Culture and the Perception of Social Dominance From Facial Expression

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Eyebrow and mouth gestures, identified from nonhuman primate studies as potential human dominance gestures, were tested in a series of cross-cultural experiments. Pairs of human portrait photographs were shown to observers in 11 national/cultural settings. Some observers selected dominant-looking members from each pair, and others selected happier-looking members. When posed with lowered brows or nonsmiling mouths, portrait models were expected to look more dominant than when posed with raised brows or smiles, respectively. Models were expected to look happier when smiling than when not smiling. Results strongly supported a universal association between smiles and happiness and weakly supported a universal nonsmiling/dominance association but restricted a lowered-brow/dominance association to relatively more Westernized samples.

Humans possess powerful nonverbal expressive abilities as well as verbal ones. Humans share the facility for nonverbal expression with other primate species. These and related observations prompted theorists as early as Darwin to argue that there is evolutionary continuity between the expressive behaviors of human and nonhuman primates (Andrew, 1963; Darwin, 1872/1965; Hewes, 1973; Pitcairn & Eibl-Eibesfeldt, 1976).

Virtually all studied species of nonhuman primates use facial gestures to signal social status (dominance and submissiveness). These gestures help regulate relationships among conspecifics by forecasting the probable nature of impending interactions (Andrew, 1963; Chevalier-Skolnikoff, 1973; Marler, 1965). From an evolutionary perspective, it is reasonable to expect that homologous facial gestures exist for humans.

Some of the expressions that correspond to assertive and submissive behavior among Old World monkeys and apes involve differing eyebrow positions. Typically, the brows are lowered on dominant or threatening individuals and raised on submissive or recep-

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tive individuals (e.g., Andrew, 1963; Bolwig, 1964; Hinde & Rowell, 1962; Hooff, 1967; Redican, 1975). However, there are several exceptions to this pattern (e.g., Hooff, 1967, pp. 19–20; Redican, 1975, p. 109).[1]

Brow position has been found to influence human perceptions of social dominance, at least in the United States. College student observers viewed portraits of human models, each model photographed once with brows raised and once with them lowered. Observers viewing lowered-brow poses designated models as dominant more than observers viewing raised-brow poses did (Keating, Mazur, & Segall, 1977; Mazur & Stevens, Note 1). In addition, more observers perceived models as dominant-looking if they viewed models' nonsmiling poses rather than smiling poses (Keating et al., 1977). The latter result is consistent with the idea that the homologue to the human smile is the primate submissive grimace or grin (Hooff, 1967, 1972, p. 212).

With some exceptions (Zivin, 1976, 1977), human ethologists observing the behavior of Western school children have reported a correspondence between lowered-brow expressions and assertive behavior during free play (Blurton Jones, 1971; Brannigan & Humphries, 1972; Grant, 1969) and competitive tasks (Camras, 1977). Brow raising has been associated with fleeing during children's disputes (Blurton Jones, 1971). Though there is argument over its status as universal (Ekman, 1979), the rapid brow-raise, characteristic of greeting among diverse cultures, has been interpreted as a signal inviting social contact (Eibl-Eibesfeldt, 1972). Smiling has also been associated with greeting in both Western (e.g., Lockard, Fahrenbruch, Smith, & Morgan, 1977) and non-Western cultures (Eibl-Eibesfeldt, 1972). Among United States college females, smiling characterized approval-seeking behavior (Rosenfeld, 1966).

It seems that smiling and raised-brow expressions relate to social deference, whereas lowered-brow expressions relate to social dominance. The links between these gestures and status behaviors correspond to their universal role in emotional expression. Panculturally, lowered brows have been identified with anger, raised brows with fear or surprise, and smiles with happiness or joy (e.g., Boucher & Carlson, 1980; Ekman & Friesen, 1971; Ekman, Sorenson, & Friesen, 1969; Izard, 1971; cf. Kilbride & Yarczower, 1980). Although expressions of emotion and social status may overlap, the present research aimed to test the universality of brow and mouth gestures as expressions of social dominance/submission without presuming underlying emotional correlates.

Overview

Observers in several national/cultural settings responded to a standard series of paired, portrait photographs depicting human models posed with either raised and lowered brows or with smiling and relaxed mouths. Within each culture, some observers were instructed to choose the more dominant-looking individual from each portrait pair. Others made choices based on appearances of happiness. Thus, within each culture, the same model pairs were viewed by some observers judging dominance and others judging happiness. Provided that the task was meaningful to observers, smiling poses should predominate "happy" choices for a majority of observers from each culture. Results diverging from this expected relationship served as an alert to methodological or communication problems (Campbell, 1964). If the hypothesized relationships between brows, smiles, and status were correct, lowered-brow poses and nonsmiling poses should be disproportionately selected as dominant. Since brows were hypothesized to have special significance as a cue for dominance, we expected a reliable relationship to emerge between brow position and dominance choices but not between brow position and happiness choices. These hypothesized relationships were expected to hold regardless of model characteristics (i.e., ethnic variations in facial physiognomy) or observer characteristics (i.e., culture group or gender).

