of symptoms or reactions mentioned by a respondent for each of a number of categories that had been formed on the basis of theoretical considerations (see below). In this manner, scales approaching interval character from 0 (none of the respective items mentioned) to *n* (maximal number of relevant items mentioned) were constructed. The following scales were thus formed:

Physiological symptoms. As mentioned above, Gellhorn's (1970) distinction between ergotropic and trophotropic systems was used, and the symptoms were grouped according to symptom discussions in the relevant psychophysiological literature (Gellhorn, 1970; Grossman, 1967; Schmidt & Thews, 1980). *Ergotropic symptoms* (scored 0 to 4): change in breathing, heart beating faster, muscles tensing/trembling, and perspiring/moist hands; *trophotropic symptoms* (scored 0 to 3): lump in throat, stomach troubles, and crying/sobbing; felt temperature (scored -1 to 2): feeling cold/shivering, feeling warm/pleasant, and feeling hot/cheeks burning (0 being assigned when no temperature symptom was mentioned).

Expressive behavior. Four composite variables were formed: (a) *movement behavior* (scored -1 to 1): withdrawing (-1) versus moving toward (1) people and things (0 being assigned when no movement category was mentioned). (The questionnaire item "moving against people and things, aggression" was not included in the scale because it was felt that the addition of *aggression* implies a qualitatively different dimension in comparison to sheer movement) (b) *Nonverbal behavior* (scored 0 to 6): laughing/smiling, crying/sobbing, other facial expression change, screaming/yelling, other voice changes, and changes in gesturing; (c) *paralinguistic behavior* (scored 0 to 3): speech melody change, speech disturbances, and speech tempo change. (d) *For verbal behavior*, for which respondents could check the categories silence, short utterance, one or two sentences, and lengthy utterance, an interval scale variable with

Can't find it



Table 2
Background Data for the Respondents in 37 Countries

| Country | No. of subjects | Gender | | Mean age | % psychology students |
|----------------------|-----------------|--------|---------|----------|-----------------------|
| | | % men | % women | | |
| Central Europe | | | | | |
| Austria | 69 | 41 | 59 | 21.4 ✓ | 100 ✓ |
| France | 63 | 16 | 84 | 20.2 ✓ | 98 ✓ |
| Germany | 117 | 39 | 61 | 23.2 ✓ | 47 ✓ |
| The Netherlands | 69 | 35 | 65 | 21.4 ✓ | 100 ✓ |
| Switzerland | 80 | 27 | 73 | 21.7 ✓ | 99 ✓ |
| Southern Europe | | | | | |
| Italy | 98 | 51 | 49 | 21.1 ✓ | 51 ✓ |
| Portugal | 88 | 24 | 76 | 21.2 ✓ | 39 ✓ |
| Spain | 78 | 50 | 50 | 21.0 ✓ | 56 ✓ |
| Northern Europe | | | | | |
| Finland | 76 | 33 | 67 | 23.5 ✓ | 50 ✓ |
| Norway | 36 | 61 | 39 | 24.3 ✓ | 0 ✓ |
| Sweden | 84 | 44 | 56 | 26.5 ✓ | 42 ✓ |
| South-Eastern Europe | | | | | |
| Greece | 66 | 51 | 49 | 22.7 ✓ | 49 ✓ |
| Eastern Europe | | | | | |
| Bulgaria | 73 | 42 | 58 | 22.2 ✓ | 48 ✓ |
| Poland | 87 | 49 | 51 | 21.6 ✓ | 44 ✓ |
| Yugoslavia | 80 | 50 | 50 | 22.9 ✓ | 50 ✓ |
| Near East | | | | | |
| Israel | 44 | 35 | 65 | 23.7 ✓ | 5 ✓ |
| Lebanon | 51 | 29 | 71 | 20.4 ✓ | 56 ✓ |
| Asia | | | | | |
| China (Mainland) | 79 | 61 | 39 | 20.9 ✓ | 27 ✓ |
| India | 68 | 53 | 47 | 23.4 ✓ | 100 ✓ |
| Hong Kong | 81 | 54 | 46 | 20.7 ✓ | 7 ✓ |
| Japan | 214 | 45 | 55 | 20.9 ✓ | 36 ✓ |
| Oceania | | | | | |
| Australia | 117 | 32 | 68 | 22.6 ✓ | 45 ✓ |
| New Zealand | 60 | 37 | 63 | 24.1 ✓ | 52 ✓ |
| South America | | | | | |
| Brazil | 58 | 28 | 72 | 21.8 ✓ | 2 ✓ |
| Chile | 65 | 49 | 51 | 19.8 ✓ | 48 ✓ |
| Costa Rica | 58 | 50 | 50 | 19.2 ✓ | 13 ✓ |
| El Salvador | 40 | 27 | 73 | 24.0 ✓ | 97 ✓ |
| Guatemala | 45 | 47 | 53 | 18.7 ✓ | 3 ✓ |
| Honduras | 55 | 18 | 82 | 21.9 ✓ | 56 ✓ |
| Mexico | 139 | 46 | 54 | 22.1 ✓ | 62 ✓ |
| Venezuela | 73 | 38 | 62 | 19.3 ✓ | 38 ✓ |
| North America | | | | | |
| United States | 69 | 58 | 42 | 19.5 ✓ | 17 ✓ |
| Africa | | | | | |
| Botswana | 79 | 68 | 32 | 22.8 ✓ | 1 ✓ |
| Malawi | 75 | 51 | 49 | 22.2 ✓ | 0 ✓ |
| Nigeria | 77 | 65 | 35 | 23.4 ✓ | 100 ✓ |
| Zambia | 111 | 65 | 35 | 22.4 ✓ | 7 ✓ |
| Zimbabwe | 99 | 53 | 47 | 22.3 ✓ | 40 ✓ |
| Total | 2,921 | 45 | 55 | 21.8 ✓ | 43 ✓ |

scores from 0 (silence) to 3 (lengthy utterance) was constructed by recoding the category checked into the appropriate value for the variable.

Results

Universality Versus Cultural Relativity

A mixed-design ANOVA with the seven emotions treated as a fixed within-subject factor (repeated measures) and countries

as a random between-subjects factor was computed. Emotion was treated as a fixed factor because it is assumed that the seven emotions studied constitute only a specific sample of all possible emotions. Country, on the other hand, was treated as a random factor because one can argue that 37 countries from all continents can be considered a reasonably representative sample of all countries in the world. In consequence, mixed design ANOVAs (37 countries \times 7 emotions) were computed for all of

the variables (see the Method section). The results are shown in Table 3.

Given the large number of subjects and of statistical tests (with a corresponding inflation of significance levels), we adopted a p level of .001. Because many of the main and interaction effects in Table 3 reached and often greatly surpassed the critical values, significance levels are not very informative. As mentioned above, the statistical parameters of real interest are the effect size estimates for the emotion and country factors, and their interaction. η s varied between .7 and .8 for emotion differences, and between .2 and .4 for country differences, depending on the variable. The Emotion \times Country interaction η s rarely exceeded .2. Figure 1 provides a graphic illustration of the relative effect sizes by displaying η s. Although this is similar to an estimate of variance accounted for by the two factors, η values need not add up to 1.

For all response domains—subjective feelings, physiological symptoms, and motor expression patterns—the seven emotions differed significantly and strongly (in terms of relative effect size) among each other. Geographical and socio-cultural factors, as reflected in country effect sizes, also affected emotional experience, but the effects were much smaller than those for differences among the emotions. Significant interaction effects indicate that geographical and socio-cultural factors can have differential effects on specific emotions but that the size of these effects is relatively small. These results warrant the conclusion that there are strong and consistent differences between the reaction patterns for the seven emotions and that these are independent of the country studied. It could be argued that these universal differences in self-reports of emotional reactions are evidence for psychobiological emotion patterning. We describe

the characteristics of the different reaction patterns for the seven emotions later.

