

PAUL EKMAN, KAREN A. BRATTESANI, MAUREEN O'SULLIVAN, WALLACE V. FRIESEN

smiling under both smiling/sex differences and the reverse. I then look in a single alphabetized 5 x 8 card file for the complete reference with whatever notes I have made, and/or a single alphabetized or numbered reprint file for the full article. John DeLay, who wrote the COBOL program, assures us that it is both simple and adaptable, for example, to reference numbers instead of references, to more or fewer index terms, or to other types of index information. CPU time for a run with 1200 references is three minutes on an IBM 370/125-2 computer. Core requirement is about 38K.

The biggest investment of time is in the coding of references already in your files. The major fringe benefit of this process is likely to be the purging of articles you saved for the manuscript you never wrote or the lecture you wish you hadn't. After that it's a simple matter to establish the coding habit, facilitated by leaving coding sheets wherever you are likely to read *Current Contents*, open your mail, or otherwise discover a paper you might want to retrieve at a later date.

For a copy of the sort program and a sample of the output, write to me, Department of Psychology, Eastern Kentucky University, Richmond, KY 40475.

I am grateful to John DeLay and Ed Lott for providing the programming expertise, and to the Fort Hays State University Research Committee for a grant for initial support.

Article

Does Image Size Affect Judgments of the Face?

Paul Ekman
Karen A. Brattesani
Maureen O'Sullivan
Wallace V. Friesen

ABSTRACT: Whether the video-image of the face was larger than life or about one-fifth life size made no difference in observers' judgments of emotions, attitudes, and personality traits.

Many studies have shown groups of observers videotaped samples of nonverbal behavior. The questions asked have been quite varied; for exam-

This research was supported by a grant from NIMH, MH 11976. The preparation of this report was supported by a grant from the Harry F. Guggenheim Foundation, and by a Research Scientist Award, MH 06092 from NIMH. Paul Ekman and Wallace V. Friesen are affiliated with the University of California, San Francisco. Karen Brattesani is affiliated with the University of California, Berkeley. Maureen O'Sullivan is affiliated with the University of San Francisco.

ple, are judgments accurate, is encoding skill related to decoding skill, does the information provided by the face differ from that provided by body, speech or voice? If the video shows the entire face and body the image is usually smaller than life size, perhaps depriving an observer of many details available when judgments are made in face-to-face interactions. While size reduction might not impair judgments based on hand movement or posture where the scope of movement is large, size reduction could cause the observer to miss many facial actions, which are smaller. This study investigated whether judgments of emotions, attitudes and traits from observers who saw a larger than life-size video image of the face differed from judgments made by observers who saw the small reduced facial image available in most studies of nonverbal communications.

METHOD

The stimulus materials were black and white videotapes recorded in a laboratory situation previously developed to study deception. Results have been reported on the behavior of twenty-one female nurses (Ekman & Friesen, 1974; Ekman, Friesen & Scherer, 1976) in this deception experiment. For this study fifteen additional female nurses were videotaped in each of two standardized interviews. In the honest interview, each nurse watched nature films designed to elicit pleasant feelings and was instructed to describe her feelings frankly. In the deception interview, each nurse saw a film showing amputations and burns, intended to elicit strong unpleasant affect. She was instructed to conceal negative feelings and to convince the interviewer she had seen another pleasant film.

Two cameras recorded the interviews. One obtained a head-on view of the stimulus person (nurse) seated in a chair, with the entire face and body, including the feet, visible. When this video recording was shown to observers, the body was blocked off on the video monitor so that only the face was visible. This provided the "small face" condition, in which the face occupied about one-fifth of the television monitor. The other video recording was made with a separate camera focused only on the face. The camera was placed on its side so that the maximum size face would be recorded. When this recording was shown on a television monitor (also placed on its side) the face filled the monitor, providing the "large face" condition.

The actual size of the small and large face depends upon the size of the monitor used in the experiment. Regardless, the detail for the face preserved in a video picture is a function of the number of video lines used in the recording which is fixed once the recording is made. The large face picture used virtually all the videolines, (approximately 350) to record the image of the face. Since the small face picture used approximately 70 lines, of necessity it had to provide much less detail. No matter how large the small face picture might be made, and it could be made life size if that recording was shown on a very big television monitor, it would be grainier, providing a less defined picture than the large face. In the present experiment, a 19-inch television monitor was employed. The image size for the small face condition was approximately 4 cm by 7 cm, or one-fifth of the area of the typical human face. The image size for the large face condition was approximately

17 cm by 30 cm, or about twice the area of the typical human face. The observers were seated approximately seven feet from the television monitor.

Two minute segments (almost the entire short interview) from each honest and each deception interview were edited in a random order onto two "small face" videotapes and two "large face" videotapes. The editing was performed so that each stimulus person was shown in only one interview (honest or deception) on each videotape. Each tape showed 15 interviews, half honest, half deception. Four groups of observers were used (N 's = 11, 12, 14, 18). The observers were middle-aged male and female native born Americans contacted through an extension college mailing list. Those who volunteered to participate in a study of nonverbal behavior were randomly assigned to one of the four groups. Each group and therefore each observer saw only one of the four videotapes. Immediately after viewing each stimulus person the observers made judgments on 14 bipolar 7-point adjective scales. The scales had been selected to be relevant to the information provided by face, body, and speech since the difference among these channels were the foci of another study of these materials (Ekman, Friesen, O'Sullivan, & Scherer, Note 1). The scales included judgments relevant to emotion and personality: 1) outgoing-inhibited, 2) expressive-unexpressive, 3) sociable-withdrawn, 4) calm-agitated, 5) natural-awkward, 6) stable-unstable, 7) relaxed-tense, 8) honest-dishonest, 9) sincere-insincere, 10) trustworthy-untrustworthy, 11) dominant-submissive, 12) likeable-unlikeable, 13) felt pleasant-felt unpleasant, 14) acted pleasant-acted unpleasant. Factor analyses suggested the existence of three group factors in these scales. Factor one was defined by scales 1, 2 and 3; factor two by scales 4, 5 6 and 7; and factor three by scales 8, 9 and 10. The remaining four scales did not load on any group factor.

