

Studies of stressful interpersonal disputations

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BETWEEN me and the substance of all that I can say in the allotted time are several pages of writing, the contents of which may be summarized as follows:

1. A short introduction with a barely discernible thread of humor;
2. A prosaic survey of the seven major components of what some of us have called the “multiform system of assessment” which is old hat to most of you;
3. A passage in which it is pointed out that two of the essential components of this system have been grievously neglected by most psychologists in their investigations of normal personalities, one being the collection by various means of an abundance of experiential, biographical data from each subject, and the other being a serious, systematic attempt to construct a coherent formulation of each personality;
4. The Jeremiad of an aging psychologist who views with sorrow and misgivings the apparent accentuation of certain powerful forces that are keeping a multiplicity of his colleagues dissociated from the nature and experiences of actual people by binding their energies to an enthralling intellectual game played with abstract counters of dubious importance and of spurious relevance to human life.

Integration Plan

Having been led to the belief that this dissociation, if prolonged, would seriously impede the full future development of psychology, I am eager to propose a remedy which could be instituted at numerous centers in this country on a scale that might be just sufficient to make a decisive, vital difference in the evolution of our discipline. The suggested remedy consists of integrating the endeavors of experimental specialists with those of personologists engaged in a multiform assessment program. That is, instead of choosing either to learn a lot about a single area of human activity or to learn a little about a lot of areas, everybody chooses both, and can attain both by a division of interrelated labors.

There are only two rules to this integration plan, as I shall call it, the first being that all experimenters will use the same population of thoroughly assessed subjects, no matter how many other subjects they may need. The enormous advantage of this arrangement is that each experimenter, without any expenditure of his own time, will have at his disposal to help him in interpreting his findings, not only the results of other experiments, but the massive collection of data (several hundred rank orders, for example) obtained by the assessment process. The second rule—with even greater potentialities for a sophisticated science of psychology as well as for broadening the horizon of every student—calls for two series of meetings of experimentalists and personologists: one series to formulate the personality of each subject as a unit, and another series to attempt plausible explanations of the variant individual responses in each experiment taken as a unit. The aim would be to test the most promising of these plausible explanations, and in due course to attain the enviable position of being able to predict the critical reactions of each individual subject with a fair measure of accuracy and precision.

To be a little more specific, let me outline one possible version of the integration plan. First there will be four variously trained and variously experienced personologists (members or research associates of a department of psychology) who are engaged in a three-year program of intensive study of 25 preselected subjects. They will be assisted in the assessment process by second-year graduate students who will administer, as part of their technical training course, some of the simpler tests and questionnaires. Then there will be several graduate students of more advanced standing, seven in number, let us say, each of whom is planning an experiment to be performed for a PhD degree. Their interests may vary all the way from those of a physiological psychologist in search of more precise knowledge respecting the temporal correlates of marked changes in the heart rate to those of an investigator of higher mental processes who wishes to test

certain propositions as to the power of a subject to recall different parts of a dyadic conversation in which he has actively participated.

Now, as it happens, a few of us at Harvardresearch fellows for the most part—found that these two experimental aims and five others could be pursued in unison as interdependent parts of a single chain of linked procedures. The topics of the other five studies, each concerned with a different aspect of a stressful, two-person disputation, were as follows: (a) the determinants of variations among judges in estimating degree of anxiety and of anger; (b) personological and situational determinants of degree of anxiety and of anger; (c) personological correlates of variations of mentational and linguistic style under stress; (a?) typological differences as manifested in retrospectively experiencing and reporting a stressful, verbal interaction; and (e) apperceptions and evaluations of an alter before and after meeting him and being exposed to his insulting criticisms.

Now, as partial demonstration of how researches such as these can be readily coordinated, let me outline as briefly as possible the series of techniques that was carried out by a number of us at the Annex (as I shall call our workshop in Cambridge, Massachusetts), first in 1957 with the compliance of 23 comprehensively assessed college sophomores, and then, in a more refined way, in 1960 with a comparable aggregate of 21 subjects. Imagine that you are one of these volunteer subjects.

Experimental Prodecures

First, you are told you have a month in which to write a brief exposition of your personal philosophy of life, an affirmation of the major guiding principles in accord with which you live or hope to live.

Second, when you return to the Annex with your finished composition, you are informed that in a day or two you and a talented young lawyer will be asked to debate the respective merits of your two philosophies. You are given a copy of his philosophy and he is given a copy of your philosophy. You are told that a moving picture will be taken of this debate.

Third, on arriving at the Annex on the appointed day, you are given these directions: The debate will be limited to three 6-minute periods separated by two shorter silent periods, in which to rest or collect your thoughts. The first period will be for mutual orientation, for asking and answering questions, clarifying certain points. In the second period the young lawyer will present his criticisms of your philosophy and your task will be to defend it as logically as possible. In the third and final period it will be your turn to call attention to whatever weaknesses you have noted in the lawyer's philosophy. At this point you are introduced to the young lawyer, and in his company escorted to the brilliantly lighted room where the debate will take place in front of a one-way mirror and a hole in the wall for the lens of a moving picture camera with

sound track. Before sitting down next to each other, the leads of a cardiometer (which records instantaneous heart rates and respirations) are strapped to your chest and to the lawyer's chest by Paul Gross.

