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The role of anger, anxiety, and sadness in essential hypertension.

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THE ROLE OF ANGER, ANXIETY AND SADNESS IN ESSENTIAL HYPERTENSION

A Dissertation Presented

By

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ABSTRACT

THE ROLE OF ANGER, ANXIETY AND
SADNESS IN ESSENTIAL HYPERTENSION

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The purpose of this study was to explore the emotions of anger, anxiety and sadness in 60 patients diagnosed as essential hypertensives and a control group of 60 friends and/or relatives of the patients without a history of hypertensive or heart disease. The Anger-Fear-Depression Scale, the Primary Emotions and Traits Scales, and the Irritability and Resentment scales of the Buss-Durkee Hostility Inventory were administered individually to each participant.

Hypertensives scored significantly higher than controls on the Hostility Avoidance and Physiological Arousal scales of the AFD. Analysis of the individual AFD items provided further evidence that the hypertensive patients tended to be higher on symptoms of anxiety and physiological arousal, on proneness to anger, and on guilt and inhibition associated with the expression of anger.

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CHAPTER I

INTRODUCTION

Hypertension is a disorder that has interested researchers concerned with behavioral physiology for over three decades. Estimates of its prevalence vary from 10% to as high as 30% of the total adult population, depending on how it is defined. Between December, 1973 and December, 1975, more than one million persons were screened nationwide in the Community Hypertension Screening Clinic Program at 1,171 sites. Of those screened 247 per 1,000 had a diastolic reading of 90 mm Hg or higher; 116 per 1,000 had a reading of 95 mm Hg or greater. Prevalence of elevated blood pressure with individuals up to 50 years old was higher in Blacks than in Whites, and was higher in men than in women (Stamler, et al., 1976; Harburg, et al., 1973; Pickering, 1961, 1967).

Although there exists considerable disagreement over the definition of hypertension, it is safe to say that among persons up to 50 years of age, a blood pressure of 145/95 mm Hg would be classified as mild hypertension. Hypertension in its early stages is asymptomatic, that is, it is not accompanied by any overt signs. Consequently, as many as 50% of all cases of hypertension go undetected (Onesti, Kim, & Moyer, 1973). More than 90% of all cases of hypertension are of unknown etiology; they fall into the category of primary or essential hypertension. With no known physical etiology, essential hypertension is defined solely by the presence of a chronic elevation in blood pressure. The remainder, labeled

secondary hypertension, is due to identifiable renal, endocrine, neurogenic, and other disorders (Seer, 1975).

While the medical community is not in agreement about the significance of psychological factors in hypertension, there is evidence that the disorder is related to and can be aggravated by behavioral, social and environmental conditions. Hyperactivity of the sympathetic nervous system may be a major factor in the elevation of blood pressure, particularly in the early stages of the illness, as evidenced by increased heart rate, high cardiac output and increased cardiac contractibility. This hyperactivity may occur in individuals who are particularly susceptible by reason of genetic, environmental or behavioral factors such as obesity, smoking or particular personality and emotional patterns (Shapiro & Surwit, 1976, p. 80).

According to a review of the hypertension literature conducted by Crane (1981), she asserts the following:

> In the psychosomatic literature, the emotion of anger has been considered a critical variable in essential hypertension. As early as 1939, Franz Alexander hypothesized that hypertensives struggled against their feelings of anger and had difficulty expressing them. Alexander assumed that the experience of anger leads to prolonged sympathetic nervous system overactivity. He also assumed that the experience of anger, and anxiety about the consequences of its expression, leads to the suppression of anger which further influences the cardiovascular system eventually producing hypertension.
>
> Stimulated by Alexander's psychosomatic hypotheses, there has been a great volume of research on the role of anger and and its suppression in hypertension. The particular methodology employed in these studies has paralleled the conceptual and methodological trends in vogue at that time within psychology and psychiatry. During the 1940s and early 1950s clinical case methods

were used in most studies. In the 1950s and early 1960s most investigations employed projective techniques. More recently, objective personality measures have been used. While findings from early investigations are consistent with Alexander's hypotheses, findings from investigations using more objective methodology are inconsistent and equivocal.

Conceptual ambiguity has been a major source of difficulty in measuring anger, hostility, and aggression in hypertension research. During the last few years, however, there have been important advances in the conceptualization of anger and hostility, and in the development of valid measures of these concepts. The utilization of these new psychometric instruments in hypertension research can provide a more meaningful test of Alexander's hypotheses.