Differential Patterning

We now turn to the second major question posed in the introduction. What is the nature of the emotion-specific response patterns reflected in the strong emotion main effects and how do they correspond to the theoretical predictions in the literature? Unfortunately, theoretical suggestions and empirical data for particular response modalities are scattered over the literature (Ekman, 1982, 1992; Ekman, Levenson, & Friesen, 1983; Ekman & Oster, 1979; Levenson, 1992; Riskind, 1984; Scherer, 1986, 1989; Scherer & Wallbott, 1990; Stemmler, 1984, 1989; Wallbott & Scherer, 1986a). To test a set of coherent hypotheses with the present data, we relied on predictions emanating from our earlier work. In Scherer et al. (1986) Scherer presented predictions with respect to feeling, physiological symptoms, and expressive behavior for the four emotions studied at the time (fear, anger, joy, and sadness). These predictions were generally supported by the combined European, American, and Japanese data (see above; Scherer et al., 1988) and were summarized, with minor modifications, in Wallbott and Scherer (1986b/1988). In some cases, additional predictions have been made on the basis of Scherer's component process model (see Scherer, 1981, 1984a, 1984b, 1986, 1988a).

In this section we examine the emotion differences for each of the variables in the domains of feeling, physiological symptoms, and expressive behavior. First, detailed descriptive results are reported for those variables where the individual levels can be meaningfully interpreted and linked to earlier research. Second, the results of planned comparisons of means to test published

Table 3
F Values and η s for a Mixed Model ANOVA With Country as a Random Between Factor and Emotion as a Fixed Within (Repeated Measures) Factor

| Measure | Between effects: Country | | | Within effects | | | | |
|---------------------------|-----------------------------|----------|--------|--------------------|----------|--------|-------------|--------|
| | <i>df</i> error | <i>F</i> | η | <i>df</i> error | Emotion | | Interaction | |
| | | | | | <i>F</i> | η | <i>F</i> | η |
| Subjective feeling | | | | | | | | |
| Time distance | 2,547 | 11.48 | .37 | 15,282 | 38.48 | .72 | 2.80 | .20 |
| Duration | 2,558 | 24.85 | .38 | 15,348 | 115.25 | .87 | 3.73 | .22 |
| Intensity | 2,557 | 10.40 | .36 | 15,342 | 139.39 | .89 | 1.76 | .16 |
| Control attempts | 2,086 | 4.48 | .27 | 12,516 | 200.19 | .92 | 2.16 | .20 |
| Relationship effects | 772 | 2.58 | .33 | 4,632 | 170.14 | .91 | 1.65 | .27 |
| Physiological symptoms | | | | | | | | |
| Ergotropic arousal | 2,882 | 8.81 | .31 | 17,292 | 198.60 | .92 | 2.89 | .19 |
| Trophotropic arousal | 2,876 | 9.34 | .33 | 17,256 | 173.28 | .91 | 3.61 | .21 |
| Temperature | 2,883 | 5.00 | .24 | 17,298 | 102.28 | .86 | 4.79 | .24 |
| Motor expression patterns | | | | | | | | |
| Approach behavior | 2,884 | 3.37 | .20 | 17,304 | 115.41 | .87 | 3.27 | .20 |
| Nonverbal behavior | 2,882 | 8.90 | .32 | 17,292 | 120.45 | .88 | 2.35 | .17 |
| Paralinguistic behavior | 2,880 | 4.62 | .23 | 17,280 | 61.21 | .79 | 2.37 | .17 |
| Verbal behavior | 1,002 | 4.13 | .36 | 6,012 | 63.65 | .80 | 1.32 | .21 |

Note. Degrees of freedom for the numerator: Country $df = 36$; Emotion $df = 6$; Interaction $df = 216$. For details of composite variable definition see the Method section. ANOVA = analysis of variance.

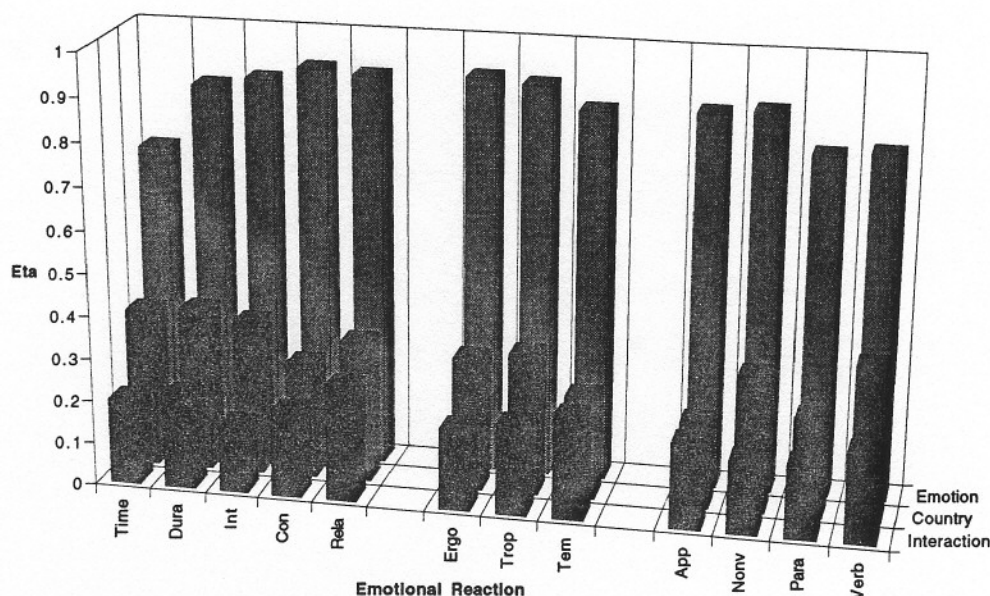


Figure 1. Variance in verbal reports explained by emotion, country, and their interaction. Time = time distance of event; Dura = duration; Int = intensity; Con = control; Rela = effect on relationships; Ergo = ergotropic symptoms; Trop = trophotropic symptoms; Tem = felt temperature; Nonv = nonverbal expressions; App = approach/withdrawal behavior; Para = paralinguistic expressions; Verb = verbal behavior.

predictions of differences among emotions are described. Third, post hoc comparisons of the differences among the means are provided. Following the discussion of the individual variables in the three domains, specific reaction profiles for each emotion are drawn and hypotheses for further study are suggested.

Overview of the Data Presentation Per Set of Variables

Before reviewing the results for each variable in turn, the procedures for data analysis are described. The question concerning how long ago the respective emotion-eliciting event happened (time distance of the event) serves to illustrate these procedures.

Descriptive data tables. In general, for all variables based on questions with a set of answer categories that represent a continuum approximating an interval scale, only measures of central tendency and variability are reported. However, in the case of some variables, the individual response categories are of interest in their own right, because the categories have specific meaning or parametric interest. Furthermore, all of the dichotomous response categories in the questionnaire (physiological symptom and expressive behavior checks) have been transformed into composite variables that approach interval scale format (see the Method section) to permit use of multivariate statistical routines. In these cases, the frequency with which individual symptoms are mentioned are of interest for purposes of comparison with earlier studies. Therefore, descriptive data tables (containing the percentage of the respondents giving the respective response) are provided and briefly discussed with respect to earlier findings reported in the literature.

For example, the levels of the variable time distance of the event (days, weeks, months, or years ago) provide interesting parametric information on the time period separating the event and its recall (see Table 4). These results generally confirm earlier findings: Sadness and fear are relatively infrequent—about three quarters of the respondents go back in memory for months or years to find a strong instance. Although joy and guilt experiences sometimes happened only days or weeks ago, in about two thirds of all cases they dated back for months or years. Anger and disgust experiences on the other hand were quite frequent, in that almost half of the respondents needed to think back only days or weeks to remember an appropriate episode.

Testing predictions through planned comparisons. As described in the introduction, the data obtained in studies using open-ended questionnaires in Europe, the United States, and Japan were used to derive a number of concrete hypotheses concerning emotion-specific reaction patterns, such as subjective

Table 4
Response Frequencies for Time Distance of the Event

| Time ago | Joy | Fear | Anger | Sadness | Disgust | Shame | Guilt |
|----------|------|------|-------|---------|---------|-------|-------|
| Days | 20.1 | 12.4 | 24.8 | 14.3 | 22.6 | 15.2 | 19.1 |
| Weeks | 15.4 | 13.2 | 22.0 | 13.2 | 21.1 | 16.3 | 19.4 |
| Months | 31.4 | 30.3 | 30.5 | 30.1 | 31.4 | 26.4 | 28.6 |
| Years | 33.1 | 44.1 | 22.7 | 42.3 | 24.9 | 42.1 | 33.0 |

Note. Data are based on $N = 2,921$ respondents. Table entries represent column percentage.

feeling (duration, intensity, and control attempts), physiological symptoms (in this case coded as ergotropic arousal, trophotropic arousal, and felt temperature), and expressive behavior (approach/withdrawal, nonverbal, paralinguistic, and verbal). Planned comparisons of means through orthogonal contrasts were used to test predictions concerning subjective feeling, physiological symptoms, and expressive behavior. Contrasts were computed for only four of the seven emotions studied (joy, fear, anger, and sadness) because the published predictions were based on earlier questionnaire studies of these four emotions (Scherer et al., 1988; Scherer et al., 1986; Wallbott & Scherer, 1986b/1988).