Fourth, a signal is given and the discussion starts, continuing through three differentiated periods as you were told it would. In the second period, however, the lawyer's criticism becomes far more vehement, sweeping, and personally abusive than you were led to expect. The directions given to the lawyer were the same as you received, except that he was told to anger you and, adhering to a rehearsed and more or less standardized mode of attack, he will almost certainly succeed in doing this, having been successful in all the dyads we have witnessed. Dyad is the convenient four-letter word we use to refer to each of these 18-minute two-person interactions, plus four inactive periods amounting to 9 minutes, i.e., about 27 minutes in all.

Fifth, after the termination of the debate, you are taken to a room where you are left alone with the instruction to write down as much as you are able to recall of what was said by the lawyer and by yourself, word for word if possible and in proper sequence.

Sixth, as soon as you have reached the end of your memories of the verbal interactions, you are escorted to the room of an interviewer (Alden Wessman), where you are encouraged to relax, and to say what comes to mind while you relive in your imagination the dyad as you experienced it, chronologically from start to finish.: When, you are through with this—about 30 minutes later, let us say—you are asked certain questions designed to obtain as valid estimates as you both *can* give and *will* give of the intensity of certain variables, such as felt anxiety, felt anger, involvement in the task, liking or disliking the lawyer, respecting or disrespecting his ability or views. A final short questionnaire covering these and other points completes your set of exercises for that day. The interviewer is left with a tape recording of the whole proceeding.

At four appointed times subsequent to your participation in the stressful dyad, you will be called back to the Annex. On two occasions there will be another verbal memory test similar to the one I have described, the aim of which is to measure the percentage of different classes of speech units in the dyad that are recalled by each subject after 2 weeks and after 8 weeks. In addition to these sessions there will be two interviews, in one of which you will again be asked to relive the experience of the dyad and to report it as you go along. In the other interview, the plan of which was both conceived and executed with extraordinary cleverness by Gerhard Nielsen, you will witness and become involved in two or three showings of the sound film of your own dyad. You will see yourself making numerous grimaces and gestures of which you were unconscious at the time, and you will hear yourself uttering incongruent, disjunctive, and unfinished sentences. You are likely to be somewhat shocked by your performance and will be moved to identify with yourself as you were feeling and thinking during those stressful moments; and when the experimenter, *this* experimenter, stops the film at critical points, and asks you what you associate with this and that physiognomic movement or with this and that verbal expression, you are likely to become uncommonly communicative and your free associations may lead you back to childhood memories. Counting

the other two reliving interviews and the three memory sessions, you will spend about 8 hours all told trying to recapture various aspects of those 18 minutes under stress.

I have devoted more minutes than I can well afford to this account of how we secured reports of your subjective experience of the dyad as a whole and in detail, because nothing more about the phenomenology of it all will be said this morning, and I wanted to assure you that we considered the covert, inner aspect of that event as essential and revealing as its overt, outer aspect.

Raw data. The dyad in which you participated has perished as an event in time and you are through with it and we with you, in a sense and for a while. But we are in no sense through with the imperishable data pertinent to that event which you have left behind with us, the nature of which I have already briefly indicated: (a) a cardiometric tracing of your heart and respiration rates, (b) a sound film portraying your physical expressions and your verbal interactions with the lawyer, (c) a typed record of the exchange of words, (d) a tape recording of the debate giving both voice and words, and (e) a series of typed protocols of everything that you said about the dyad as you retrospectively relived it. So far as I know, these interrelated temporal records of your discussion are more precise and more complete than those of any other dyadic event in human history. But *cut bono?* As they stand they are nothing but raw data, meaningless as such; and the question is what meaning, what intellectual news, can be extracted from them?

Certain Methodological Principles

Besides presenting a plan for coordinating the aims and efforts of experimental specialists and personological generalists, and besides describing a series of procedures as an example of how seven different experimental projects can be coordinated, I had another purpose for this paper to which I shall now attend, namely, to set forth a few of the strategic methodological principles, or aims, which guided the ordination (designing, planning) of our interlocked techniques. These principles will be illustrated by references to what we have learned so far regarding the determinants of variations of the heart rate during a dyadic verbal transaction of varying stressor potency.

1. *Make the experimental conditions as natural as possible.* Although some degree of artificiality is unavoidable in the design of an experiment, we have assumed (without unequivocal evidence) that the wanted range of emotional, conational, and mental involvement of the subjects (and hence sufficient elevations of the heart rate) is more frequently obtained when the experimental conditions (the directions if any, the setting, the successive stimulus situations, etc.) are naturalistic (i.e., comparable to those that occur, commonly or exceptionally, in everyday life) and, conversely, that the degree of such involvement is generally less when artificiality is conspicuous and a subject has reason to say to himself, "this is nothing but an experiment, an attempt to show that I can be excited by these means." We have also assumed that the reactions of a subject (including changes of his heart rate) will be less natural (less representative of those that occur in everyday life) if his freedom of action is impeded, either, say, by strapping him to an array of instruments and telling him not to move, or by providing him with no opportunity for effective mental action, no problem to solve, or no way of altering the course of events by verbal means; or by limiting each of the subject's responses to a mere choice between two or more predetermined alternatives, instead of expecting him to *compose* adequate responses. It is not unlikely that the change of heart rate after stimulation varies in direction or degree according to whether a subject is set (a) to inhibit or (ft) to actuate, either all impulses or impulses of a certain class.

As to the naturalness of our experimental conditions, it may be said that heated arguments are common in the ordinary course of social events and dyadic discussions before a camera are daily occurrences on TV programs; but that an unwanted and unnecessary degree of artificiality was introduced in most of the

dyads by the suddenness, intensity, and irrationality of the lawyer's criticisms in the second of the active phases of the dyad.