[1] Some of these exceptions involve species characterized by raised-brow, eyelid threats, a display thought to have evolved independently or have been exclusively maintained in these species (Bernstein, 1970).

After viewing and responding to the photographic stimuli, observers viewed pairs of cartoon faces by which brow and mouth expressions were schematically represented. These data are mentioned only briefly here but are fully reported elsewhere (Keating et al., Note 2).

Limitations

Cross-cultural variability has often been the basis for disclaiming genetic influences on observed behavior. Considering the behavioral plasticity of humans, however, many nonuniversal behavioral traits may comprise overriding, culture-specific learning, which masks common genetic foundations. To the extent that cultures are environmentally distinct and socially remote from one another, members presumably undergo different learning, so that pancultural consistency in the interpretation of facial gestures may be construed as genetically inspired. However, all behavior is constrained by genetic factors at some level, and though the discovery of universal interpretations of gestures may be used to infer phyletic homologies, other explanations are feasible. For instance, raised brows might be universally identified among humans as submissive due to a universal experience with children's facial expressions: Children everywhere must look up (not down) at (taller) adults, perhaps raising their brows to see better (Guthrie, 1976). Thus, conclusions to be drawn from evidence of behavioral universals must be properly circumspect.

Method

Subjects

Between 1976 and 1979, data were collected in the United States from university students in Fort Worth, Texas (n = 150), and Syracuse, New York (n = 202).[2] Chinese students and relatives residing in Syracuse also participated as observers (n = 98). Responses were gathered from 138 observers (mostly university students) in Konstanz, Germany. High school students in Kenya (n = 166); high school students plus local workers in Zambia (n = 198); local workers (n = 93) and students (n = 181) in the Canary Islands, Spain; and peasant farmers and laborers from rural villages in Colombia (n = 200), Brazil (n = 171), and Thailand (n = 200) were all sampled. Illiteracy among each of the latter two samples was estimated at more than 90%, and their contact with Western culture, relatively rare.

Procedure

Construction of stimulus materials. The black and white portrait photographs serving as stimuli were taken by a photographer who was unaware of the experimental hypotheses. To control for facial idiosyncrasies, each photographic model was photographed in two different poses. Some were instructed to pose with brows lowered, then raised, and others were instructed to pose with mouths relaxed, then slightly smiling. By comparing observers' responses to different poses of the same models rather than to different models, the models served as their own controls for facial idiosyncrasies.

Precautions were taken to ensure that the only difference between each model's two poses was brow (or mouth) position. The 76 portraits included as stimuli represented 38 models whose two poses were judged (by naive judges) to contain virtually no unwanted variation between them.[3] In all portraits, models appeared with direct gazes.

To control the number of times observers viewed models, the two photographs for each of the 38 models were separated into two different stimulus series, A and B. By viewing either Series A or B, observers saw each model once, in only one pose. Then, to keep observers' task simple and easy to communicate, each portrait was paired with another in which the counterpart brow (or mouth) position was posed by a different model. By asking observers to select the more dominant-looking individual of a pair, the task became a two-choice judgment procedure used successfully among diverse cultures (Ekman & Friesen, 1971).

Each portrait pair was printed on a 35.6 cm × 19 cm page in black/white halftones. Heads measured 16–18 cm from chin to crown. In both Stimulus Series A and B, each of 19 portrait pairs compared the same two models shown in the same randomly determined serial order and (left/right) position on the page. Seven pairs with contrasting mouth poses were interspersed among 12 pairs with contrasting brow poses in each series. Similarities maintained between members of each portrait pair included sex (6 female and 13 male pairs), ethnic grouping (3 Oriental–Polynesian, 4 African–Afro-American, 1 Indian subcontinent, and 11 Euro-American pairs), age (range 20–55 years), apparent distance, head size, eye level, and facial hair. The distinguishing difference, then, between Series A and B corresponding pairs was that each model reversed poses. If a pair in Series A showed Max with lowered brows and Joe with raised brows, then in Series B Max appeared with raised brows and Joe with lowered brows. Representative stimulus photographs appear in Figure 1. A photographic slide version of the stimuli was also produced.

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[2] Data from these Syracuse University students, previously reported in Keating et al. (1977), are reanalyzed here for purposes of comparison.

[3] It was impossible to expect that other facial aspects would remain perfectly identical from one pose to the next. For instance, there was a tendency for the eyes to widen in the raised-brow pose.