For the question concerning how long ago the respective emotion-eliciting event had happened (time distance of the event) it had been predicted that sadness and fear events generally happened longer ago (and are thus probably less frequent) than anger or, to a lesser extent, joy (likely to have happened more recently and thus probably more frequent). As shown in Table 5, this prediction was tested in a series of orthogonal contrasts (the second row in the matrix; the dash indicates a published prediction). The remaining two rows represent ad hoc comparisons to fill the matrix and satisfy the orthogonality requirement (we used tendencies in earlier findings and common sense to intuit possible differences, for example, assuming that anger is more frequent than joy [row 3] and that fear is more frequent than sadness [row 4]). A within-subjects design ANOVA (repeated measures over the four emotions) was computed to test the predictions. Table 5 shows the univariate F s that reached at least $p < .001$ in the analysis and the corresponding value of η .

The prediction that anger and joy episodes happen more recently than sadness and fear episodes was strongly supported. Our second contrast, expected on the basis of the earlier results, was also confirmed: Joy episodes are less recent than anger episodes and thus, if our reasoning is correct, likely to occur less frequently. The third contrast was not significant. The means on which the comparisons are based are listed in Table 6. This table also contains the means for all variables discussed below. F values and effects sizes for significant contrasts are reported below.

Using this approach, we evaluated the evidence for the hypotheses concerning reaction patterns on the basis of earlier empirical data from questionnaire studies. In the discussion of

the results, all of the planned comparisons based on published predictions are reported. The results for the ad hoc contrasts are not discussed because they were not established before data gathering and analysis.

Post hoc comparisons of differences between emotions. A priori predictions were available for only four emotions studied in the earlier research (joy, fear, anger, and sadness). Consequently, only the differences between these four could be assessed with planned comparisons based on orthogonal contrasts. To determine to what extent the means for the seven emotions were significantly different, post hoc comparisons using the Student-Newman-Keuls procedure were computed. This was done with two assumptions in mind: (a) The mean value of a variable for a specific emotion and for a specific country represents a rather stable estimate of the respective response tendency in that country; (b) whereas the answers of each subject for the seven emotions are dependent, the means across all subjects in a country are likely to be independent for the different emotions (because the dependencies have canceled each other out in the process of averaging). Consequently, a one-way ANOVA with emotion as a seven-level factor and with the 37 country means per variable as observations was computed. This procedure resulted in conservative Student-Newman-Keuls estimates on significant differences between means and on homogeneous subgroups among the levels of the emotion factor. The rank ordering of the emotions as suggested by this analysis is given below for each variable. Each group of emotions joined by an equal sign (=) represents a homogeneous subgroup with respect to the particular variable; that is, the means are not significantly different from each other. The less-than signs (<) indicate boundaries between homogeneous subgroups; that is, each emotion mean on the right of the sign is significantly different from the ones to the left. Overlap between two homogeneous subgroups is marked by a less-than sign and an equal sign (<=); that is, the two adjacent means linked by <= are not significantly different from each other. Post hoc comparison of the seven emotion means for time distance of the event yielded the following ordering (from *happened long ago* to *happened recently*): sadness = fear = shame < joy = guilt <= disgust = anger. We now discuss in detail the variables in the three response domains.

Subjective Feeling Variables

Duration. Because the response alternatives of the duration question (spaced at unequal time intervals) provide interesting parametric information, the percentages for the different categories are shown in Table 7. Corresponding to our earlier findings, sadness and joy were the longest-lasting emotions, rarely subsiding in less than several hours and often lasting for several days (particularly sadness). Guilt also lasted a long time, several hours or even a day or more. Whereas anger and shame could last for hours or days (and did so about half of the time), there were instances where the emotion disappeared after a few minutes or an hour. Fear and disgust are generally short-lived emotions, disappearing after minutes or an hour (although they can last much longer in some cases or for some people).

The formal prediction that sadness = joy > anger > fear was

Table 5
Example for the Use of Planned Comparison Contrast Codes for Predicted Differences Between Emotions

| Measure: Time distance of event | Emotion | | | | F | η |
|---------------------------------------|---------|------|-------|---------|------|--------|
| | Joy | Fear | Anger | Sadness | | |
| Contrast 0 | 1 | 1 | 1 | 1 | — | 408.6 |
| Contrast 1 | -1 | 1 | -1 | 1 | — | .359 |
| Contrast 2 | 1 | 0 | -1 | 0 | 98.9 | .186 |
| Contrast 3 | 0 | -1 | 0 | 1 | ns | .056 |

Note. df s = 1 and 2,754. Dash indicates that main hypothesis predicted; first vector indicates null hypothesis; only significant results with $p < .001$ are reported.

Table 6
Means and z Scores for the Subjective Feeling Variables

| Measure | Joy | Fear | Anger | Sadness | Disgust | Shame | Guilt |
|----------------------------|------|------|-------|---------|---------|-------|-------|
| Time distance of the event | | | | | | | |
| <i>M</i> | 2.78 | 3.06 | 2.51 | 3.01 | 2.59 | 2.95 | 2.76 |
| <i>z</i> | -.03 | .22 | -.27 | .18 | -.20 | .13 | -.05 |
| Duration | | | | | | | |
| <i>M</i> | 3.36 | 2.52 | 2.78 | 3.60 | 2.52 | 2.62 | 3.09 |
| <i>z</i> | .37 | -.36 | -.13 | .58 | -.35 | -.27 | .14 |
| Intensity | | | | | | | |
| <i>M</i> | 3.13 | 3.09 | 3.01 | 3.19 | 2.69 | 2.59 | 2.58 |
| <i>z</i> | .25 | .20 | .12 | .31 | -.23 | -.33 | -.34 |
| Control attempts | | | | | | | |
| <i>M</i> | 1.28 | 1.87 | 1.58 | 1.85 | 1.69 | 2.28 | 2.07 |
| <i>z</i> | -.67 | .09 | -.28 | .07 | -.14 | .61 | .35 |
| Effect on relationships | | | | | | | |
| <i>M</i> | 2.77 | 1.94 | 1.48 | 1.92 | 1.55 | 1.74 | 1.78 |
| <i>z</i> | 1.17 | .07 | -.53 | .04 | -.44 | -.18 | -.14 |

tested in the form of two orthogonal contrasts. Both were strongly supported: Fear was experienced for a significantly shorter period than joy, anger, and sadness, $F(1, 2744) = 824.4$, $\eta = .48$, and anger was significantly shorter lived than joy and sadness, $F(1, 2744) = 961.8$, $\eta = .51$. The post hoc comparisons of the means for all seven emotions (see Table 6) suggest the following rank ordering for duration (from shorter to longer): fear = disgust = shame < = anger < guilt < joy < sadness.

Intensity Because the individual levels of this variable provide little information that cannot be retrieved from the means, no descriptive data table is provided. The formal prediction that joy = sadness > fear = anger was tested with a single contrast: joy and sadness versus fear and anger. The data confirmed the prediction, $F(1, 2749) = 54.6$, $\eta = .14$, but the effect size for the difference was quite low. It is possible that this is due to a ceiling effect. Because respondents were asked to recall a fairly strong emotional experience they may have chosen situations of similar affective impact. A certain intensity may be necessary to maintain long-term memory for the event. Furthermore, unlike duration, where objective time units provide a basis for the verbal report, there is no clear comparison level for subjectively felt intensity. As shown in Table 6, however, disgust, shame, and guilt were lower in intensity than the other four emotions. This difference reached significance in the post hoc comparison for the intensity means (from weaker to stronger): shame = guilt = disgust < anger = fear < = joy = sadness. Although one might have expected weak intensity for disgust (because it often con-

cerns only rather transient exposure to contaminating matter), it is not obvious why shame and guilt were experienced with relatively lower intensity. It is interesting that the four classic fundamental emotions studied in our earlier research—joy, sadness, fear, and anger—were relatively more intense than the three that were added. However, this pattern of findings should be replicated before one tries to interpret these differences.