2. *Aim at a temporal, holistic model of the observed event by obtaining synchronized recordings of the occurrence and intensity of each of the most influential participating variables.* "Holistic model" in this sentence means («) a sufficiently complete model of the whole (entire) event, one which includes all parts (variables) that are of noteworthy relevance and significance, and (ft) a model of the event as a whole, one which represents the interdependence of the parts (variables) and in so doing exhibits whatever degree of unity or disunity may prevail. Pertinent to this principle is our assumption that variations in the heart rate are determined by the interaction of several different variables. The importance of synchronized temporal records of the occurrence and intensity of each of the relevant variables is obvious, since only in this way can one discover what intrasubject, sequential (cause and effect), or concomitant relationships among the variables recur with dependable regularity. Furthermore, we should not lose sight of the basic tenet that time is an inherent component or attribute of every process and that the history of an event *is* the event.

In charting changes in the intensity of a variable, such as anxiety or anger, or changes in the heart rate or speech rate, a good deal may depend on the duration of the time unit that is represented by a single figure (the average of all measures obtained during that temporal segment). In representing changes in heart rate, for example, the choice of a short micro time unit of 5 seconds (with one point indicating the average interval between six successive beats if the rate is 60 beats per minute) will generally eliminate the effects of respiration (occurring at the rate of roughly 12 a minute); and a choice of a large micro time unit of 30 seconds will generally result in the obliteration of the effects of gross muscular motility if the frequency and magnitude of these movements remain constant; and the choice of a large macro time unit of 6 minutes will obliterate the effects of changes of stimulation during the course of that phase, and so forth. Some of these points will be demonstrated later.

3. *Assume that every psychological variable is a hypothetical (theoretical) construct, the activity of which can be inferred only on the basis of one or more of its subjective and/or objective manifestations.* For centuries every psychological variable was conscious by definition; but within the last half century most psychologists have come round to Freud's conception of unconscious psychic processes; and a host of psychologists have been persuaded, first of all, by Pavlov and Watson, to study organisms who are unable to report whatever awareness of interior mental experiences they may have. As a result many psychologists are now accustomed to the practice of inferring (on the basis of more or less rigorously defined criteria) the operation of imperceptible central (psychic) variables. In view of the preva-

lent American bias in favor of “behavioral” psychology I am strongly disposed to stress the understanding to be gained from the development of a sophisticated “experiential” psychology.

4. *Attempt to explain the reactions, especially the variant reactions of every individual subject.* We do not say that every person is unique, but say, instead, that every person is in certain very general respects like *all* other persons, in certain less general respects like *some* other persons (persons of this or that sex, age, culture, status, vocation, type, etc.), and in certain particular respects like no other person. As usual, we take note of whatever is common to all subjects, and then of whatever is common to this and to that aggregate or class of subjects, and, finally, we investigate in great detail whatever eccentric or hitherto unknown particularities are manifested by different individuals. From endeavors to understand these unique features have come the greater portion of our “new ideas.” But these endeavors, I believe, would have had little chance of bearing fruit if we had had to deal with subjects whose lives and personalities were unexplored by us. Here, then, is another good reason for adhering to the practice of performing experiments only on thoroughly assessed persons.

Now, to illustrate the application of the third principle (variables as theoretical constructs), I shall present an outline of our conception of anger, and then to illustrate the second principle (synchronized temporal tracings) I shall describe one of our ways of estimating the degree of anger.

Theoretical and Operational Definition of Anger

Anger was defined as an hypothetical state of excitation in certain not-yet-definitely-localized, subcortical regions of the brain (say, in the hypothalamus and limbic systems) which, if sufficiently intense, produces various manifestations of which the following could be discriminated in our data:

1. Covert manifestations: (*a*) experienced, or felt, anger, (*b*) aggressive words or images of aggressive actions invading the stream of consciousness, and (*c*) certain “emotional” qualities of the temporal structure of mentation; the avowals of all of which by the subject (at various times in the three postdyadic interviews) are ordinarily but not always modulated by some degree of inhibition (suppression).
2. Physiological manifestations: autonomic excitations, including changes of the heart rate and respiration rate as recorded on the polygraph by the cardiota-chometer, the nature of which changes seems to depend on the character of the situation.

3. Overt manifestations: (a) physiognomic and motoric phenomena which can be seen in the silent moving picture and analyzed in great detail by means of a perceptoscope projecting one frame at a time; (b) verbal productions of an oppositional, rude, critical, aggressive, or insulting nature which can be read in the typed protocol; (c) vocal qualities, such as louder and more rapid speech which, in conjunction with the verbal productions, can be heard in the playback of the magnetic tape recording of the dyad; and, finally, (d) temporal patterns of these motoric, verbal, and vocal manifestations, which can be synchronously seen and heard in the sound movie in conjunction with the behavior of the alter, or lawyer; all of which manifestations of central processes are modulated to some degree by the subject's efforts to control and to conceal them.

To be complete, this scheme would have to be supplemented by the addition of physical (muscular) endeavors, such as fighting, and by further specifications here and there, for example as to the qualities of voice and flow of speech which may be recorded instrumentally, or discriminated without instruments even when one does not understand the language spoken by the subject. But these supplementations are not pertinent to our data which allows for only four completely independent sources of information (cf. 1, 2, 3a, and 3b) which may be compared in respect to their dependability as indices of central anger.