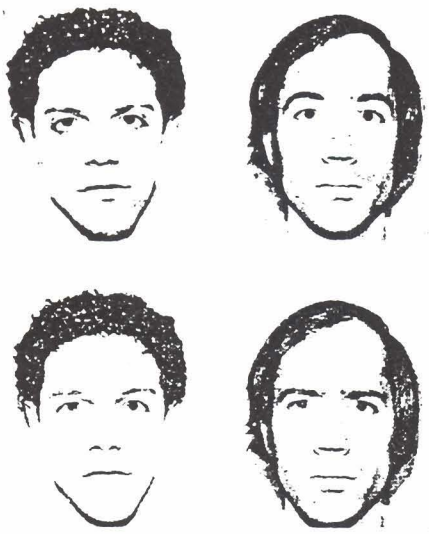

Figure 1. Representative stimulus face pairs.

Testing. Observers were instructed in their native language. (Kenyans performed in their national language, English). The English-language instructions were written to be readily translatable, and "back translation" procedures (Brislin, Lonner, & Thorndike, 1973, p. 33) were used everywhere but Germany and the Canary Islands. The observers' task was introduced by a five-item comprehension check requiring them to select one of two faces based on deliberately obvious criteria like size.[4] Next, observers were shown either Series A or Series B photographs and instructed to make judgments of dominance or happiness. Those judging dominance were told: "A dominant person usually tells other people what to do, and is usually respected. A dominant person seldom submits to others." Observers judging happiness were told: "A happy person is usually content, glad and pleased. A happy person is seldom sad." Observers then viewed each face pair and made their independent selections.

Field conditions sometimes made independent viewing impractical, and some experimenters were forced to improvise. In particular, Thai observers, seated one behind the other in rows of six, viewed the stimulus photographs together. Judgments were kept independent by requiring the last observer in each row to silently signal his/her response first, then the next-to-last observer, and so forth. Most experimenters with access to populations from urban or school settings used photographic slides to present the stimuli to groups of observers. In these cases (Texas, Germany, Canary Island students, and Kenya), observers recorded their own independent responses.

Dependent Measures

Each observer earned two scores, one based on judgments of the 12 brow-gesture pairs and the second based on judgments of the 7 mouth-gesture pairs. Observers were scored for selecting certain models. For the first score, each observer viewing Series A earned from 0 to 12 points depending on the number of times lowered-brow models were selected from the 12 face pairs contrasting models with varied brow poses. Observers from Series B earned from 0 to 12 points for choosing the same models but with raised brows, since models reversed poses between series. Series A observers were thus scored for choosing predicted, lowered-brow poses and served as a reference group against which Series B observers, scored for choosing the same models but with nonpredicted (raised-brow) poses, could be compared. For the second score, Series A observers earned up to 7 points based on the number of times nonsmiling models were selected from pairs contrasting mouth positions. Again, Series B observers were given points for choosing these same models, though models posed with smiles.[5] Given our dichotomous-choice situation, scores were based on selections of only one model from each pair, since scores based on the other portrait pair member would merely duplicate results.

Both scores for each observer were converted to proportions (score over 12 or 7 for brow pairs and mouth pairs, respectively). The mean score (equivalently, the mean proportion of models selected) for Series A observers was later compared with that for Series B observers who viewed the same face pairs but with poses reversed.

Design and Analysis

Observers in each cultural setting were randomly assigned to groups. Observers judged either dominance or happiness and viewed either Stimulus Series A or B, resulting in four groups: dominance–Series A, dominance–Series B, happiness–Series A, and happiness–Series B.

Data from each sample were analyzed independently as for separate experiments, and culture was not treated as a variable. This approach was warranted, since culture was confounded with experimenter effects, observer characteristics like age and sex, year of data collection, and, to a degree, experimental procedure. For each sample, a 2×2 factorial design comprised judgment criteria (dominance or happiness) and stimulus series (A or B). All Chinese observers judged dominance, however, due to a small sample size. Where field conditions permitted the recruitment of sufficient numbers of both male and female observers, observers' gender was added as a factor.

Since observers contributed two scores, two separate overall analysis of variance tests were performed for

[4] Experimenters in the Canary Islands and Germany reported that the comprehension items were unnecessary and omitted them.

[5] Series A observers were arbitrarily selected to be scored for predicted dominance choices on brow and mouth poses. For groups judging happiness, Series B observers were scored for choosing predicted poses and served as a reference group for Series A observers.

each sample, one using responses to brow gestures, and the other using responses to mouth gestures as the dependent measure. A regression approach to analysis of variance was used (Cohen & Cohen, 1975). Individual scores were proportions, which meant that in violation of regression assumptions, means and variances were related. A standard arc sine transformation, $2 \times$ arc sine $\sqrt{\text{proportion}}$, was applied to each score to stabilize the variance (Winer, 1971, p. 400).