Control attempts. Only one comparison had been planned, reflecting the formal prediction that joy would be less controlled than the other three emotions. This was confirmed by a highly significant effect, $F(1, 2401) = 1323.7$, $\eta = .60$. Post hoc comparisons of the means for all seven emotions yielded the following rank ordering on the extent of attempts to control the emotion (from low to high): joy < anger < disgust < sadness = fear < guilt < shame.

Very few attempts were made to control joy. Anger and disgust were also relatively freely expressed. This is somewhat surprising because it is often surmised that there are socio-cultural norms inhibiting the expression of anger. In any case, replication of this result is required. The fact that the self-reflexive emotions guilt and shame were the most strongly controlled emotions in this study might reflect efforts to protect the self, which may be already tarnished by the behavior that elicited the emotion.

Effects on relationships. Because this variable had been added as an afterthought, following a suggestion by one of our Asian collaborators, no predictions had been made. However,

Table 7
Response Frequencies for Duration of the Emotion

| Duration | Joy | Fear | Anger | Sadness | Disgust | Shame | Guilt |
|---------------|------|------|-------|---------|---------|-------|-------|
| A few minutes | 8.2 | 30.5 | 20.1 | 4.6 | 30.8 | 29.4 | 13.6 |
| An hour | 6.4 | 15.2 | 16.6 | 5.0 | 14.7 | 13.0 | 11.5 |
| Several hours | 27.0 | 26.0 | 28.4 | 15.9 | 25.6 | 23.2 | 27.4 |
| A day or more | 58.4 | 28.3 | 34.9 | 74.4 | 28.9 | 34.3 | 47.6 |

Note. Data are based on $N = 2,921$ respondents. Table entries represent column percentage.

the patten
interestin
relationsh
tive): ange
Anger, c
relationsh
proach/w
and fear h
the situati
The posit
contagion

Physiolog

Table 8
presence c
these prop
ing the av
symptom
standard d
deviation
low 13 (sy
27 (symp
points are
scriptive d
variables a
tion, plan
trapolated
individual sym
Ergotro
licating th
see Table
t: Muscle
nd sadnes
eports. A
or fear, bu
nd joy. Ir
quently for

the pattern of means, as tested by post hoc comparison, showed interesting differences for the effect of the different emotions on relationships with the people involved (from negative to positive): anger < disgust < shame = guilt < sadness = fear < joy.

Anger, disgust, shame, and guilt may have negative effects on relationships because of their distancing function (see approach/withdrawal behavior below). It is possible that sadness and fear have a positive effect on relationships because others in the situation empathize with the predicament or even share it. The positive effect of joy might be explained by a process of contagion.

Physiological Symptom Variables

Table 8 shows the proportions of respondents indicating the presence of the different physiological symptoms. In evaluating these proportions we use the following rule of thumb: Computing the average frequency with which respondents check a symptom or behavior pattern results in a mean of 20% and a standard deviation of 14%. Applying an interval of one standard deviation around the mean, we have marked all percentages below 13 (symptom or behavior infrequently observed) and above 27 (symptom or behavior frequently observed). These cut-off points are used to comment on the correspondence of the descriptive data to earlier results. The means for the composite variables are shown in Table 9. As mentioned in the introduction, planned comparisons for the contrast analyses were extrapolated from the published hypotheses on the basis of individual symptoms.

Ergotropic arousal. The percentages of the respondents indicating the presence of the symptoms considered as ergotropic (see Table 8) were consistent with the predictions listed in Table 1: Muscle symptom reports were above average for anger, fear, and sadness. Only fear was characterized by high perspiration reports. As expected, heart-rate increase reports were highest for fear, but in this study they also reached high levels for anger and joy. In this study respiration changes were reported frequently for fear, anger, and shame.

With respect to the planned comparisons involving "ergotropic arousal," the major prediction (on the basis of Wallbott & Scherer, 1986b/1988, and Scherer et al., 1988) was that fear and anger should be accompanied by stronger ergotropic arousal than joy and sadness. This prediction received strong support, $F(1, 2882) = 1888.0, \eta = .63$. The second contrast predicted on the basis of earlier data, fear being assumed to be characterized by stronger ergotropic arousal than anger, was also confirmed, $F(1, 2882) = 330.3, \eta = .32$.

The post hoc comparisons of means for all seven emotions (see Table 9) suggest the following order for strength of ergotropic arousal (from weak to strong): disgust = joy = guilt = sadness < = shame < anger < fear. These results again confirm the prediction that fear and anger are emotions most characterized by ergotropic arousal. The remaining emotions are scarcely differentiated from each other with respect to this response system.

Trophotropic arousal. Table 8 shows the percentages of the respondents who experienced the symptoms considered to belong to the trophotropic syndrome. Frequent mention of stomach symptoms had been expected for sadness, fear, and anger. This expectation was not borne out by the present data where stomach symptoms were absent or infrequent for joy, anger, and shame and around average for the remaining emotions. Most noticeable was the high frequency of "lump-in-throat" reports for sadness (and, to a lesser extent, guilt).

The prediction that trophotropic arousal should be much less pronounced in joy compared with fear, anger, and sadness was strongly confirmed, $F(1, 2880) = 1748.9, \eta = .62$. It was also predicted (see Scherer, 1986, p. 154) that trophotropic arousal should be more pronounced for sadness than for anger and fear. This was also confirmed, $F(1, 2880) = 1424.8, \eta = .58$.

The post hoc comparison of the means for all seven emotions (see Table 9) yielded the following rank ordering of the emotion with respect to trophotropic arousal (from weak to strong): joy < shame = anger = disgust < = guilt < = fear < sadness. As expected, sadness seemed to be the only emotion with a very

Table 8
Percentage of Physiological Symptoms Reported

| Measure | Joy | Fear | Anger | Sadness | Disgust | Shame | Guilt |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Ergotropic arousal | | | | | | | |
| Breathing change | 20.3 | 46.6 | 37.1 | 24.2 | 18.1 | 20.6 | 17.2 |
| Heart beat faster | 40.0 | 65.3 | 49.5 | 26.6 | 22.6 | 35.2 | 26.6 |
| Muscles tensing | 10.0 | 51.9 | 42.7 | 27.2 | 24.6 | 22.8 | 21.8 |
| Perspiring | 11.2 | 36.9 | 21.1 | 16.1 | 13.1 | 25.6 | 17.3 |
| Trophotropic arousal | | | | | | | |
| Lump in throat | 13.5 | 29.2 | 25.0 | 55.7 | 20.5 | 23.7 | 28.1 |
| Stomach trouble | 3.2 | 21.2 | 10.9 | 18.5 | 21.1 | 11.0 | 15.1 |
| Crying/sobbing | 8.7 | 15.5 | 15.4 | 54.7 | 6.6 | 8.9 | 13.2 |
| Felt temperature | | | | | | | |
| Cold | 2.0 | 35.7 | 8.3 | 22.1 | 13.8 | 10.7 | 12.2 |
| Warm | 63.0 | 1.3 | 1.4 | 1.4 | 0.9 | 2.2 | 1.2 |
| Hot | 17.8 | 14.0 | 31.7 | 8.7 | 11.7 | 40.3 | 17.7 |

Note. Data are based on $N = 2,921$ respondents. Percentages less than 13% and greater than 27% are in bold type (see text).