Here I shall limit myself to estimations of anger based on observations of the sound movie which combines the vocal qualities of speech with two of the independent sources of information (physiognomic movements and verbal productions). These estimates were made from moment to moment independently and simultaneously by six psychologists (Arthur Couch, Paul Gross, Kenneth Keniston, David Ricks, Bernard Rosenthal, and myself), each of whom held a dial whose movements produced tracings on a polygraph, that could be synchronized with the tracings of the heart rate, as well as with the speech units produced by the two debaters.

The overt manifestations of five other, preselected psychological variables (the subject's level of anxiety, gross motility, vocal-verbal intensity, and task involvement, and the potency of the lawyer's criticisms and insults) were estimated, one by one, in a similar fashion, two of these variables by six judges and three by two judges. I shall not discuss, at this time, the question of the determinants of the unreliability of these estimates, but return to the second methodological principle that I mentioned, which calls for a temporal record of each variable, and illustrate the difference in amount of information gained between choosing a macro or a meso time unit for each point that is represented in a graph by showing two records of the heart rate, before, during, between, and after the dyadic interactions.

Figure 1 shows first, the average basal heart rate (74) for all subjects and then seven average dyadic heart rates plotted against time. (The average of about 12 afternoon pulse rates, as counted by each subject on different days under resting conditions, was taken as that subject's basal heart rate.) The three black circles give the average HR

(absolute heart rate) for each of the periods of active verbal interchanges (a 6-minute time segment). The white circles give the average HR for each of the verbally inactive periods: pre-dyadic first, postdyadic last, and two intradyadic rest periods. Time units of this percentage of total time (about four to six minutes in this case) are called by us macro units and each circle is called a macro figure. What can we learn from this macro temporal chart?

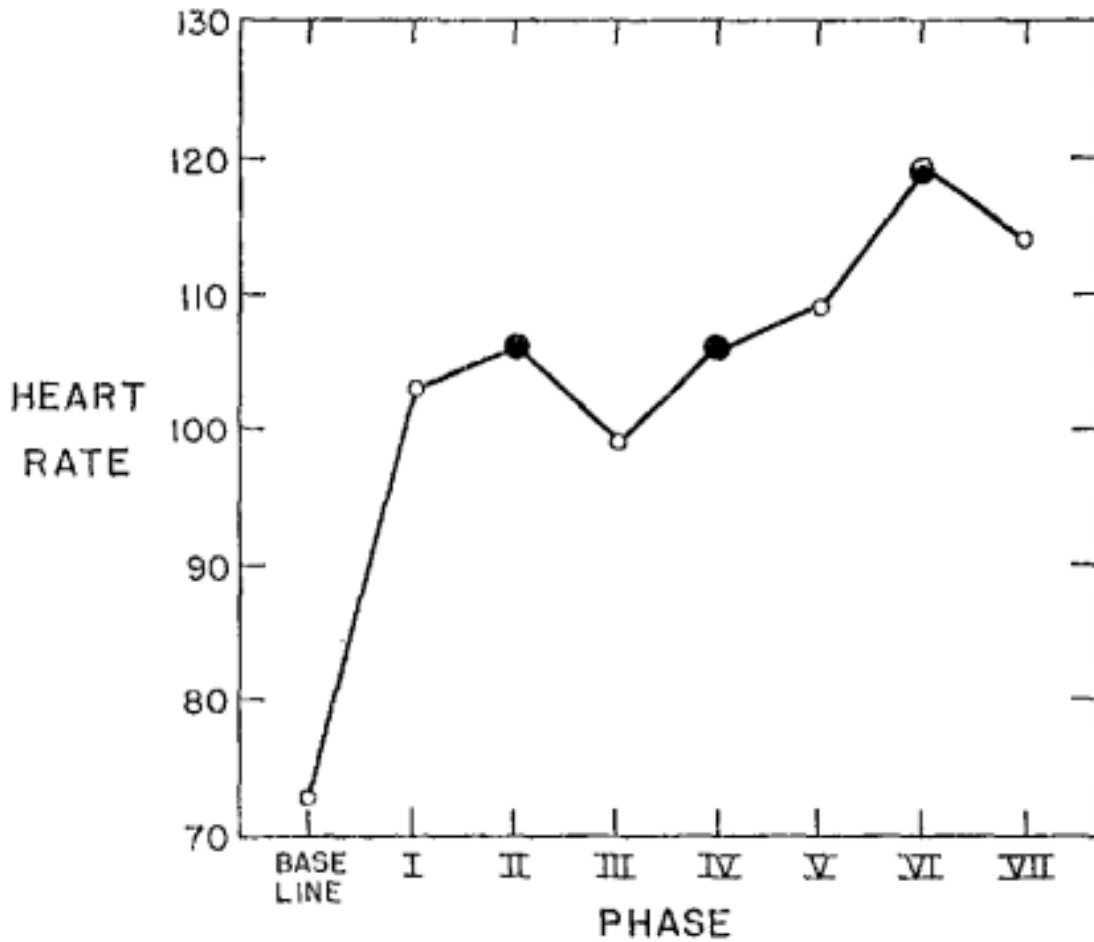


Fig. 1. Average heart rate during stressful dyad (with seven points).

1. Note the relatively great elevation of the heart rate (above the average basal rate of 74) before the start of the dyad, an index of a high degree of anticipatory central excitation, and then note a similar anticipatory rise before Phase 6, the phase in which the subject had been instructed to criticize the lawyer's views.