Research on the Psychophysiological Correlates of Blood Pressure and Essential Hypertension in Man

This section summarizes a review of studies (Weiner, 1977) dealing with the role of psychological stimuli, in particular the negative emotions (anger, fear and anxiety) in changing blood pressure. Psychophysiological studies on patients with essential hypertension have been carried out with several purposes in mind. The one which has relevance to this investigation involves those studies that assessed the role of simple and complex psychological stimuli and the emotions they elicit in changing blood pressure.

Psychophysiological studies are fraught with technical, methodological, and conceptual problems. The fact that elevations of blood pressure occur in hyptertensive patients in response to psychological stimuli does not constitute prima facie evidence that psychological stimuli have etiologic or pathogenic relevance to the disease. Similarly, short-term changes in blood pressure produced in the laboratory do not necessarily provide us with important

insights into the nature of sustained high blood pressure. Another methodological problem in such studies is the tendency to study only one or two cardiovascular variables, such as heart rate and blood pressure. Such studies may be misleading, because profound hemodynamic changes (for example, in regional blood flow) may occur without a discernible change in blood pressure. Several cardiovascular variables must be studied simultaneously in psychophysiological studies.

Because of the repeated clinical observations that patients with essential hypertension harbor strong feelings of anger, there have been attempts to correlate anger with cardiovascular responses (Moses, et al., 1956; Schachter, 1957), and to contrast these responses with those obtained when fear, pain or anxiety are elicited. Schachter (1957) produced these cardiovascular responses as follows: pain was produced by immersion of the patients' hand in ice water at 3° C for one minute, anger was stimulated by insult and abuse, and fear produced by a mild electric shock. In hypertensive patients greater increments in blood pressure occurred (between two control periods) in the three situations designed to produce, respectively, pain, anger and fear compared with normotensives. In both the pain and anger conditions, diastolic blood pressure rose significantly because of increased peripheral resistance, whereas fear produced increases in systolic blood pressure as the cardiac output increased.

In Schachter's experiment (1957), the situation designed to produce pain, immersion of a limb in ice water, has often been used to measure blood pressure reactivity in normal and hypertensive

subjects. The effects of mild pain and vasoconstriction are confounded in such experiments. Pain and other feelings interact with vasoconstriction. Blood pressure reactivity is greater when the cold immersion test is given to anxious patients than to controls (White & Gildea, 1937). Blood pressure reactivity is also greater in neurotic (Malmo & Shagass, 1952) and angry (Cranston, et al., 1949) patients than in calm ones.

Heart rate and blood pressure changes have been used to infer or measure the associated humoral changes that correlate with specific affects (Schachter, 1957). When overt aggression and active emotional states are elicited in subjects, norepinephrine secretion occurs, whereas when anger is handled intrapunitively, urinary epineprhine levels are increased in normal subjects (Cohen, et al., 1957; Cohen & Silverman, 1959; Elmadjian, et al., 1957). The relationship between blood catecholamine excretion, and mental stress depends in part on the state and stage of hypertension. It may be, for example, that borderline hypertensives have different cardiovascular dynamics and catecholamine levels than patients with well-established hypertension or normals. Nestel (1969) has re-examined this problem by studying 17 normotensive subjects and 20 patients with mild labile hypertension. The diagnosis of labile hypertension was based on an outside doctor's history of at least two readings of 160 mm Hg systolic and 100 mm Hg diastolic or greater and at least one reading of 140/90 mm Hg or less obtained on separate days. None of the patients had been treated. The controls were eight inpatients or outpatients being investigated for minor disorders of lipid metabolism and nine healthy volunteers.

Basal urinary excretion levels of norepinephrine and epinephrine were the same in both groups of subjects. The subjects were asked to solve visual puzzles--the Raven's matrix test--for 40 minutes. Much greater increments in systolic (Δ = 35 mm Hg) and diastolic (Δ = 25 mm Hg) blood pressure occurred in the labile hypertensive group than in the normotensive group. The urinary output of norepinephrine and epinephrine rose in all subjects, but the increases were significantly greater in the hypertensives, rising in 17 of the 20. By comparison, the urinary output of the neurotransmitters rose in only 7 of the 17 normotensive subjects. Mean postexperimental levels of catecholamines were also higher in the hypertensive group. The changes in urinary catecholamine levels correlated significantly with changes in blood pressure levels, particularly in the labile hypertensive group.