Table 9
Means and *z* Scores for the Physiological Symptom Variables

| Measure | Joy | Fear | Anger | Sadness | Disgust | Shame | Guilt |
|----------------------|------|-------|-------|---------|---------|-------|-------|
| Ergotropic arousal | | | | | | | |
| <i>M</i> | 0.81 | 2.01 | 1.50 | 0.94 | 0.82 | 1.04 | 0.83 |
| <i>z</i> | -.26 | .71 | .30 | -.16 | -.26 | -.08 | -.25 |
| Trophotropic arousal | | | | | | | |
| <i>M</i> | 0.25 | 0.66 | 0.51 | 1.29 | 0.48 | 0.44 | 0.56 |
| <i>z</i> | -.43 | .07 | -.11 | .86 | -.15 | -.20 | -.04 |
| Temperature | | | | | | | |
| <i>M</i> | 0.88 | -0.03 | 0.58 | -0.02 | 0.12 | 0.74 | 0.26 |
| <i>z</i> | .55 | -.41 | .23 | -.40 | -.26 | .40 | -.11 |

strong level of trophotropic arousal. The other emotions showed very similar levels, except for joy, where there was very little trophotropic arousal.

Felt temperature The prediction that joy feels warm, anger hot, and fear cold was confirmed by the percentages in Table 8. Shame also reached a high percentage of hot responses. Three planned comparisons were tested for the composite variable felt temperature on the basis of the predictions mentioned above. Two of these were significant: Anger was "hotter" than sadness, joy, and fear, $F(1, 2883) = 222.1, \eta = .27$. The effect size was small because joy, contrary to expectation, showed a higher mean on felt temperature than anger (because of the more frequent mentioning of feeling warm or hot; see Table 8). Joy was hotter than fear and sadness, $F(1, 2883) = 2193.0, \eta = .66$. The prediction that fear feels colder than sadness was not supported. Post hoc comparison of the means for all seven emotions suggests the following order with respect to felt temperature (from cold to warm/hot): fear = sadness < disgust < guilt < anger < shame < joy. In addition to the predicted, and confirmed, differences between fear and sadness as cold and joy and anger as warm or hot emotions, this analysis corroborates the intuitive assumption that shame is also a hot emotion (often vividly externalized by blushing).

Expressive Behavior Variables

The percentage of respondents who reported showing different aspects of expressive behavior during the recalled emotion episodes are shown in Table 10. The 20% ($\pm 7\%$) rule of thumb (see above) is again used in commenting on these descriptive data. As in the case of physiological symptoms, the individual expressive reactions were transformed into composite variables (see the Method section). Consequently, the planned comparisons performed in the context of ANOVA contrasts were extrapolated from published predictions based on individual expression behaviors. The means for expressive behavior variables are listed in Table 11.

Approach/withdrawal behavior. It had been expected that joy should be accompanied by positive approach behavior. Not surprisingly, this prediction was strongly supported by the results of the planned comparison, $F(1, 2884) = 1521.8, \eta = .59$, as could be expected on the basis of the percentages shown in Table 8. Post hoc comparison of the means for all seven emo-

tions yielded the following results for approach/withdrawal behavior (from withdrawal to approach): shame = guilt = disgust = sadness < fear < anger < joy. These results suggest that joy leads to approach and shame and guilt, disgust, and sadness to withdrawal from other people, corroborating our intuitive notions in this respect. As shown in Table 10, there was an augmented tendency toward aggressive movement against others in anger. It is noticeable, however, that approach/withdrawal behavior was relatively infrequently reported compared with other behavior patterns.

Nonverbal behavior. The percentages for individual expression behaviors in Table 10 are consistent with earlier findings. Not surprisingly, crying/sobbing was uniquely characteristic for sadness, and laughing/smiling for joy. As expected, facial expression was the most frequently mentioned form of expression for all emotions. Contrary to expectation, voice changes and gestures were not reported with high frequency.

Two planned comparisons were tested for the composite variable nonverbal behavior, and both were confirmed: Joy and anger were more expressive than sadness and fear, $F(1, 2883) = 307.0, \eta = .31$, and within the pair of less expressive emotions, sadness was more expressive than fear, $F(1, 2883) = 186.7, \eta = .25$. It should be stressed again that *more or less* expressive is of course limited to the reaction alternatives that were provided in the questionnaire.

The post hoc comparison of the means for all seven emotions suggests the following ordering for nonverbal behavior (from little to much): guilt < disgust = shame = fear < sadness < = anger < joy. The finding that joy, anger, and sadness are most likely to be accompanied by many nonverbal expressions may be related to the relatively low level of control attempts for these emotions. Another major factor is probably the need to communicate these emotional states that is much more pronounced than in the case of the self-reflexive emotions (shame and guilt) or fear and disgust, which often occur in nonsocial situations, elicited by natural rather than social stimuli or events. This pattern suggests that expressive behavior, at least for some emotions, may be more pronounced in social situations (see Rimé, 1983).

Paralinguistic behavior. Only two pronounced frequencies for paralinguistic speech variables emerged from the listing of percentages in Table 10—speech melody change for joy and speech tempo change for anger. No prior predictions had been made for differences in terms of speech characteristics and, in

Table 10
Percentage of Expressive Behaviors Reported

| Measure | Joy | Fear | Anger | Sadness | Disgust | Shame | Guilt |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Approach/withdrawal behavior | | | | | | | |
| Move toward | 38.9 | 14.4 | 10.0 | 12.5 | 5.2 | 5.4 | 8.1 |
| Move away | 1.4 | 18.1 | 17.9 | 29.5 | 22.3 | 26.7 | 23.9 |
| Move against, aggression | 0.3 | 5.3 | 28.6 | 6.1 | 11.4 | 4.0 | 6.0 |
| Nonverbal behavior | | | | | | | |
| Laughing/smiling | 84.5 | 4.3 | 3.1 | 3.9 | 4.2 | 14.4 | 4.4 |
| Crying/sobbing | 8.7 | 15.5 | 15.4 | 54.7 | 6.6 | 8.9 | 13.2 |
| Facial expression | 14.8 | 30.9 | 39.0 | 29.4 | 38.5 | 30.5 | 26.2 |
| Screaming/yelling | 8.1 | 12.8 | 22.1 | 5.8 | 7.4 | 2.7 | 4.0 |
| Other voice changes | 14.4 | 18.4 | 31.8 | 22.6 | 16.7 | 19.3 | 17.2 |
| Gesture | 18.9 | 17.0 | 26.5 | 14.4 | 17.7 | 18.0 | 16.5 |
| Paralinguistic behavior | | | | | | | |
| Melody change | 29.2 | 11.6 | 25.6 | 13.6 | 10.7 | 10.9 | 11.4 |
| Speech disturbance | 6.7 | 15.2 | 15.0 | 12.5 | 7.2 | 14.9 | 11.4 |
| Tempo change | 22.0 | 12.8 | 27.8 | 9.9 | 10.8 | 10.1 | 9.9 |
| Verbal behavior | | | | | | | |
| Silence | 12.7 | 50.5 | 24.1 | 60.8 | 38.8 | 46.7 | 48.2 |
| Short utterance | 16.2 | 20.1 | 17.4 | 19.7 | 21.7 | 19.7 | 16.8 |
| One/two sentences | 12.8 | 11.0 | 14.1 | 12.0 | 12.3 | 14.1 | 12.4 |
| Long utterance | 35.2 | 7.3 | 29.0 | 8.7 | 14.2 | 7.7 | 11.8 |

Note. Data are based on $N = 2,921$ respondents. Percentages less than 13% and greater than 27% are in bold type (see text).

consequence, no contrast analysis was computed. On the basis of the post hoc comparison of the means for all seven emotions (see Table 11), the following rank order resulted (from little to much): disgust = guilt < = shame < = sadness < fear < joy < anger. This pattern of results, as might be expected, is very similar to the nonverbal behavior responses and is probably affected by the same factors. If this is replicated, one might consider combining the nonverbal and vocal behaviors to a single composite variable of expressive behavior.

Verbal behavior. We expected silence for sadness and fear and extensive verbal activity for joy and anger. The percentages for the individual categories in Table 10 seem to confirm this expectation. In fact, all emotions except anger and joy seem to be frequently rather silent affairs. The a priori hypothesis tested through contrasts for the verbal behavior variable—more talk during joy and anger than during fear and sadness—was strongly confirmed, $F(1, 1424) = 606.8, \eta = .55$. Post hoc comparison yielded the following rank order of the emotions with respect to verbal behavior (from little to much): fear = sadness = shame = guilt < disgust < anger = joy.

On the basis of these results and the percentages shown in Table 10, joy and anger are most likely to produce more and longer utterances, whereas disgust produces short utterances (such as exclamations). Fear and sadness are likely to be the most silent emotions. Again, the pattern is similar to the nonverbal and paralinguistic behavior results and may be determined by communication pressure factors.