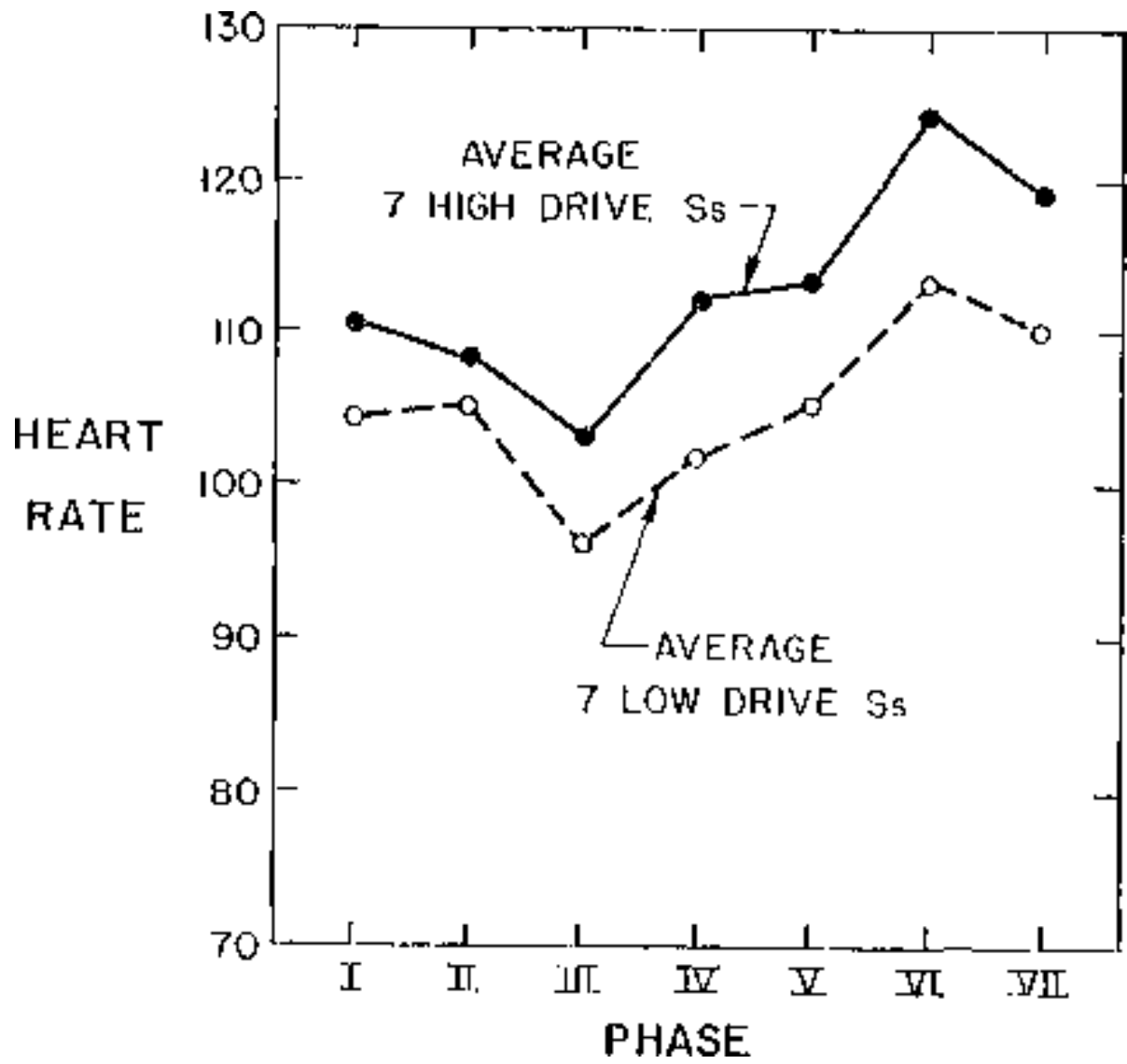


Fig. 2. Average heart rate during stressful dyad (with 17 points).

2. Note the increase of heart rate during the transition from an overtly inactive state to an overtly active state in all three instances. Micro analyses show that this occurred in 18 of our 21 subjects.
3. Note that the average heart rate in the sixth phase, when most of the subjects were criticizing the lawyer, was considerably higher than it was in Phase 4, when they were *being* criticized.
4. Note the surprising and in-this-graph-un- explainable fact that the average heart rate in the fourth phase (when the subjects were insulted) was no higher than it was in the second phase during which the interpersonal atmosphere was friendly.

Figure 2 is a mesotemporal chart which exhibits 17 successive figures, one for the first, or predyadic, phase, then one for each of 15 subphases (9 active and 6 inactive) of the dyad proper, and finally one for the seventh, or postdyadic, phase. Each black circle is the average for a 2-minute time unit (instead of for a 6-minute time unit), a choice of temporal segment which certainly gives you a more intelligible picture of what generally occurred during those stressful proceedings.