RESULTS

The analyses used the mean of each group of observers' ratings on each stimulus person on each scale for each interview situation. The data, then, consisted of 840 group means, two means for each of the face sizes (large or small) for each of two situations (honest or deception) for each of 14 scales for each of 15 stimulus persons. These data were analyzed using t tests for independent means. Analysis of variance procedures could not be used because each observer saw half the honest and half the deception interviews. Each t test, then, compared the observers' mean ratings over the 15 stimulus nurses for each scale separately. T tests of the difference between means comparing mean judgments for large versus small face, scale by scale, over the 15 stimulus persons, yielded no significant differences for the judgments on any of the 14 scales in the deception interviews. (t values ranged from .08 to 1.49), and only one significant difference for the judgments of facial behavior from the honest interviews. The large face observers judged that the stimulus persons acted more pleasant than did the observers of the small face ($t(28) = 2.19, p < .037$). This difference is probably best attributed to chance, since there were no significant differences among the other 27 t tests including the felt pleasant scale and the other "positive" scales. T tests

of the difference between means of three composite scores (derived from the factor analyses previously mentioned) also showed no significant differences. Since these composite scores are averaged across several separate scales they might be more reliable and therefore more capable of revealing a difference. Nonetheless, these composite scores showed no significant differences. The t values for these composite scores ranged from .22 to 1.25, with a median t value of .52.

F ratios comparing differences in the variances of both the single scale scores and the composite scores yielded only a single significant result. In the small face condition, observers' ratings for dominance were more variable ($F = 3.22$, $p < .037$). Again, we interpret this finding as due to chance since it involves a different scale and a different condition than the single significant result in the t test analyses.

DISCUSSION

Whether individual scales or composite scale scores were analyzed, whether means or variance in the ratings were examined, little difference was found in ratings made by those who observed a large or small facial image. Even though only one out of 34 t tests between means was significant, it could be argued that this finding should not be dismissed as due to chance, since the scale was one known to be specially relevant to the face, acted pleasant (Ekman, Friesen, & Ellsworth, 1972), and pleasantness was a salient issue in the experimental interviews. (Recall that in the honest interview the subjects were instructed to describe their feelings frankly while watching a film designed to be pleasant, and in the deception interview the subjects were instructed to describe pleasant feelings while watching a film designed to be unpleasant.) This interpretation is weakened by the fact that significance was obtained on only one of two pleasantness scales (the *acted* pleasant scale, but not the *felt* pleasant scale), and in judgments of behavior in only one interview (honest not deception).

Another basis for questioning these findings is the issue of whether the scales were relevant to the information available from the face in these experimental interviews and whether the scales were reliable measures of such information. If the scales cannot be shown to be both relevant and reliable the study cannot be considered a fair test of whether the size of the facial image observed affects judgments. Other investigations (Ekman, Friesen, O'Sullivan & Scherer, Note 1) have found that these scales do produce reliable differences in judgments based on viewing the face, the body, or the whole person, or in hearing the speech, as well as differences in ratings based on these behaviors in honest and deception interviews.

Nonsignificant findings, as were largely obtained in this study, can sometimes conceal weak but nevertheless consequential phenomena. While fifteen stimulus persons (nurses) is a large number compared to many studies of nonverbal communication, it is a small absolute number. Perhaps if more

people were observed a difference between the ratings of small and large facial images would emerge. How inconsequential facial image size seems to be for these ratings can be appreciated by extrapolation based on our data. More than 1000 stimulus persons would have to be judged before a significant difference would be obtained at the .05 level for most of the scales used.

It seems reasonable to conclude that little information is lost when observers are shown a very small facial image, one-fifth the size it would appear at the usual conversational distance. This is consistent with other recent findings. Hager and Ekman, (1979) found that the face can transmit information about emotion over a long distance (in excess of 45 meters) when facial image size is quite small. Facial actions provide consistent information despite considerable size reduction. It might be that specially trained observers, alert to the most subtle facial clues, might lose information when viewing a small facial image, but that is a question for further research.

REFERENCES

- Ekman, P. & Friesen, W. V. Detecting deception from the body and face. *Journal of Personality and Social Psychology*, 1974, 29, 288-298.
- Ekman, P., Friesen, W. V. & Ellsworth, P. *Emotion in the Human Face*. New York: Pergamon, 1972.
- Ekman, P., Friesen, W. V. & Scherer, K. R. Body movement and voice pitch in deceptive interaction. *Semiotica*, 1976, 16, 23-27.
- Hager, J. & Ekman, P. Long distance transmission of facial affect signals. *Ethology and Sociobiology*, 1979, in press.

Reference Note

1. Ekman, P., Friesen, W. V., O'Sullivan, M. & Scherer K. Relative importance of face, body, and speech in judgments of personality and affect. Manuscript submitted for publication, 1978.

Conference

A conference is scheduled on the *Neural and Developmental Bases of Spatial Orientation*. British and American investigators from the fields of developmental, environmental and physiology psychology, clinical neurology and neurophysiology will present recent research on spatial orientation in normal and special children, brain-damaged adults and non-human animals.