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SELF-CONTACT AND GESTURING IN DIFFERENT STIMULUS SITUATIONS: RELATIONSHIP WITH CEREBRAL DOMINANCE[1]

VEZIO RUGGIERI, CARLOTTA CELLI, ANTONELLA CRESCENZI

University of Rome

Summary.—The relationships among self-contact and gesturing scores of 27 female undergraduate psychology students in 2 neutral and 2 emotional stimulus situations have been examined. To study the role of cerebral dominance, the self-contact and gesturing behaviors produced by the left and right halves of the body have been separately analyzed. In the emotional situations there was enhancement of the self-contact score on the left side of the body, but in one of the two, self-contact scores on the left were associated with high free-gesturing scores on the right side of the body. The self-contact score increases on the right side of the body in the situation of a first social interaction. The role of the self-contact as an anxiety-reducing system is discussed.

The aim of this research was to examine gestural and self-contact behaviors from the point of view of a general homeostatic hypothesis. In fact, the gestures have different and simultaneous functions of communicating both cognitive and emotional contents, and of regulating the level of the internal arousal. For the second point, external (of the environment) or internal (of the organism) stimuli determine psychophysiological modifications with an increase in level of arousal. In this context the gestures represent a motor response which regulates and reduces the increased arousal to achieve homeostatic balance.

Many authors single out the role of the muscular system, which is involved in every gestural behavior, is that of a homeostatic regulator (Goldstein, 1972; Malmo, 1965). In addition, internal arousal and activation appear in different emotional states such as rage, frustration, etc. (Lang, *et al.*, 1972).

Then we point out that the literature notes various aspects of gesturing, some correlated, others not correlated with speech. The former gestures are iconic, illustrational and emblematic, and the latter are regulators of social interaction and those expressing emotional states (Rosenfeld, 1966; Freedman & Hoffman, 1967; Mahl, 1967; Ekman & Friesen, 1969; Argyle, 1965; Ruggieri, *et al.*, 1980; Ricci Bitti, *et al.*, 1974). Among those gestures not correlated with speech, self-contact gestures have been identified as those by which contact is established between one part of the body and another.

The literature shows that self-contact increases when interpersonal distance decreases, when a topic of conversation becomes more intimate (Schulz & Barefoot, 1974) and whether there is anxiety (Jurich & Jurich, 1974; Waxer, 1977). But we hypothesized that the different gestures assume various roles and mean-

[1]Request for reprints should be sent to Vezio Ruggieri, Via Bisagno, 28-00199 Rome, Italy.

ing. The free gesturing, especially correlated with speech, represents a motor expression activity more related to social communication, but self-contact behavior is characterized as tactile self-stimulation and identified by some authors (Morris, 1978) as a microcaress. In this way the self-contact represents a system of protective reassurance activated to maintain internal stability which is modified by the experiences of anxiety and frustration.

Also, other authors (Patterson, 1975) have suggested an arousal model of interpersonal intimacy, which singles out different non-verbal responses, associated with positive or negative emotions.

In the study of emotional behavior emerged another important aspect: the role of cerebral dominance. Schwartz, *et al.* (1979) have demonstrated that "negative emotions" produce an increase in the myographic scores of the left half of the face, while "positive emotions" increase the myographic scores of the right half of the face. This experiment is important for our conceptual framework because myographic activity is involved in each form of gesturing behavior. We think that hemispheric choice, for a certain behavior, must be included in an integrated program that considers simultaneously the activity of both hemispheres (Ruggieri, *et al.*, 1981).

We hypothesize that gestural behavior (free-gesturing and self-contact) changes in different stimulus situations; a situation characterized by a negative emotional connotation should produce an increase in self-contact behavior (specially on the left of the body), while positively connoted situations should produce increase in the free-gesturing (specially on the right half of the body).

METHOD

Subjects

In the experimental group were 27 female undergraduates in psychology who were between 19 and 35 yr. of age. All subjects verbally declared themselves right-handed.

Materials

We have considered as gesturing behavior any noticeable movement of arm, hand, or finger not in moving contact with another part of the body and as self-contact behavior a response that involves motion of one part of the body in contact with another (Rosenfeld, 1966). We have measured the duration in seconds of gesturing and self-contact behavior that appears during each of the four stimulus situations. Gestural and self-contact behaviors were recorded on videotape. The apparatus was located behind one-way mirror in a room adjacent to the experimental one.