The manner in which stimulus faces were selected precluded counterbalancing model characteristics like sex and facial physiognomy within gesture types for all samples. However, within some samples, it was possible to test relationships between the impact of gestures and general facial characteristics, which varied with models' ethnic grouping. Using samples as units of analysis, relationships between ranked cultural similarity and effect sizes of gestures were explored.

Results

Ignoring statistical significance for the moment, consider the general pattern of results that emerged for each of the four hypothesized associations between facial cues and judgments. Smiles and happiness were associated as expected in all 10 of the 10 samples tested, nonsmiles and dominance in 11 of 11 samples, lowered brows and dominance in 8 of 11 samples, and, unexpectedly, raised brows and happiness in 8 of 10 samples. The following sections describe, first for mouth and then for brow gestures, statistical comparisons between group mean scores for each separate sample. For ease of communication, Figures 2 through 5 present the mean scores for groups of observers as mean proportions. Means for statistical tests, however, were based on the transformed scores.

Within-Sample Analyses

Mouth gestures. Differences between groups of observers judging happiness are represented in Figure 2. The nonshaded bar in Figure 2 indicates for each sample the mean proportion of models chosen by observers (happiness–Series B) scored for selecting smiling models as happier-looking across all seven face pairs contrasting smiling and nonsmiling mouths. The mean proportion of these same seven models picked by those observers scored for selecting nonsmiling poses (happiness–Series A) is shown for each sample by the shaded bar in Figure 2. As Figure 2 indicates, models were selected more frequently when smiling. Mean differences were significant beyond the .001 level for each sample: Canary Island workers, $t(89) = 5.56$; Canary Island students, $t(177) = 13.26$; Brazil, $t(167) = 4.78$; Colombia, $t(192) = 11.51$; Germany, $t(135) = 10.28$; Kenya, $t(162) = 13.2$; New York, $t(194) = 20.28$; Texas, $t(146) = 18.56$; Thailand, $t(196) = 17.05$; and Zambia, $t(190) = 10.72$. Confirmation of the previously established association between smiles and happiness suggested that our observers were responding to the experimental task in a meaningful fashion.

Other observers judged dominance. When posed without smiles, were models more often perceived as dominant than when posed with smiles? For each sample, Figure 3 contrasts the mean proportion of models picked by observers selecting their smiling poses (nonshaded bar groups, dominance–Series B) with the mean proportion picked by observers selecting their nonsmiling poses (shaded bar groups, dominance–Series A). Statistical comparisons confirmed that Canary Island workers, $t(89) = 2.18$, $p < .05$, and students, $t(177) = 12.67$, $p < .001$; Brazilians, $t(167) = 5.1$, $p < .001$; Colombians, $t(192) = 9.69$, $p < .001$; Germans, $t(135) = 3.19$, $p < .001$; New Yorkers, $t(194) = 9.35$, $p < .001$; Chinese, $t(94) = 3.94$, $p < .001$; Thais, $t(196) = 5.94$, $p < .001$; and Zambians, $t(190) = 4.00$, $p < .001$, chose models more frequently as dominant when they portrayed the nonsmiling pose. A similar trend for Kenyans judging dominance was not statistically significant, $t(162) = .20$, but for Texans was marginally significant, $t(146) = 1.83$, $p < .10$.

Brow gestures. Observers judging dominance and those judging happiness also viewed models portraying brow gestures. Figure 4 shows unexpected differences between the mean scores of observers judging happiness for raised-brow (nonshaded bar groups, happiness–Series B) and lowered-brow poses (shaded bar groups, happiness–Series A). On the average, models' raised-brow poses were selected as happier significantly more often than their lowered-brow poses among the two United States samples, New York, $t(194) = 7.46$, $p < .001$, and

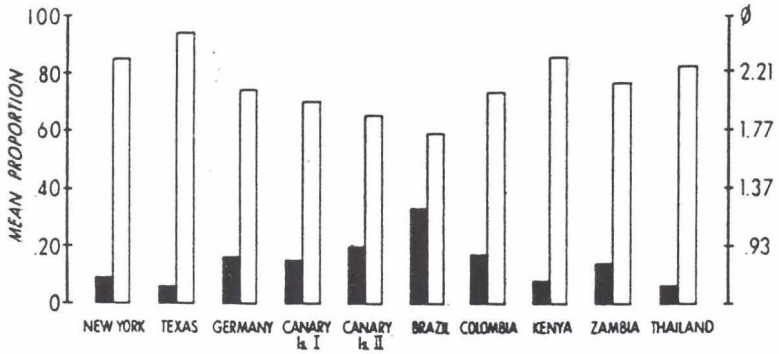

Figure 2. Mean proportion of models' smiling and nonsmiling poses chosen by observers as happy. (Shaded bars indicate nonsmiling poses; nonshaded bars indicate smiling poses. Statistical tests were done using the arc sine transformation [Ø].)