Emotion-Specific Response Profiles

To render the patterning comparable across domains and response scales, we converted all variables to z scores (the deviation of a specific emotion score from the mean of each variable

over all seven emotions) for each respondent. We then obtained the mean of these z scores across respondents for each of the seven emotions studied. The z score values are listed together with the means in Tables 6, 9, and 11.

Standardized scores permitted the construction of profiles of emotion-specific deviations from the overall mean of zero that are comparable across all variables. These standardized deviation-from-the-grand-mean profiles are shown in Figure 2. A graphic presentation has been chosen to highlight to what extent and in what directions the seven emotions differ from the mean with respect to subjective feeling, physiological symptoms, and expressive reactions.

The use of z scores clearly highlights the differences between the emotions. This can be justified by two arguments: First, the questionnaire method, which requires the recall of specific emotional experiences, does not allow one to obtain comparable data for a "neutral" state. Thus, because we do not have any metric to compare changes either from a hypothetical neutral baseline or across emotions, our only point of reference for a quantitative comparison is the average value across different emotional states. Although this may not tell us how different a particular emotional state is from a nonemotional state, it will tell us how that particular state differs from the mean of a representative cross-section of emotional states. Because the seven emotions studied here represent a representative sample of the fundamental emotions, one could expect that the overall mean will not change too drastically as other emotions are added. It should be noted that the comparison of the response pattern for each emotion to the mean of a sample of emotions rather than a neutral or baseline state is likely to underestimate emotion differentiation. Second, given the wide discrepancy of scale levels used across variables in this study (and across different stud-

Table 11
Means and z Scores for the Expressive Behavior Variables

| Measure | Joy | Fear | Anger | Sadness | Disgust | Shame | Guilt |
|-------------------------|------|-------|-------|---------|---------|-------|-------|
| Approach/withdrawal | | | | | | | |
| <i>M</i> | 0.38 | -0.03 | -0.07 | -0.16 | -0.17 | -0.21 | -0.15 |
| <i>z</i> | .76 | .05 | -.02 | -.18 | -.19 | -.26 | -.17 |
| Nonverbal behavior | | | | | | | |
| <i>M</i> | 1.49 | 0.99 | 1.38 | 1.31 | 0.94 | 0.94 | 0.81 |
| <i>z</i> | .37 | -.14 | .26 | .19 | -.18 | -.19 | -.31 |
| Paralinguistic behavior | | | | | | | |
| <i>M</i> | 0.58 | 0.40 | 0.68 | 0.36 | 0.29 | 0.36 | 0.33 |
| <i>z</i> | .21 | -.04 | .36 | -.09 | -.20 | -.10 | -.14 |
| Verbal behavior | | | | | | | |
| <i>M</i> | 2.00 | 0.75 | 1.66 | 0.76 | 1.06 | 0.85 | 0.92 |
| <i>z</i> | .75 | -.31 | .46 | -.31 | -.05 | -.23 | -.19 |

ies in this area), the use of z scores would seem to be the only solution for a transformation of the data onto a common scale that allows direct comparison.

The emotion-specific patterns shown in Figure 2 are discussed below. Because of the use of z scores, a negative score, for example on ergotropic arousal for joy, does not mean that there may not be more ergotropic arousal for joy as compared with a neutral state. The value must be interpreted as relatively less ergotropic arousal for joy as compared with the mean for all emotions. Even cursory visual inspection of the profiles in Figure 2 shows that each emotion is characterized by a specific pattern of response characteristics.

Joy is a relatively intense, long-lasting emotion that is hardly at all controlled or regulated in its expression. In consequence, it is marked by highly expressive behavior, both nonverbal and verbal, and strong approach behavior toward other people. On the physiological level, felt temperature is most important, the person feeling warm or hot. Furthermore, trophotropic symptoms are virtually absent. Fear is the most transient emotion. Although the outward expression is not as pronounced as for some other emotions, fear has strong internal consequences: extremely high ergotropic arousal and very low felt temperature. Anger is a highly expressive emotion, both verbally and nonverbally, and is not very strongly controlled. Strong ergotropic arousal and high felt temperature characterize the physiological response. Sadness is the most intense and the longest-lasting emotion. It is the only one for which there is a disjunction between vocal and nonverbal behavior: Although it is accompanied by relatively strong nonverbal expression, there is little vocal, nonverbal, or verbal behavior. Sadness is the only emotion dominated by trophotropic arousal. Felt temperature is very low. Disgust has relatively unremarkable concomitants across all three reaction domains—relatively low intensity, short duration, little expressiveness, and low arousal. Shame, though not very long lasting or intense, is characterized by a very high level of control attempts. Expressivity is relatively low, but there are strong withdrawal tendencies. The physiological response is marked by high felt temperature. Guilt is quite similar to shame except for longer duration and the absence of marked physiological response symptoms.

We interpret the response profiles as evidence for a differen-

tial patterning view of emotion. Many of these patterns can be readily interpreted in terms of the adaptive functions generally ascribed to the specific emotions, for example, preparation for fight in the case of anger, flight in the case of fear, avoidance in the case of disgust, and recovery and readjustment to loss in the case of sadness (see Frijda, 1986; Levenson, 1992; Plutchik, 1980; Scherer, 1984b, 1986).

Discussion

This study focused on the controversies concerning the universality and differentiation of emotional experiences. An attempt has been made to advance the discussion by providing empirical evidence from an extensive data set collected in a series of cross-cultural studies on self-reported emotional experience. We now take stock with regard to the two questions posed at the outset.

What Is the Relative Importance of Universal Biopsychological Patterning Compared With Country-Specific Socio-Cultural Factors in Shaping Emotional Experience?

As one might have expected from earlier examples of similarly futile controversies (e.g., genes vs. environment and personality vs. situation), we find that both emotion specificity and culture (in the form of country differences) explain sizable amounts of the variance in the emotion reports of our respondents. As was also to be expected, these factors interact. We used effect size estimates to compare the relative importance of cultural or psychobiological factors, or their interaction. The results for the three response domains investigated—feeling, physiological symptoms, and expression—show consistently strong effects for universal, emotion-specific effects and small to medium effects for country and the Emotion \times Country interaction. The data reported here do not support an extreme position of cultural relativism with respect to emotional experience. However, because respondents were faced with the task of recalling episodes with respect to seven basic emotion categories, the data do not address the issue of whether there might not be some emotions that are unique to a particular culture.