Procedure

The experiment was carried out at the Institute of Psychology, University of Rome. The experimental situation was a standardized interview of the sub-

ject by an interviewer, while they were seated facing one another. A small table was located to the side; the chairs were placed a meter apart. A microphone, linked with the videotape in the adjacent room, was placed on the table. The experimenter behind the one-way mirror filmed the interview using a telecamera connected to the videotape. The interviewer was instructed to look fixedly at the subject and to avoid using gestures after formulating the questions during the response period. During the interview four questions were asked; these provided two different contexts: the first two questions referred to "neutral" situations, the latter two referred to more personal and emotional situations. The interviewer presented the situation to the subject as follows: "This is an experiment on conversation. The microphone which you see on the table will be used to tape what will be said. I will ask you a series of questions; however should you wish, you may speak as long as you like. Immediately following the interview I will explain the aims and the meaning of the questions." The questions were: (1) How do you generally occupy your day? (2) Can you tell me generally how you passed your vacation this summer? (3) Surely you have on occasion found yourself in an embarrassing situation. How did you feel and how did you react? (4) The male-female relationship is generally a difficult one. On the basis of your personal experience, what are the most problematic situations? Each question was posed separately. The time for the response was not limited.

RESULTS

We calculated separately the durations (in percentage with respect to the total duration of the response) of the gestures independently produced only by the right and left hands in the four different stimulus situations (partial gesturing). We also calculated the durations of the gestures carried out simul-

TABLE 1

MEANS AND STANDARD DEVIATIONS OF VARIABLES IN FOUR SITUATIONS

Measure	Situations							
	1		2		3		4	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Gesturing (*f*)								
Total right	14.24	17.09	15.32	16.12	15.85	15.98	23.51	22.76
Total left	21.04	25.73	20.53	24.37	14.50	18.33	18.41	21.11
Partial right	5.10	7.93	6.70	11.07	8.38	13.19	13.09	19.01
Partial left	11.90	21.15	11.91	21.86	7.01	15.23	8.00	13.64
Simultaneous	9.14	13.52	8.61	11.86	7.48	11.15	10.41	15.77
Self-contact (*f*)								
Total right	83.06	18.66	80.31	16.72	80.99	21.71	70.52	26.75
Total left	70.33	32.26	73.70	27.27	85.11	18.76	80.38	23.15
Partial right	41.14	42.87	38.15	37.72	37.97	37.14	33.57	37.11
Partial left	28.41	36.80	31.54	33.14	42.09	36.23	43.42	37.52
Simultaneous	41.92	38.75	42.16	36.84	43.02	37.15	36.95	35.66

taneously by two hands (simultaneous gesturing). The first score (measure of the partial duration of the gesturing by only one side) summed with the duration of the simultaneous gesturing provides a "total" score, respectively, for the right and the left sides. The same procedure was used for the self-contact (examined as partial right, partial left, simultaneous, total right, and total left).

The duration (in percentage) of self-contact of each hand is longer than gesturing behavior in all the situations examined.

The mean values for right and left self-contact and gesturing behavior in each of the four situations are indicated in Table 1 and in Figs. 1 and 2.

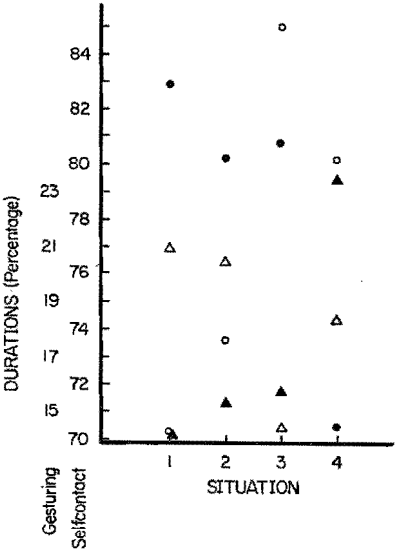

FIG. 1. Mean values of total right ▲ and left △ gesturing and right ● and left ○ self-contact in the four situations

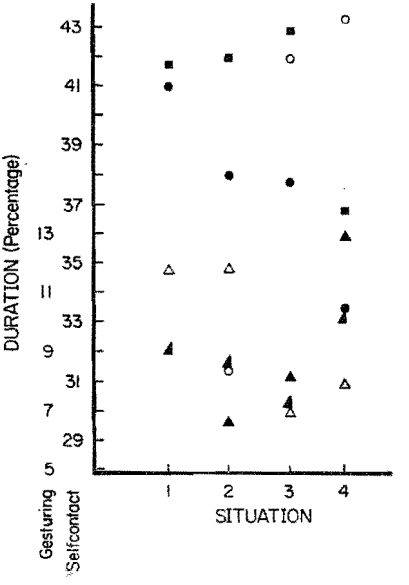

FIG. 2. Mean values of partial (▲ right and △ left) and simultaneous gesturing (◭) and partial (● right and ○ left) and (■) simultaneous self-contact

Left Self-contact

The *total* left self-contact score shows statistically significant differences in the four situations ($F_{3,25} = 3.09$, $p < 0.05$), the largest value appears in the third situation, emotional one, which differentiates significantly from the two neutral situations (first and second).