Texas, $t(146) = 8.27$, $p < .001$; Germans, $t(135) = 4.37$, $p < .001$; Canary Island students, $t(177) = 5.42$, $p < .001$; Colombians, $t(192) = 3.00$, $p < .005$; and the two African samples, Kenya, $t(162) = 2.45$, $p < .02$, and Zambia, $t(190) = 1.99$, $p < .05$.. The predominant choices among Thai groups judging happiness were lowered-brow poses, $t(196) = -3.62$, $p < .001$. Similar comparisons for Canary Island workers, $t(89) = .13$, and Brazilians, $t(167) = -.37$, were nonsignificant.

Did brow pose influence observers judging dominance? Figure 5 indicates that the predicted lowered-brow dominance choices prevailed among some of the samples. Models were more often perceived as dominant when posed with lowered brows (shaded bar group, dominance–Series A) than raised brows (nonshaded bar group, dominance–Series B) among Brazilians, $t(167) = 3.16$; Canary Island workers, $t(89) = 5.2$, and students, $t(177) = 10.22$; Chinese males, $t(94) = 7.85$, and females, $t(94) = 4.18$; Germans, $t(135) = 6.79$; New Yorkers, $t(194) = 17.86$; and Texans, $t(146) = 11.7$ (all $ps < .002$). Models' raised-brow poses were significantly more likely to be chosen among Thai observers who judged dominance, $t(196) = -2.13$, $p < .05$. Group differences in response to brow poses were not significant for Colombia, $t(192) = 1.05$; Kenya, $t(162) = -.63$; or Zambia, $t(190) = -.18$.

Observer characteristics: Gender. Information about the influence of sex of observer on judgments was available for the New York, Chinese, Colombian, and Zambian samples. The results for these samples were reported earlier without specific mention of gender effects.

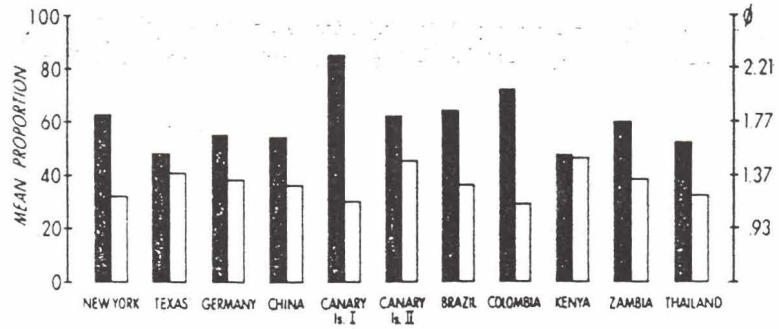

Figure 3. Mean proportion of models' smiling and nonsmiling poses chosen by observers as dominant. (Shaded bars indicate nonsmiling poses; nonshaded bars indicate smiling poses. Statistical tests were done using the arc sine transformation [Ø].)

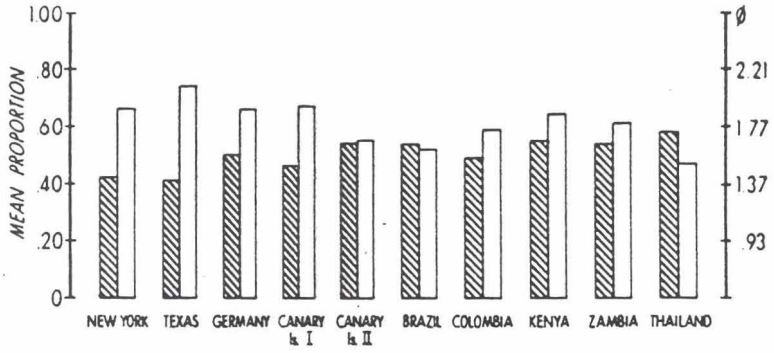

Figure 4. Mean proportion of models' lowered- and raised-brow poses chosen by observers as happy. (Shaded bars indicate lowered-brow poses; nonshaded bars indicate raised-brow poses. Statistical tests were done using the arc sine transformation [Ø].)

Gender differences were sporadic and characterized by small (≤2%) effect sizes. In fact, no significant gender differences emerged for Colombia or Zambia. Among Chinese observers (all of whom judged dominance), a significant Pose × Gender interaction occurred in response to brow gestures, $F(1, 94) = 3.93$, $p < .05$. (Thus, the planned comparisons reported above for brow gestures were performed separately for each sex.) Post hoc comparisons revealed that Chinese males chose lowered-brow poses somewhat more consistently than did females, $t(94) = 2.46$, $p < .02$.