Psychophysiological studies have shown that each person responds physiologically to a variety of stimuli in his own manner; hypertensive persons, in general, have larger blood pressure responses than normotensive persons. In most early laboratory studies the experimenter attempted to provoke a particular feeling in his subjects. In more recent studies, feelings were not purposely provoked. Instead, the experimenter or an observer of the interaction of the experimenter and the subject observed the individual's psychological style.

In other experiments, observations were focused on the style in which the subject and experimenter related to each other, while the blood pressure and other hemodynamic changes were measured. Weiner,

et al. (1962) found that hypertensive subjects were more unreactive physiologically than normotensives because they interacted little with the experimenter. One hypertensive subject who had previously been unresponsive physiologically was persuaded against his will to undergo the laboratory procedure on a second occasion. He equated the second experiment with a threat to his life. His distant style crumbled, and a very brisk, long-lasting blood pressure response occurred. These experiments demonstrate that the nature of the experimenter-subject relationship and the effectiveness of a habitual style of relating to the experimenter may be the critical determinants in producing cardiovascular changes in the laboratory. As long as a style "works", no changes occur in the normotensive or hypertensive subjects. The detailed findings of this study have been verified (McKegney & Williams, 1967; Williams & McKegney, 1965; Williams, et al., 1972a). The findings shed some light on the complex interactions among the following variables: (1) the subject-experimenter relationship; (2) the manner in and success with which subjects cope with a task and an experimenter; and (3) changes in cardiovascular function.

Hypertensive patients have individual styles of relating to physicians and experimenters in the laboratory. They keep their distance from them and avoid close personal involvements. They eschew relationships because they perceive the physician to be hostile, dangerous, coercive, or ungiving. If they cannot avoid the relationship, their blood pressure responses are greater and more prolonged than those of normotensive patients (Shapiro, 1973; Thaler, et al., 1957; Weiner, et al., 1962).

In summary, "coping" and "defensive" styles in man may be the critical intervening variables between the perception of a psychosocial stimulus, the psychological response (including the emotional one) to that perception, and the individual's physiological response to the stimulus. If these styles are successful, little physiological change occurs. If not, changes occur. The changes are greater and last longer in hypertensive patients than in normotensives. The specific feelings that a stimulus provokes are not associated with specific physiological changes. According to Weiner, anger does not uniquely raise blood pressure. Other feelings, such as fear and pain, are equally effective. Each person responds physiologically in his own manner to a variety of feelings and stimuli, but hypertensives respond with brisker and more enduring blood pressure responses to a variety of psychological tasks and feelings, as well as to cold and pain. Their cardiovascular responses are predetermined, individual, and hyperactive for unknown reasons. Their responses may reflect an intrinsic defect in the regulation of blood pressure that may antedate the disease. Hypertensive patients also have individual psychological responses to the experimenter and laboratory and cope differently with pain, cold, and cognitive tasks.

Critique of Psychophysiological Studies

Psychophysiological studies of essential hypertension have provided empirical support for the link between emotional arousal and blood pressure reactivity. Hypertensives typically respond to experimental inductions with pressure elevations of greater magnitude

and duration than normotensives. Nevertheless, the literature fails to clarify fully either the mechanisms underlying this reactivity or the disorder of hypertension itself, partially because of methodological inadequacies. Heterogeneity among hypertensives is extreme in both the psychological and physiological domains. According to Weiner (1977) researchers have often neglected to report such sample characteristics as phase of hypertensive disease, sex differences (men and women have been compared neither within a single study nor across studies), onset and duration of illness, diet, medication, and family history data. Other variables of great importance are patient status (pychiatric referral vs. inpatient vs. outpatient vs. volunteer) and diagnostic procedure. Diamond (1982) stated that differential diagnosis of secondary as opposed to primary hypertension has been overlooked. The process of diagnosis and the criteria for inclusion in a hypertension study need to be clearly outlined.

Research on Interviews and Projective Tests That Examined the Relationship Between Anger, Hostility and Other Personality Variables and Essential Hypertension

According to many experts in the field who have researched the relationship between anger, hostility and other negative emotions and essential hypertension, it is widely believed that environmental and personality factors play a significant role in causing and maintaining essential hypertension. Epidemiological studies have suggested a consistent relation between elevated systemic arterial blood pressure and environmental conditions which require continous behavioral adjustments from the individual. Psychological and

personality factors determine in part the individual's behavioral response to his environment (Gutmann & Benson, 1971).