1. Take note of some new information: first, the fall of the heart rate during Phase 2 and again during Phase 6, one reasonable explanation of which would be in terms of homeostatic principles, namely that an elevated heart rate always tends to fall as the person becomes habituated to the existing situation, provided the stressor potency of the situation does not increase. During the first two-thirds of Phase 4 the subjects were confronted by a series of unexpected provocations in the form of personally offensive criticisms from the lawyer, and consequently the existing HR level did not fall, but was sustained during the middle subphase and in the last phase ascended sharply. The low HR level during the first subphase of Phase 4 as compared to the level during the initial but unaggressive subphase of Phase 2 might be partly explained by the low level in the middle of resting Phase 3 (the level from which the heart rate had to rise) as compared to the higher level of Phase 1, the predyadic phase. And the lower HR level during the middle subphase of Phase 4 as compared to the level in the third subphase might be partly explained by the fact that subjects talked far less in the first two subphases of Phase 4 than they did during any other period of the dyad; since, according to our micro findings, the HR level is lower, as a rule, when subjects are listening than it is when they are talking. Another possible explanation that needs to be explored through micro analyses is that the eruption of covert anger (which came suddenly in the first subphase of Phase 4 when conditions more or less prohibited its ample expression) produced momentary increase in blood pressure (the noradrenalin effect) and a consequent decrease in the heart rate in some subjects.

2. Again note that the heart rate was high at the end of Phase 4, by which time most subjects had become engaged in self-defensive refutations and still higher in Phase 6 when they were both most talkative and most offensively aggressive. Taking this covariation of heart rate and vigorous verbal activity in conjunction with the fall in level during the first two-thirds of each resting period, as well as with the other pertinent facts that I have mentioned (e.g., the rise of the heart rate at the end of each of three inactive periods, and the additional rise beyond this point, in all instances, as the subject went from inaction to interaction), the data exhibited in our graphs all point to a positive correlation of the heart rate with (a) anticipated interactivity of a certain sort and (b) with the first phase of actual interactivity. After that, if the intensity level of the interactivity decreases or remains constant, the heart rate will decline; but if the intensity level increases the heart rate will rise or remain constant. Viewing these facts within a functional frame of reference, we might say that the circulatory system of the majority of our subjects was overprepared (by nervous excitement) for Phase 2 and for Phase 6 (i.e., the subjects anticipated, consciously or unconsciously, more stressors, more demands for quick, difficult, and effective responses, than they subsequently encountered), and as they came to the realization that the situational demands were not so pressing (less than they were physiologically prepared to meet), their heart rates fell to a level that was appropriate to the apperceived current state of affairs. This well-known habitational, or homeostatic, fall of the heart rate, particularly in Phase 2, was the cause of numerous negative intrasubject correlations between heart rate and anxiety (nervous excitement); because, since the subjects were not filmed during any of the inactive periods, the judges had no grounds for inferring a high level of anxiety at the very start of the interaction. Generally speaking, the judges started Phase 2 (the first phase to be observed in the movie) at zero and moved up as signs of nervousness appeared and reappeared and their confidence in the significance of these signs became less wavering. Therefore, while the judges' tracings for anxiety were mounting ("catching up" to the subject's current emotional state) the subject's heart rate was declining. This was but one of many unexpected complications we encountered.

My first reason for showing the two graphs of average heart rate changes during the dyad was to illustrate the general principle (which applies to data such as ours) that, above an ascertainable low limit, the shorter the time segment which is represented by a single figure, the greater will be the amount of usable information to be gained by mere inspection. My second reason was to point out the suitability of the synchronized mesotemporal graphs of our major variables: They present nine opportunities for intersubject correlations between the rank orders of the average subphase intensities of the variables and eight opportunities for intrasubject correlations of their concurrently changing intensities between subphases. Besides these we have the opportunity

afforded by the macrotemporal graphs for three more sets of intersubject intercorrelations and finally a set of intercorrelations based on average variable intensities for the total dyad, yielding in all 13 intersubject correlation coefficients for each pair of variables. Finally, to end this paper with a little meat to chew on, it was my intention to summarize the unexpected results of the execution, by Paul Gross and others, of some of the just-enumerated possible correlations for comparison with the information gained through a close inspection of the mesotemporal graph (Figure 2).

The first surprise, if not distress, was occasioned by the finding that the elevated heart rate, calculated in the manner I described earlier, was correlated to a significant degree with *none* of our major variables, in *contrast* to the absolute heart rate which correlated positively with all our “activity” variables, in two instances at the 5% level of significance. This result, which at first blush runs counter to accepted principles of measurement in physiology, constitutes a riddle for which I have no ready answer, except to report that the correlation of $-.78$ between basal heart rate and elevated heart rate might conceivably be the key to its solution. In any case, the average of 13 rank order correlations were significantly positive between absolute heart rate and both of our two measures of manifest drive, or need achievement, in the dyad (the apparent degree of continuous concentration and emotional-mentational-verbal energy devoted to the accomplishment of the assigned task): (a) *vocal-verbal intensity*, aver. $+.45$ (range from $+.19$ to $+.59$, with all but one over $+.34$); and (b) *task-involvement*, aver. $+.42$ (range from $+.31$ to $+.56$). The fact that these correlations are all positive, that they are consonant with all the data presented by the graphs, and that they make functional sense, suggests that individual differences among our subjects in respect to basal heart rate and degree of sensitivity of the neurocardiac system were not so great or influential as to cancel the possibility of demonstrating a consistent relationship between motivation and heart rate under the stressful conditions that existed in the dyads. The comparably high heart rates of surgeons while performing major operations could likewise be attributed to this functional relationship. Also positive, but to no significant degree, are the correlations between HR and (c) *manifest anger*, aver. $+.30$ (range from $+.11$ to $+.49$), and (d) *gross muscular motility*, aver. $+.29$ (range from $+.16$ to $+.35$). Most surprising was the absence of any correlation with (e) *anxiety*, aver. $-.03$ (range $+.15$ to $-.28$), and a not-yet-explained, slightly negative correlation with *press* (the alter’s *vocal-verbal* intensity and *aggressiveness*), aver. $-.26$ (range $+.04$ to $-.58$). The averages of the intrasubject correlations were also significantly positive for absolute heart rate and vocal-verbal intensity, gross muscular motility, and task-involvement, in that order, and insignificantly positive for press and anger. The correlation with anxiety was in this case slightly negative.