For New York, the planned comparisons reported earlier combined male and female responses, since there was no significant interaction involving gender, judgment criteria, and facial pose for either brow or mouth gestures. A significant Pose × Gender interaction did result for mouth gestures, $F(1, 194) = 9.29$, $p < .01$. Collapsed across judgment criteria (dominance/happiness), post hoc comparisons revealed that males scored for choosing models' nonsmiling poses chose these poses more often, on average, than did females who were similarly scored, $t(194) = 2.73$, $p < .01$. Males scored for choosing smiling poses (regardless of judgment criteria) picked them less frequently than their female counterparts, $t(194) = -2.13$, $p < .05$. Irrespective of judgment criteria, smiling poses were chosen more consistently than nonsmiling poses by both males, $t(194) = -2.05$, $p < .05$, and females, $t(194) = -6.9$, $p < .001$.

Model characteristics: Facial physiognomy. Observers from each Caucasian sample (New Yorkers, Texans, Germans, Canary Island students and workers, Bra-

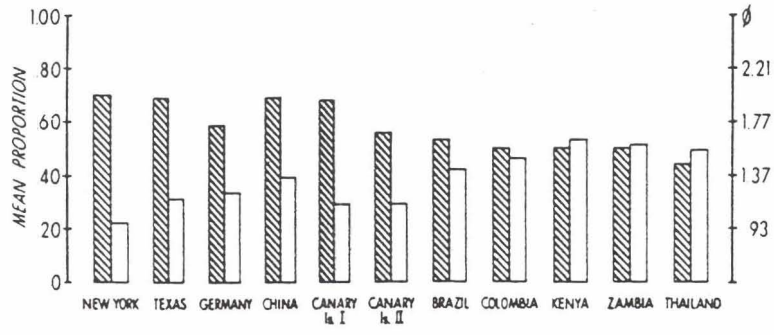

Figure 5. Mean proportion of models' lowered- and raised-brow poses chosen by observers as dominant. (Shaded bars indicate lowered-brow poses; nonshaded bars indicate raised-brow poses. Statistical tests were done using the arc sine transformation [Ø].)

zilians, and Colombians) viewed six models who posed brow gestures but had relatively dissimilar or unfamiliar facial characteristics (Oriental–Polynesian, African–Afro-American, and Indian–subcontinent models). For each Caucasian sample, a point-biserial correlation coefficient was calculated between model type (similar physiognomy = 1, dissimilar physiognomy = 0) and a measure of the effectiveness of each model's brow gesture. The latter measure was simply the percentage-point difference between the proportion of observers selecting a given model posed with lowered brows as dominant and the proportion of observers selecting the same model posed with raised brows as dominant.

For New York, Texas, Germany, Canary Island workers, Canary Island students, Brazilians, and Colombians, point-biserial correlations were, in order, −.06, .43, .01, −.19, −.16, .25, and .05, with corresponding t values of −.19, 1.51, .03, −.6, −.51, .86, and .14. None of these t values exceeded levels of chance ($df = 10$, where alpha = .05).[6] Thus, observer familiarity with models' facial physiognomy did not consistently increase or decrease the effectiveness of brow cues in altering dominance perceptions, at least for these samples. Too few smiling/nonsmiling models were included as stimuli to attempt similar analyses.

Summary of comparisons. Results of the group comparisons for each sample are summarized in Table 1. Table 1 describes which (if any) facial pose compelled observers to attribute dominance or happiness to models. Measures of effect size for each gesture were also determined. For the analysis of brow gestures and mouth gestures separately, the proportion of the total variability of observer choices attributable to facial pose variations was calculated for each sample.[7] The resulting measures of effect size are presented in Table 1.[8]

The summary of results in Table 1 was based on responses averaged across stimulus face pairs. But an item-by-item (face pair by face pair) look at responses revealed similar patterns. For example, examination of the proportion of observers selecting a particular pair member as happier showed, for each sample, that 7 of 7 models were chosen more often in their smiling than nonsmiling pose. The number of models picked as dominant more frequently when shown without smiling was 6 or 7 (of 7) for all samples except Texas and Kenya, for which the number was 5. In Thailand, Kenya, Zambia, and Colombia, 7 or fewer of 12 brow models were chosen as dominant more often when posed with lowered than raised brows, but everywhere else at least 11 models were. The number of brow models picked more often as happier-looking when posed with raised brows ranged from 4 of 12 in Thailand to 11 of 12 in Texas.

Samples as Units of Analysis

A good deal of the apparent uniformity of effects across samples, outlined in Table 1, may be due to sampling bias. The subpopulations assembled in this research in no way represent a random sampling of world cultures. Cultural overlap among the samples under study would inflate any index of the universality of effects (Campbell & Naroll, 1972).

To check the cross-cultural generalizability of the findings summarized in Table 1 while accounting for the predominance of

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[6] Since significance with 10 df requires such large effects, it is also worth noting that, taken together, the ts show no directional consistency either. Still, these tests may be controversial, since effectiveness measures for both model types were based on the same sets of observers.