On the contrary, the *partial* self-contact score is highest in the fourth situation (also emotional) and is differentiated significantly from the two neutral situations (Student's t for dependent means, $p < 0.05$, Table 2).

The discrepancy between total and partial self-contact scores in the two

emotional situations depends on the difference of the simultaneous self-contact score. In the third situation it is higher than for the fourth question (the difference is statistically significant; Student's t for dependent means, $p < 0.05$, Table 2).

TABLE 2

STATISTICALLY SIGNIFICANT DIFFERENCES IN MEAN TOTAL DURATIONS FOR CONTRALATERAL AND HOMOLATERAL SCORES IN FOUR SITUATIONS

Measure	Situations	t_{25}
Total right gesturing	2—4	−2.18
Total right self-contact	1—4	2.07
	3—4	2.72
Total left self-contact	1—3	−2.50
	2—3	−2.18
Partial left self-contact	1—4	−2.57
	2—4	−2.11
Simultaneous self-contact	3—4	2.31
Total right/left self-contact	1	2.08
Partial right/left self-contact	1	2.08

Note.—Situations: 1, neutral (first contact with interviewer); 2, neutral; 3, emotional (recall of embarrassing experience); 4, emotional (male-female relation).

Right Self-contact

The *total* right self-contact score is smallest for the fourth emotional situation (Table 1). The differences between the first and the third questions are statistically significant (Student's t for dependent means, $p < 0.05$, Table 2).

The *partial* right self-contact scores were not statistically significantly different among the four situations.

The mean difference between right and left self-contact within each situation are statistically significant only for the first situation (Student's t for dependent means, $p < 0.05$, Table 2), in which there is more right self-contact than left.

Gesturing Behavior

The analysis of the variance did not show significant differences among the four situations but it is of interest that the total right-gesturing score is highest in the fourth situation and is significantly different from the right gesturing score of the second situation (Student's t for dependent means, $p < 0.05$, Table 2).

DISCUSSION

Our results indicate that the different stimulus situations affect in a statistically significant way the duration and the location of the activity of the two hands (right and left). The increase in motor activity such as gesturing or self-

contact behavior during the emotional situations supports our homeostatic hypothesis. Particularly in both emotional situations did significant increases in the *left self-contact* appear. But the two emotional situations present some differences; in the third situation also the simultaneous self-contact produced by the two hands increases while in the fourth situation left self-contact is associated with increased *right free gesturing*. We think that the different responses to the two emotional situations depend on the kind of stimulus situation. In the third situation the subject was asked to recall an embarrassing experience and to pay attention to what he had felt and to how he had reacted. The question had negative and frustrating connotations of the evoked emotion. In the fourth situation, on the contrary, the subject was asked to express his own opinion about the male-female relationship according to his personal experience in a general way without recalling directly any emotional reaction which might have occurred. This distinction is important because, as Lang, *et al.* (1980) specified, there are significant differences in autonomic and somatic response patterns if the imaginative style refers to mental representation only or there is a request for an experiential involvement with the mental representation. Then the experiential involvement in the fourth situation, even if less intense, may have both positive and negative connotations. We can also say that in the third situation the subject pays more attention to himself, to his internal state, re-activated by the recall and that in the fourth situation the subject is more interested in "communicating" his opinion about male-female relationship, even if in this "communication" emotional components (positive and negative) are present. In the introduction we pointed out that arousal and activation appear in different emotional states as frustration, rage, pleasure, etc. Now we hypothesize that self-contact and gesturing behavior play a different role because they reduce arousals related to different forms of behavior. *Self-contact* may reduce the increased level of arousal related to the experience of frustration and anxiety. In this case the subject pays more attention to himself and to his internal state; the self-contact may represent a compensatory mechanism (a form of micro-caress). Then the finding that self-contact increases on the left during emotional situations may be linked to the fact that the left half of the body, according to the literature on cerebral dominance (Schwartz, *et al.*, 1979), is most activated in a situation which has a negative connotation.

