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EYES AS THE CENTER OF FOCUS IN THE VISUAL EXAMINATION OF HUMAN FACES

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Summary.—An experiment was conducted to determine the degree to which individuals focus upon the eye region of others while visually inspecting their faces. Using an eye-tracking camera, 16 male subjects spent approximately 40% of their looking time focused upon the eye region of facial photographs, with each of the remaining parts of the face being looked at less.

Many experiments which have examined the role of eye-contact in human nonverbal communication processes have relied upon an assumption, proposed by Argyle (1970), that people tend to focus upon the eyes of another when looking in the direction of that person's face, rather than upon "ears, shoulders or adjacent areas" (p. 395). Given the methodological difficulties involved in obtaining a precise measure of eye-contact (Stephenson & Rutter, 1970; von Cranach & Ellgring, 1973), the assumption of eye-to-eye focus during social gaze represents a critical point that underlies most observer-based measures of interpersonal looking. While many studies underscore the importance of the eye region in perceiving (Yarbus, 1976), forming impressions of (Terry, 1977), and remembering others (McKelvie, 1976), the present investigation was designed to measure directly the relative amount of time a group of subjects actually spent looking at the eye region of a series of others during a social impression-formation task.

Sixteen male volunteer subjects were each shown a series of 4 color and 4 black and white slides which had been developed in a manner similar to that described by Izard (1971) to examine the role of various facial components in the expression of emotion.[2] Each slide presented a head and shoulders full face view of either a man or woman expressing a positive, e.g., joy, or negative, e.g., anger, emotion. Subjects were asked to form an impression of each person depicted and told they would be asked questions about them at a later time. Each subject viewed the slides while fitted within a Polymetric Eye Movement Recorder (Series V-1164-2). Videotapes were made of each subject's visual focus during his inspection of each slide by electronically superimposing a point source of light (reflected off the viewer's cornea) upon a television image of the slide being examined. Each facial slide was presented for 15 sec. A calibration-matrix slide was presented before and after each facial slide to aid in the continued adjustment of the equipment. Following the eye-tracking session, each subject was disconnected from the eye-movement apparatus, shown the series again, and asked to indicate which portions of the faces he had attended to the most.

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[2]Responses to a post-experimental questionnaire completed by subjects indicated that the emotions being expressed in the target slides were recognized as intended by a majority of the subjects (85.2%).

Preliminary examination of the subjects' self-reported looking behavior indicated that, without exception, subjects described the eye and mouth regions as the primary centers of visual attention. To compare these two regions in terms of actual looking time, two raters independently viewed replays of the videotaped eye-movement recordings. To facilitate objective ratings, templates representing the eye and mouth regions[3] were placed over the faces being rated and the brightness control on raters' monitors adjusted so that only the white dot representing the subject's point of visual focus appeared on the television screen. The raters, kept blind regarding the nature of the study, depressed switches attached to cumulative stopwatches each time the white dot appeared within the eye or mouth "window." The interrater reliabilities for eye and mouth region looking times recorded in this manner were quite high ($r = .93$ for eye ratings and $r = .95$ for mouth ratings).

An examination of subjects' mean looking times (averaged across raters) indicated that 43.4% ($SD = 16.5$) of their visual inspection time was spent looking in the region of the eyes and 12.6% ($SD = 6.5$) of the time was spent looking at the mouth region. The greater amount of time spent looking at the eye region rather than the mouth region held true for all slides, independent of color of slide, facial expression, or sex of the person depicted. Further examination of the videotapes indicated that other points of focus, e.g., nose, ears, hair, shoulders, each received a relatively small proportion of looking time.

The results, while certainly not conclusive for all studies dealing with looking at others, add support to Argyle's (1970) notion that the eye region represents a prime area of visual interest. The greater amount of time spent looking at the eye region as compared to the mouth region in the present study helps to clarify trends reported in earlier eye-tracking studies (e.g., Sakano, 1963; Yarbus, 1967) that showed both regions to be important areas of visual focus. It should be noted, however, that, as with these earlier studies, the results of the present study are limited to situations in which individuals examine static facial displays. It remains for future investigations to determine the extent to which the visual "pull" of the eye and mouth regions varies as a function of eye and mouth movements during longer inspections of more dynamic facial displays.

REFERENCES

ARGYLE, M. Eye-contact and distance: a reply to Stephenson and Rutter. *British Journal of Psychology*, 1970, 61, 395-396.

IZARD, C. E. *The face of emotion.* New York: Appleton-Century-Crofts, 1971.

MCKELVIE, S. The role of eyes and mouth in the memory of a face. *American Journal of Psychology*, 1976, 89, 311-323.

SAKANO, N. The role of eye movements in various forms of perception. *Psychologia*, 1963, 6, 215-227.

STEPHENSON, G., & RUTTER, D. Eye-contact, distance, and affiliation: a re-evaluation. *British Journal of Pyschology*, 1970, 61, 385-394.

TERRY, R. Further evidence on components of facial attractiveness. *Perceptual and Motor Skills*, 1977, 45, 130.

VON CRANACH, M., & ELLGRING, J. Problems in the recognition of gaze direction. In M. von Cranach & I. Vine (Eds.), *Social communication and movement: studies of interaction and expression in man and chimpanzee.* New York: Academic Press, 1973. Pp. 419-443.

YARBUS, A. *Eye movements and vision.* New York: Plenum, 1967.

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[3]The eye region was defined as a rectangular area bounded temporally by the frontal process of the zygomatic bone, superiorly by the eyebrows and inferiorly by the zygomatic infra-orbital margin. The mouth region was defined as a rectangular area whose sides were bounded by the periphery of the orbicularis oris.