[7] Orthogonal contrasts were calculated (Kirk, 1968, pp. 70–72) to determine the proportion of total variation due to predicted differences between group means. First, a weighted sum of cell means (M_i) was constructed as for hypotheses of the form Ho: $\mu_1 = \mu_2$. The weights were $H = (1)M_1 + (-1)M_2 + (0)M_3 + (0)M_4$, where the sum of the weights adds to zero. The proportion of between-cell variation was derived from $H^2/\Sigma\ (C_j^2/N_j)$ where C_j = weight for M_j. This portion of variation was then divided by the total variation to determine the proportion of total variation attributable to predicted differences between group means.

[8] For example, about 32% of the variability in response to mouth gestures was produced among Colombians by differences between groups judging happiness, whereas 19% was due to differences between groups judging dominance. Less than 1% (.0053) of the variability in response to brow gestures was owed to differences between Colombian observers judging dominance, whereas those judging happiness contributed 4% variation.

Table 1
Facial Poses and Effect Sizes Associated With Dominance and Happiness

	Mouth				Brow			
	Happiness		Dominance		Happiness		Dominance	
Sample	Pose	r^2	Pose	r^2	Pose	r^2	Pose	r^2
New York (1)	smiling	.58	nonsmiling	.12	raised	.09	lowered	.54
Texas (1)	smiling	.69	nonsmiling	.01[a]	raised	.18	lowered	.36
Germany (2)	smiling	.42	nonsmiling	.04	raised	.07	lowered	.22
Chinese/U.S. (2)	—[b]	—	nonsmiling	.14	—[b]	—	lowered	.39
Canary students (2)	smiling	.32	nonsmiling	.29	raised	.09	lowered	.33
Canary workers (2)	smiling	.25	nonsmiling	.04	—	.03[c]	lowered	.22
Brazil (4)	smiling	.11	nonsmiling	.12	—	.00[c]	lowered	.06
Colombia (3)	smiling	.32	nonsmiling	.19	raised	.04	—	.01[c]
Kenya (3)	smiling	.52	—	.00[c]	raised	.03	—	.00[c]
Zambia (3)	smiling	.35	nonsmiling	.05	raised	.02	—	.00[c]
Thailand (4)	smiling	.52	nonsmiling	.06	lowered	.06	raised	.02

Note. Effect sizes (r^2) indicate the proportion of total response variation due to contrasting poses. Cultural similarity rank is shown in parentheses.
[a] Marginal significance ($p < .10$). [b] Data not collected. [c] No significant effect.

Westernized samples, a scaling system was devised and each sample ranked for its similarity to United States/urban culture.[9] First, each sample received 1 point for each of the following criteria when for at least 90% of the sample, (a) language facility was greatest with a non-English language, (b) interpersonal contacts were predominantly non-Western, and (c) observers were illiterate. Second, the relative effectiveness of varied poses for each judgment criteria was ranked across samples. The effect size measure, presented in Table 1, was the proportion of observer choice variability attributable to choice differences between groups viewing contrasting poses of a set of models. Rankings for effect size (variation due to pose) and cultural similarity (using American culture as a reference point) for the four major effects (see Table 1) were submitted to a correlational analysis. Only one sample per nation was included.[10]

If lowered-brow dominance cues were predominantly Western, a large, positive correlation between each list of ranks should result. If lowered-brow dominance cues were not constrained to Western cultures, then rankings of effect size should not vary directly with rankings of cultural similarity (with reference to American culture). In fact, Kendall's tau (τ) coefficient was .65, indicating a significant monotonic relationship between the two sets of ranks ($p < .05$) (Siegel, 1956). Ranked cultural similarity to the United States was associated with the relative effectiveness of lowered-brow dominance cues.

The same type of agreement emerged between the ranked effectiveness of raised-brow happiness cues and cultural similarity ranks ($\tau = .71$, $p < .05$). Again, effectiveness of brow cues was related to similarity to American culture.

Was the effectiveness of nonsmiling dominance cues confined to related culture groups? Rankings for the effectiveness of nonsmiling poses and for cultural similarity to the United States produced a nonsignificant tau coefficient of $-.34$, $p > .15$. Cue effectiveness and culture showed no important monotonic relationship in this case.

The ranked effectiveness of smiling poses for groups judging happiness also showed no monotonic relationship with cultural similarity rankings ($\tau = .28$, $p > .15$).

[9] We use *Westernized* to describe samples that were relatively more urbanized, or industrialized, or modernized.

[10] We report correlations omitting the New York and Canary Island student samples. Essentially the same results were obtained when these samples replaced the Texas and Canary Island worker samples in the analysis.

Discussion

Smiles were identified with happiness perceptions panculturally, as previously established (e.g., Ekman, Frieser, & Ellsworth, 1972; Izard, 1971). When contrasted with smiles, nonsmiling poses had a modest but culturally pervasive impact on dominance attributions. Nonsmiling mouths emerged as a dominance cue among some of the most (e.g., New York) and least (e.g., Thailand) Westernized samples. Only observers from Kenya were exempt from this pattern, showing no significant bias toward either mouth position when judging dominance.