As to anxiety, we might first of all raise the question of whether this is the most appropriate term to apply, say, to a surgeon at the start of a difficult emergency operation. His nervousness is not morbid anxiety in the Freudian sense (fear of conscience), nor is it associated with any tendency to escape, to withdraw, or to avoid, in the usual sense: Surgery is his chosen profession and here is his opportunity to save a life and

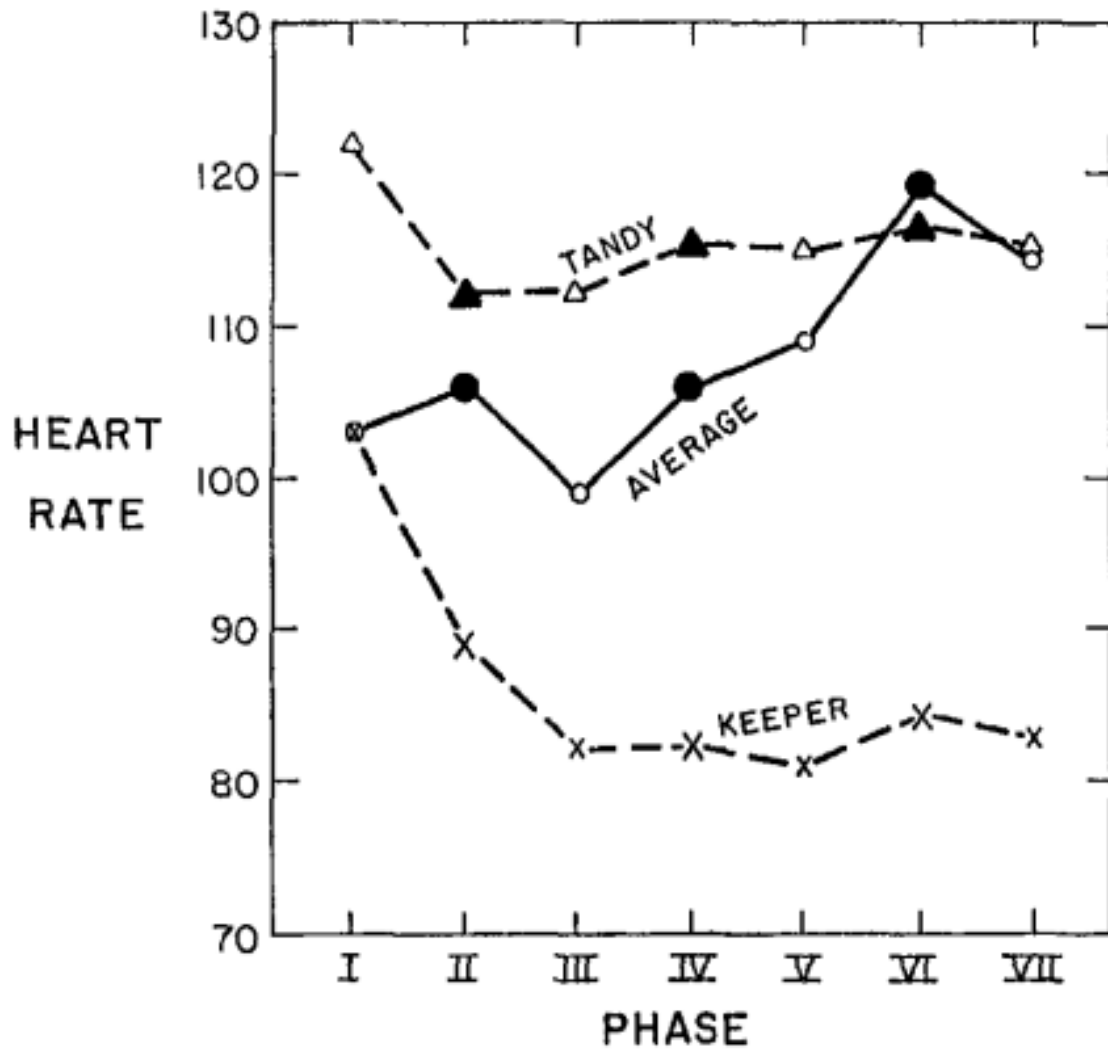


Fig. 3. Average heart rate of two deviant cases compared to group average.