Numerous investigators have postulated a "hypertensive personality" and attempted to demonstrate a relation between elevated systemic arterial blood pressure and specific personality traits or characteristics. Earlier studies depended primarily on subjective descriptions of hypertensive patients (Alexander, 1939; Ayman, 1933; Hamilton, 1942; Palmer, 1950; Tucker, 1949) which varied considerably in terminology, content and emphasis.

Some studies emphasized a discrepancy between the overt behavior and underlying motives of hypertensives. For example, Wolf and Wolff (1946, 1951) noted a superficial affability that overlay suspicion and a strong desire to act aggressively. Patients appeared to be restraining their aggressive drives while attempting to please others. Similarly, Binger (1951) observed exaggerated dependency needs, submissiveness, feelings of weakness and defenselessness, suppression of hostility, fear of injury, and emotional detachment. Hambling (1951) attributed the suppressed rage he observed in hypertensives to parental rejection.

Alexander (1939) advanced the notion of a "central conflict" in hypertensives between hostile impulses and passive-dependent needs. Hostility was described as motile, always accompanied by anxiety, incompletely repressed, and incapable of adequate overt expression. Alexander believed that hypertensives lacked a fantasy life and were incapable of forming a "structured neurosis". Support for Alexander's hypothesis came from the clinical work of Saul (1939), who reported

on the psychoanalyses of seven hypertensives; in most cases, chronic, intense, and strongly inhibited hostility emerged as the central issue. Developmentally, these patients had been embroiled in conflict with a dominating parent, which engendered a submissive solution against which the patient unsuccessfully attempted to rebel. Frustration of dependency ("oral") needs was seen as contributing to the chronic rage.

Reiser, Brust, and Ferris (1951) conducted a multidisciplinary study correlating onset of hypertensive illness with precipitating life events and psychodynamic structure. They concluded that the course of illness was accelerated when life situations evoked unresolved feelings that could not be repressed through habitual defense mechanisms. Although individuals did differ as to underlying conflicts, frequently noted conflicts involving dependency versus hostility related to parental figures; hostility toward siblings; and fear, guilt and hostility in social situations. It is interesting that the likelihood of uncovering a link between life events and disease onset increased linearly with the extent of psychiatrist-patient contact, suggesting either that some of the relation was artifactual or that more intensive study of patients than is customary in research would reveal such a connection more often.

In a clinical study comparing psychoneurotics, character-disordered patients, and essential hypertensives, Moses, Daniels, and Nickerson (1956) found that mild hypertension was more related to anxiety than to hostility, whereas hypertensives with markedly elevated pressure exhibited predominantly rage and hostility. Moses,

et al. concluded that hypertensives "mobilize anxiety and rage in response to frustration of basic dependency, security, and status needs ... affects are suppressed, only partly repressed, minimally bound in specific psychic symptoms, and inadequately discharged through verbalization or motor activity."

Various personality traits have been studied in potentially hypertensive subjects (those with a family history of hypertension) in order to determine a possible causal relation between personality and hypertension. The results of these studies have been inconclusive (Ostfeld & Shekelle; Thomas, 1967). "Prehypertensive females (subjects with blood pressure readings in early adult life which exceed 140 systolic or 90 diastolic or both) were found to respond differently than controls to psychological stress (Harris, 1967; Harris, et al., 1953; Kalis, et al., 1961; Sikolow, et al., 1961). They were less well controlled, more impulsive, more egocentric, and generally less adaptable in "stressful" situations. The implications are that the prehypertensive females were less able to deal with situations involving psychological stress and were therefore more likely to exhibit the autonomic nervous system concomitants of emotions, including repetitive rises of blood pressure. Unfortunately, blood pressure measurements were not made during the "stress" interviews. Also the size of the original sample was reduced to less than one-third by the second follow-up eleven years later, and data concerning the incidence of hypertension were not available.