Brow cues failed to produce reliable, culturally invariant attributions of social status. Lowered brows served as a dominance cue mostly among Westernized samples, where brows were highly effective in altering dominance perceptions. Lowered brows and dominance were also associated in rural Brazil, but weakly. In contrast, raised brows characterized the dominance choices of rural Thais. Raised brows were often associated with happiness attributions, particularly among Western samples, though the association was typically weak.

These findings are consistent with results for comparable cartoon face stimuli, with one important discrepancy (see Keating et al., Note 2). Only observers from New York, Texas, and Thailand, and the Canary Island students reliably selected a nonsmiling cartoon face as dominant over its smiling cartoon counterpart. Though no significant contradictory cartoon results emerged among the remaining samples, support for the nonsmiling-mouth/dominance association is further qualified.

In sum, the evidence strongly supported a universal association between smiles and happiness and weakly supported a universal nonsmiling/dominance association but restricted the lowered-brow/dominance association to the relatively Western samples. As far as could be determined, neither observers' gender nor familiarity with models' ethnic facial characteristics had any important influence on dominance attributions.

We inferred that our judgment procedure was meaningful to observers from remote places when smiling poses related to happiness judgments. But we cannot be sure whether the concept of dominance was as readily understood as happiness in all cultures. It did not appear, at least, that the less-Westernized samples had special difficulty with the dominance instructions. Had this been the case, significant correlations between the Westernization and gesture effect size measures would be expected for dominance judgments involving either gesture. Instead, such relationships emerged exclusively for brow gestures.

Even the happiness instructions resulted in a few odd results. Curiously large proportions (6%–11%) of observers from some samples (i.e., Canary Island workers, Brazil, Colombia, and Zambia) selected fewer than two of seven smiling faces as happy. Smiling/nonsmiling poses had a peculiarly weak effect on Brazilians judging happiness (but not those judging dominance). Maybe smiling is not as persistently associated with emotional experience as previously thought (Kraut & Johnston, 1979), especially when smiles are as subtle as those portrayed here.

Why did the correspondence between nonsmiling mouths and dominance perceptions extend to all cultural samples but Kenya? Perhaps the concept of dominance evoked a negative connotation everywhere (but Kenya) on which its association with nonsmiling (less happy-looking) facial poses was based. Kenyans, recall, were tested in their national rather than native tongue. But why would the nonsmiling/dominance association be so weak for Texans and Canary Island workers but strong for New Yorkers and Canary Island students? The meanings of dominance should have been the same for both United States and both Canary Island samples. Perhaps there are regional variations in the interpretation of nonsmiles/smiles as Seaford (1978) found for the way that people smile.

The more subtle effects of smiling should not be ignored (Zivin, Note 3). Particularly in some societies, the most effective strategy during dominance interactions may involve the manipulation of others (e.g., Dawkins & Krebs, 1978) by clever (or "polite") portrayals of deference. Thus, a case might be

made for a power of a smile and smiling identified with social dominance as well as subordination.

Cross-cultural discrepancies implicate factors affecting data quality, especially in studies like this one where what was called "culture" involved much more than that. Modifications of the standard procedure were left to the discretion of each experimenter, hence the inevitable confounding of culture with these and other experimenter-based effects. Some might argue (Triandis, Malpass, & Davidson, 1971), however, that in the face of such an array of differences characterizing culture, the consistency we did observe is all the more impressive.

Despite discrepancies, the regularity with which mouth position affected status attributions among observers from socially distinct, geographically distant groups suggests underlying phyletic constraints consistent with Hooff's (1972) argument that the homologue to the human smile is the primate submissive grin. But what do cultural differences in the interpretation of brow position imply? Possibly the proposed brow status gestures have no phyletic basis and are products of cultural invention much like the superficial elements of language. Alternatively, socialization in some cultures may have obscured phyletic underpinnings. Social experience clearly plays an important role in the manifestation of gestural communication among humans (Gewirtz, 1965; Kilbride & Kilbride, 1974; Wolff, 1963) as it does among nonhuman primates (Mason & Hollis, 1962; Miller, Caul, & Mirsky, 1967). Thus, cultural variation in the interpretation of brow gestures may reflect differences in cultural display rules (Ekman et al., 1972; Klineberg, 1940), which restrict certain (brow?) dominance gestures and modify their interpretation. Cross-cultural studies of developmental trends in responses to facial gestures would help determine whether culture modifies their meaning.

Reference Notes

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2. Keating, C. F., et al. *Cross-cultural perceptions of dominance and happiness from schematic faces.* Manuscript in preparation, 1980.
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