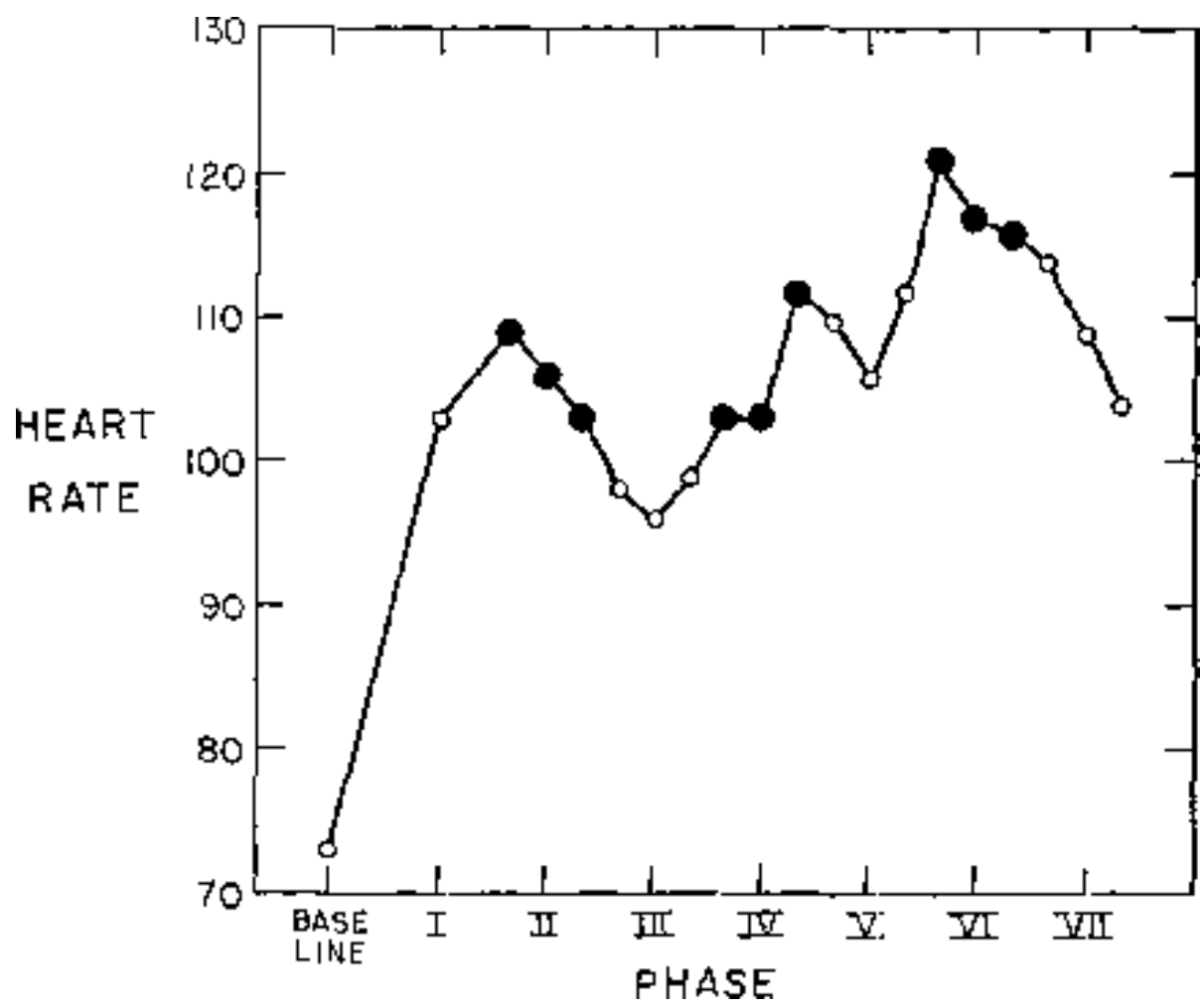


Fig. 4. Average heart rate for seven subjects with highest drive and seven subjects with lowest drive.

thus to achieve an all-important result. It might be said, however, that he is bent on avoiding disaster for both his patient and himself. But, regardless of these and other objections, I shall continue to use the term “anxiety” for the duration of this paper to stand for a nervous apprehension of the forthcoming possibility of experiencing some sort of acute pain, distress, failure, exposure, shame, or disgrace. Now, despite the fact that none of our rank order correlations between heart rate and anxiety were positive, it is clear from the graph that the effect of pre-panic anxiety (nervous excitement) on the heart rate (elevating it 33 points on the average) is greater than that of any other definable variable, that is to say, heart rate and anxiety *are* in fact positively correlated, as effect and cause, or cause and effect, in all subjects. The contradiction can be explained, in functional terms, by assuming that anxiety (situational fear) is a mobilization of energy for emergency action in a situation that is apprehended as perilous. If the anxiety is high and a resulting drive to overt action is correspondingly high, particularly if the drive is combined with anger as well as an increase of gross motility, the heart rate will be in the highest range, and since the signs of anxiety will be largely obscured or inhibited by the vigorous and focused ongoing- activity (verbal in our experiments), the subject will be given a rather low rating on anxiety and a very high rating on both vocal-verbal intensity and task involvement (see the curve of Tandy in Figure 3). If, on the other hand, an equally high degree of anxiety results in a form of action which may be termed “surrender and submission,” with extrapunitiveness replaced by a mild intrapunitiveness, the heart rate will fall and remain at a low level, as one can see in the case of Keeper, also represented in Figure 3. Keeper will receive low ratings on vocal-verbal intensity and high ratings on manifest anxiety. This, in brief, is a partial explanation of the absence of positive correlations between heart rate and anxiety.

And now I have come to the end of my allotted time, with only a few seconds in which to show one last figure (Figure 4) in which the average heart rates of seven subjects with the highest drive ratings are compared with the average heart rates of seven subjects with the lowest drive ratings.

A critique of his ideas & actions.



Studies of stressful interpersonal disputations
1963

American Psychologist, Vol 18. DOI: 10.1037/h0045502

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