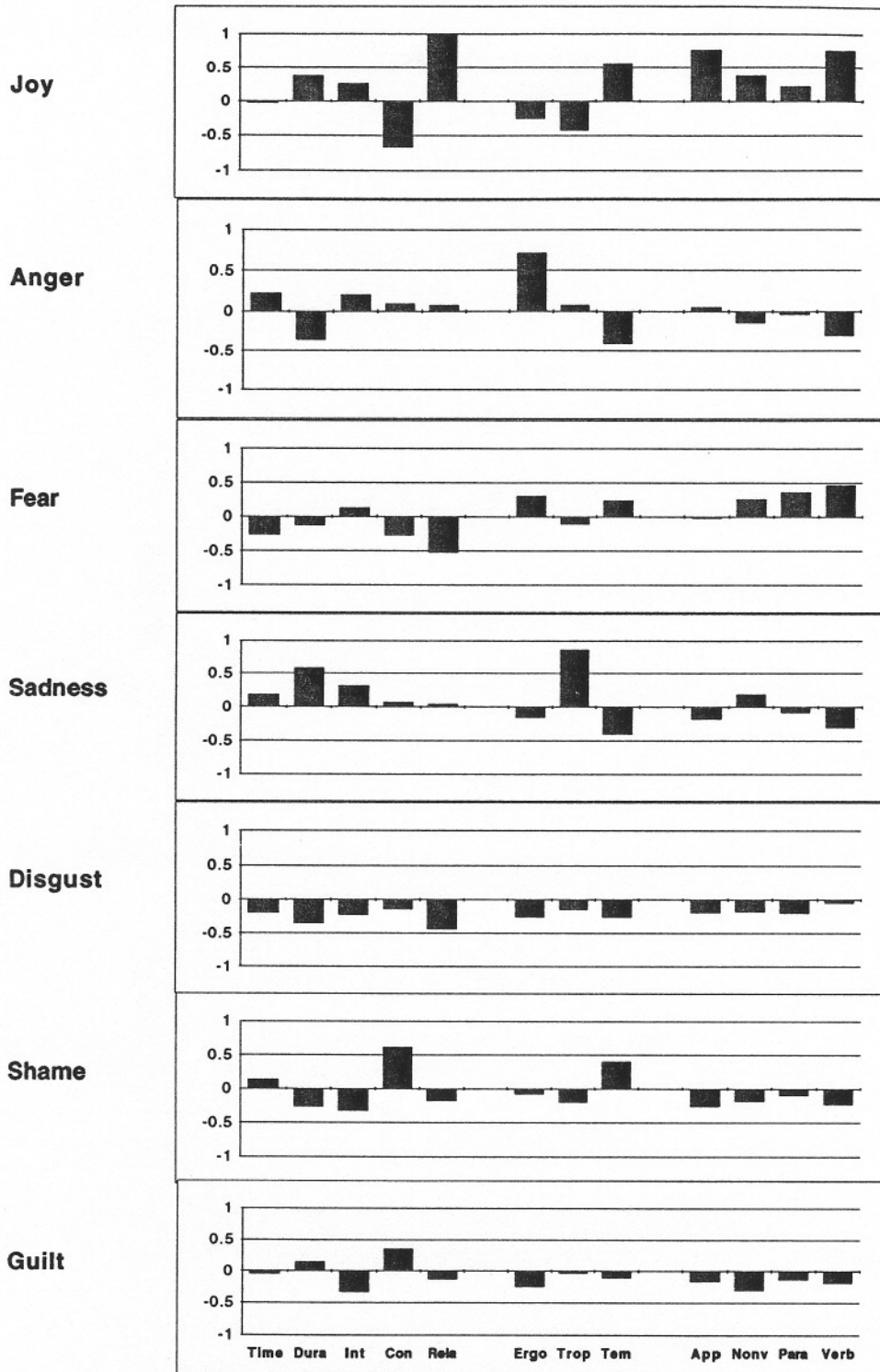


Figure 2. Standardized emotion profiles across subjective feeling, physiological symptoms, and motor expression patterns. Time = time distance of event; Dura = duration; Int = intensity; Con = control; Rela = effect on relationships; Ergo = ergotropic symptoms; Trop = trophotropic symptoms; Tem = felt temperature; App = approach/withdrawal behavior; Nonv = nonverbal expressions; Para = paralinguistic expressions; Verb = verbal behavior.

We hope the present results will de-ideologize the discussion between universalists and culturalists and encourage them to collaborate in order to understand how and to what extent the psychobiological phenomenon emotion is elicited, regulated, and experientially flavored by socio-cultural factors.²

What Is the Evidence for Specific Reaction Patterns—Subjective Feeling, Physiological Symptoms, Verbal, and Nonverbal Expression for the Major Emotions? Do These Patterns Correspond to Prior Predictions?

The data reviewed in this article show distinctive response patterns for subjective feeling, physiological symptoms, and expressive behavior on the basis of central tendencies of the variables under study. Because it has been possible to confirm a large number of predictions on the basis of earlier data, one can assume that these patterns are stable and replicable. In addition, the empirically established patterns can be meaningfully integrated with the adaptational function served by each of the specific emotions (as postulated by Darwin and other pioneers in the study of emotion). In this sense, we believe that the present state of the evidence favors a differential patterning position.

It is instructive to compare our data on symptom reports with a recent summary of the empirical evidence for autonomic nervous system (ANS) differences among emotions (Levenson, 1992). Levenson enumerated several aspects of ANS specificity that have been repeatedly found in his and other researchers' laboratories: heart-rate acceleration during anger, fear, and sadness; heart-rate deceleration during disgust and peripheral vascular differences between fear and anger. The correspondence between these totally different data sets is rather striking. Our data show that fear and anger elicit the highest ergotropic arousal reports (sympathetic activity, with heart-rate acceleration being a major factor). Although sadness ranks below the strong ergotropic levels for anger and fear, its *z* score in this domain is average. In fact, as shown in Table 8, for sadness, heart-rate change was reported with a frequency somewhat above average (and most certainly above normal; the heart-rate acceleration for sadness has been mostly found in comparison with neutral and joyful situations, see Levenson, 1992). Similarly, whereas reports of parasympathetic (trophotropic) activity for disgust are lower than for sadness or fear, it is significantly higher than joy (and most likely higher than neutral). Furthermore, the heart-rate deceleration observed in the experimental studies, which have mostly used disgusting slides (mutilation and the like) is probably partly due to an orienting response to these unusual stimuli. The experimental finding that fear is characterized by cooler surface temperatures, greater vasoconstriction, and lesser bloodflow in the periphery than anger is mirrored in the corresponding differences in the temperature reports we obtained.

Given the correspondence between experimental studies using psychophysiological measurement and our self-report data, it seems premature to claim that self-reported reactions only exist as socially constituted representations in our heads. In any case, the common experience of powerful basic emotions most likely produces a form of social representation that allows us to abstractly report on emotion patterning (see Scherer, 1992). If

such social representations were independent of universal biopsychological patterning, they should vary quite strongly across different cultures. In fact, if emotion as a phenomenon were primarily socially constituted, one would expect to find little overlap between the different representations. The data reported here, however, show rather massive overlap in the verbally reported patterning of emotional experience. The evidence, then, seems to support theories that postulate both a high degree of universality of differential emotion patterning and important cultural differences in emotion elicitation, regulation, symbolic representation, and social sharing.

² It should be noted that the conclusion that much of the verbally reported emotion reactions are universally shared is not interpreted as evidence of genetic determination. Although universality would seem a necessary condition for such inference, it is obviously not a sufficient one.

References

- Averill, J. R. (1980). A constructivist view of emotion. In R. Plutchik & H. Kellerman (Eds.), *Emotion. Theory, research, and experience* (Vol. 1, pp. 305–340). San Diego, CA: Academic Press.
- Averill, J. R. (1982). *Anger and aggression: An essay on emotion*. New York: Springer.
- Borg, I., Staufenbiel, Th., & Scherer, K. R. (1988). On the symbolic basis of shame. In K. R. Scherer (Ed.), *Facets of emotion: Recent research* (pp. 79–98). Hillsdale, NJ: Erlbaum.
- Boucher, J. D. (1979). Culture and emotion. In A. Marsella, R. Tharp, & T. Ciborowski (Eds.), *Perspectives on cross-cultural psychology* (pp. 159–178). San Diego, CA: Academic Press.
- Brislin, R. W. (1980). Translation and content analysis of oral and written material. In H. C. Triandis & J. W. Berry (Eds.), *Handbook of cross-cultural psychology. Methodology* (Vol. 2, pp. 389–444). Boston: Allyn & Bacon.
- Darwin, C. (1965). *The expression of the emotions in man and animals*. Chicago: University of Chicago Press. (Original work published 1872)
- Davitz, J. L. (1969). *The language of emotion*. San Diego, CA: Academic Press.
- Duffy, E. (1941). An explanation of "emotional" phenomena without the use of the word "emotion." *Journal of General Psychology*, 25, 283–293.
- Edelmann, R. J., Asendorpf, J., Contarello, A., Georgas, J., et al. (1987). Self-reported verbal and non-verbal strategies for coping with embarrassment in five European cultures. *Social Science Information*, 26, 869–893.
- Ekman, P. (1973). Darwin and cross-cultural studies of facial expression. In P. Ekman (Ed.), *Darwin and facial expression* (pp. 1–83). San Diego, CA: Academic Press.
- Ekman, P. (Ed.). (1982). *Emotion in the human face* (2nd ed.). Cambridge, England: Cambridge University Press.
- Ekman, P. (1984). Expression and the nature of emotion. In K. R. Scherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 319–344). Hillsdale, NJ: Erlbaum.
- Ekman, P. (1992). Facial expression of emotion: New findings, new questions. *Psychological Science*, 3, 34–38.
- Ekman, P., Levenson, R. W., & Friesen, W. V. (1983). Autonomic nervous system activity distinguishes between emotions. *Science*, 221, 1208–1210.
- Ekman, P., & Oster, H. (1979). Facial expression of emotion. *Annual Review of Psychology*, 30, 527–554.
- Foschi, M., & Hales, W. H. (1979). The theoretical role of cross-cultural