On the contrary *gesturing behavior* may reduce the arousal which appears when the subject pays more attention to the environmental stimuli, as it happens in the communication of thoughts and emotions, than to internal state. With this hypothesis we can explain why in the fourth situation high level of gesturing and self-contact appears because it is possible that the arousal is related to more than one condition. The gesturing behavior appears in the right part of the body, which is more involved in the active manipulation of the environ-

ment and in social interaction; for example, in our culture shaking hands is carried out with the right hand.

Another result of our research is that in the first situation, which represents the first contact with the interviewer, the *right* self-contact is, in a statistically significant way, more elevated than the left. In this case we can hypothesize that self-contact is not provoked by specific internal emotional and imaginative contents, because the stimulus was "neutral," but by the aspecific interpersonal situation of first interview. We would call this "social" or "relational" anxiety. The self-contact which appears on the right side of the body may acquire the sign of "barrier" which has a meaning opposite that of the gesture of shaking hands (interpersonal contact).

In conclusion, we hypothesize that left hemisphere which controls the right part of the body is more activated, producing free gesturing or self-contact in situations in which interpersonal and social aspects are predominant. The right hemisphere which controls the left part of the body is more activated, producing self-contact in situations in which internal emotional contents are predominant.

REFERENCES

ARGYLE, M. *Il corpo e il suo linguaggio.* Bologna: Zanichelli, 1975.

EKMAN, P., & FRIESSEN, W. The repertoire of nonverbal behavior. *Semiotica*, 1969, 1, 49-98.

FREEDMAN, N., & HOFFMAN, S. Kinetic behavior in altered clinical states. *Perceptual and Motor Skills*, 1967, 24, 527-539.

GOLDSTEIN, I. B. Electromyography: measure of skeletal muscle response. In N. S. Greenfeld & R. A. Sternbach (Eds.), *Handbook of psychophysiology.* New York: Holt, Rinehart & Winston, 1972. Pp. 329-365.

JURICH, A., & JURICH, J. Correlations among nonverbal expressions of anxiety. *Psychological Reports*, 1974, 34, 199-204.

LANG, P. I., KOZAK, M., MILLER, G., LEVIN, D., & MCLEAN, A. Emotional imagery: conceptual structure and patterns of somato-visceral response. *Psychophysiology*, 1980, 17, 179-192.

LANG, P. I., RICE, D. G., & STERNBACH, R. A. The psychophysiology of emotion. In N. S. Greenfeld & R. A. Sternbach (Eds.), *Handbook of psychophysiology.* New York: Holt, Rinehart & Winston, 1972. Pp. 623-643.

MAHL, G. Some clinical observations on nonverbal behavior in interviews. *Journal of Mental and Nervous Disease*, 1967, 144, 492-505.

MALMO, R. B. Physiological gradients and behavior. *Psychological Bulletin*, 1965, 64, 225-234.

MORRIS, D. *L'uomo e i suoi gesti.* Verona: Arnoldo Mondadori Editore, 1978.

PATTERSON, N. L. An arousal model of interpersonal intimacy. *Psychological Review*, 1976, 83, 235-243.

RICCI BITTI, P. E., GIOVANNINI, D., & PALMONARI, A. Atteggiamento interpersonale dell'intervistatore e comportamento gestuale dei soggetti intervistati. *Rivista di Psicologia*, 1974, 1, 231-239.

ROSENFELD, H. Instrumental affiliative functions of facial and gestural expression. *Journal of Personality and Social Psychology*, 1966, 4, 65-72.

RUGGIERI, V., CERIDONO, D., CEI, A., & BERGERONE, C. Figure background perception and cerebral dominance: integrated process of hemispheric specialization. *Perceptual and Motor Skills*, in press.

RUGGIERI, V., GIULIANO, C., & FUSCO, A. Relationship between depression and self-contact. *Perceptual and Motor Skills*, 1980, 51, 195-198.

SCHULZ, R., & BAREFOOT, J. Nonverbal responses and affiliative conflict theory. *British Journal of Social and Clinical Psychology*, 1974, 13, 237-243.

SCHWARTZ, G. E., AHERN, G. L., & BROWN, S. Lateralized facial muscle response. *Psychophysiology*, 1979, 16, 561-571.

WAXER, P. Nonverbal cues for anxiety. *Journal of Abnormal Psychology*, 1977, 86, 306-314.

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