- comparisons in experimental social psychology. In L. H. Eckensberger, W. J. Lonner, & Y. H. Poortinga (Eds.), *Cross-cultural contributions to psychology* (pp. 247–254). Lisse, The Netherlands: Swets & Zeitlinger.
- Frijda, N. (1986). *The emotions*. Cambridge, New England: Cambridge University Press.
- Gardiner, H. M., Clark-Metcalf, R. C., & Beebe-Center, J. G. (1980). *Feeling and emotion: A history of theories*. New York: American Book. (Original work published 1937)
- Gellhorn, E. (1970). The emotions and the ergotropic and trophotropic systems. *Psychological Research*, 34, 48–94.
- Gergen, K. J. (1985). The social constructionist movement in modern psychology. *American Psychologist*, 40, 266–275.
- Greenwood, J. D. (1992). The social constitution of emotion. *New Ideas in Psychology*, 10, 1–18.
- Grossman, S. P. (1967). *Physiological psychology*. New York: Wiley.
- Gudykunst, W. B., & Ting-Toomey, S. (1988). Culture and affective communication. *American Behavioral Scientist*, 31, 384–400.
- Harré, R. M. (Ed.). (1986). *The social construction of emotions*. Oxford, England: Basil Blackwell.
- Heelas, P. (1984). Emotions across cultures: Objectivity and cultural divergence. In S. Brown (Ed.), *Objectivity and cultural divergence* (pp. 21–42). Cambridge, England: Cambridge University Press.
- Hochschild, A. R. (1983). *The managed heart*. Berkeley: University of California Press.
- Hofstede, G. (1984). *Culture's consequences: International differences in work-related values*. Beverly Hills, CA: Sage.
- Hofstede, G., & Bond, M. H. (1984). Hofstede's culture dimensions: An independent validation using Rokeach's value survey. *Journal of Cross-Cultural Psychology*, 15, 417–433.
- Izard, C. E. (1971). *The face of emotion*. New York: Appleton-Century-Crofts.
- Jahoda, G. (1980). Theoretical and systematic approaches in cross-cultural psychology. In H. C. Triandis & W. W. Lambert (Eds.), *Handbook of cross-cultural psychology: Perspectives* (Vol. 1, pp. 69–141). Boston: Allyn & Bacon.
- Levenson, R. W. (1992). Autonomic nervous system differences among emotions. *Psychological Science*, 3, 23–27.
- Levy, R. I. (1984). The emotions in comparative perspective. In K. R. Scherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 397–410). Hillsdale, NJ: Erlbaum.
- Lonner, W. J., & Berry, J. W. (1986). Sampling and surveying. In W. J. Lonner & J. W. Berry (Eds.), *Field methods in cross-cultural psychology* (pp. 85–110). Beverly Hills, CA: Sage.
- Lutz, C. (1982). The domain of emotion words on Ifaluk. *American Ethnologist*, 9, 113–128.
- Lutz, C. (1988). *Unnatural emotions: Everyday sentiments on a Micronesian atoll and their challenge to Western theory*. Chicago: University of Chicago Press.
- Lutz, C., & White, G. M. L. (1986). The anthropology of emotions. *Annual Review of Anthropology*, 15, 405–436.
- Mandler, G. (1984). *Mind and body: The psychology of emotion and stress*. New York: Norton.
- Mead, M. (1975). Review of Darwin and facial expression. *Journal of Communication*, 25, 209–213.
- Mesquita, B., & Frijda, N. H. (1992). Cultural variations in emotions: A review. *Psychological Bulletin*, 112, 179–204.
- Osgood, C. E., Suci, G. J., & Tannenbaum, P. H. (1957). *The measurement of meaning*. Urbana: University of Illinois Press.
- Piers, G., & Singer, M. B. (1971). *Shame and guilt*. New York: Norton.
- Plutchik, R. (1980). *Emotion: A psychobioevolutionary synthesis*. New York: Harper & Row.
- Rimé, B. (1983). Nonverbal communication or nonverbal behavior? Towards a cognitive-motor theory of nonverbal behavior. In W. Doise & S. Moscovici (Eds.), *Current issues in European social psychology* (Vol. 1, pp. 85–104). Cambridge, England: Cambridge University Press.
- Rimé, B., Philippot, P., & Cisamolo, D. (1990). Social schemata of peripheral changes in emotion. *Journal of Personality and Social Psychology*, 59, 38–49.
- Riskind, J. H. (1984). They stoop to conquer: Guiding and self-regulatory functions of physical posture after success and failure. *Journal of Personality and Social Psychology*, 47, 479–493.
- Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, 39, 1161–1178.
- Schachter, S., & Singer, J. E. (1962). Cognitive, social, and physiological determinants of emotional states. *Psychological Review*, 69, 379–399.
- Scherer, K. R. (1981). Wider die Vernachlässigung der Emotion in der Psychologie [Against the neglect of emotion in psychology]. In W. Michaelis (Ed.), *Bericht über den 32. Kongress der Deutschen Gesellschaft für Psychologie in Zürich 1980* (pp. 304–317). Göttingen, Germany: Hogrefe.
- Scherer, K. R. (1984a). Emotion as a multicomponent process: A model and some cross-cultural data. In P. Shaver (Ed.), *Review of personality and social psychology* (Vol. 5, pp. 37–63). Beverly Hills, CA: Sage.
- Scherer, K. R. (1984b). On the nature and function of emotion: A component process approach. In K. R. Scherer & P. Ekman (Eds.), *Approaches to emotion* (pp. 293–317). Hillsdale, NJ: Erlbaum.
- Scherer, K. R. (1986). Vocal affect expression: A review and a model for future research. *Psychological Bulletin*, 99, 143–165.
- Scherer, K. R. (1988a). Criteria for emotion-antecedent appraisal: A review. In V. Hamilton, G. H. Bower, & N. H. Frijda (Eds.), *Cognitive perspectives on emotion and motivation* (pp. 89–126). Dordrecht, The Netherlands: Martinus Nijhoff.
- Scherer, K. R. (Ed.). (1988b). *Facets of emotion: Recent research*. Hillsdale, NJ: Erlbaum.
- Scherer, K. R. (1989). Vocal correlates of emotion. In H. Wagner & A. Manstead (Eds.), *Handbook of psychophysiology: Emotion and social behavior* (pp. 165–197). London: Wiley.
- Scherer, K. R. (1992). On social representations of emotional experience: Stereotypes, prototypes, or archetypes? In M. von Cranach, W. Doise, & G. Mugny (Eds.), *Social representations and the social bases of knowledge* (pp. 30–36). Göttingen, Germany: Hogrefe & Huber.
- Scherer, K. R., Banse, R., Wallbott, H. G., & Goldbeck, T. (1991). Vocal cues in emotion encoding and decoding. *Motivation and Emotion*, 15, 123–148.
- Scherer, K. R., & Tannenbaum, P. H. (1986). Emotional experiences in everyday life: A survey approach. *Motivation and Emotion*, 10, 295–314.
- Scherer, K. R., & Wallbott, H. G. (1990). Ausdruck von Emotionen [The expression of emotion]. In K. R. Scherer (Eds.), *Enzyklopädie der psychologie. Band C/IV/3 Psychologie der Emotion* (pp. 345–422). Göttingen, Germany: Hogrefe & Huber.
- Scherer, K. R., Wallbott, H. G., Matsumoto, D., & Kudoh, T. (1988). Emotional experience in cultural context: A comparison between Europe, Japan, and the USA. In K. R. Scherer (Ed.), *Facets of emotion: Recent research* (pp. 5–30). Hillsdale, NJ: Erlbaum.
- Scherer, K. R., Wallbott, H. G., & Summerfield, A. B. (Eds.). (1986). *Experiencing emotion: A cross-cultural study*. Cambridge, England: Cambridge University Press.
- Schlosberg, H. A. (1952). The description of facial expressions in terms of two dimensions. *Journal of Experimental Psychology*, 44, 229–237.
- Schlosberg, H. (1954). Three dimensions of emotion. *Psychological Review*, 61, 81–88.