All of these studies have been criticized because they are based on subjective impression (Davies, 1971). Many critics are dissatis-

fied with the methods of clinical observation and inference. Yet, it is remarkable how consistent the clinical descriptions of hypertensive patients are. Nonetheless, they need to be verified by more objective tests. Saslow and his coworkers (1959), using psychiatric interviews, confirmed the fact that hypertensive patients have certain traits; they are less overtly assertive and manifest compulsive character traits more often than normotensive patients who had personality disorders. Thaler and her coworkers (1957) and Weiner and his (1962) further attempted to specify the nature of the hypertensive patient's interpersonal relationships by studying how these patients perceive and interact with their physicians. These data were gathered through the use of projective responses on Doctor-Patient Projective Stories, The Facial Expressions Test in which they focused on the "role" of the patient, the perception of relationships with others and feeling states in them and the Rorschach. The implicit aim of these studies was to identify how hypertensive patients perceive other people and how that perception affects their relationships to them. These studies made no explicit or implicit assumption that either the patient's perception of, or relationships with, others had etiologic or pathogenic significance for the disease. They found that hypertensive subjects perceive other people as dangerous, derisive, and untrustworthy. Because of this perception, hypertensive patients attempt to maintain a distant relationship. Paradoxically, they provoke others and are alert to anger and hostility directed toward them, the very reactions they most fear.

This interpersonal style in the manner in which hypertensive subjects defend against personal involvements was also observed by Grace and Graham (1952) who verified their findings in a later study (Graham, et al., 1962b). In the first study (1952), one hundred and twenty-eight patients who had one or more of the following symptoms or diseases as responses to life situations were studied: uritaria, eczema, cold hands, vasomotor rhinitis and asthma, diarrhea, constipation, nausea and vomiting, duodenal ulcer, migraine, arterial hypertension, low back pain. It was found that each of these conditions was associated with a particular, completely conscious attitude toward the precipitating situation. There were, in other words, physiological changes specific to each attitude. These changes were biologically appropriate to the attitudes that accompanied them. It was proposed that "emotion" be defined to mean "an attitude with its associated physiological changes." In a subsequent research project (Graham, 1962), two interview studies with hospitalized patients investigated whether attitudes predicted to be associated with diseases were more applicable to patients having the disease in question than to patients who did not have the disease. There were 16 patients with eight diseases in the first study, and 20 patients with ten diseases in the second study. Half of the patients, matched for disease, were interviewed by a psychologist unfamiliar with the specific predictions of the hypothesis under investigation. The recorded interviews were edited to remove references identifying diseases and were submitted to two medical and two nonmedical judges. Judges selected from a list of 18 previously described attitudes the three attitudes most

similar to those expressed in each interview. They also ranked all 18 attitudes in the order of their applicability to the patient. It was concluded that different psychosomatic diseases are associated with different attitudes. The association was demonstrated even when a naive interviewer and naive judges were employed. The observations of Thaler and coworkers (1957) were put to the test by Sapira and coworkers (1971) by a different method: 19 hypertensive and 15 normotensive patients were shown two movies, one depicted a rude and disinterested physician and the other a physician who was at ease and related with patients in a warm and kindly manner. The hypertensive patients had significantly greater blood pressure and heart rate responses while viewing the two films and during a later interview. The hypertensive patients denied perceiving any differences between the actions and attitudes of the two physicians. The normotensive group could tell the difference in the behavior of the two physicians. The interviewer evoked greater blood pressure response in hypertensive patients when he played the role of the interviewer and physician in the movies than when he only played the role of the interviewer (Sapira, et al., 1971). Of considerable interest was the absence of a difference in response between the exposure to the good doctor, pariticularly in the hypertensive group. The authors postulate that the hypertensive patients screen out the perception of the differences between the "good" and "bad" doctor while still showing blood pressure changes in order to defend against their cardiovascular hyperactivity. The patients in this study presumably did not state that they could tell the difference between a "good" and "bad" doctor because to admit

that they saw one would be tantamount to seeing the other.

Because no agreement has been reached about the role of hostility in the etiology or pathogenesis of essential hypertension, it might be worthwhile to review the attempts to verify clinical impressions by predictive psychiatric and psychological studies. Notable among these are studies carried out by Alexander and his colleagues (1968). The psychological criteria used to differentiate hypertensive patients in this study were that they were

> struggling against aggressive feelings and had difficulties in asserting them. The patients were afraid to lose the affection of others and had to control the expression of their hostility. In childhood the patients were prone to outbursts of rage and aggression. As they matured and developed the angry attacks came under control. Consequently they became overtly compliant and unassertive. As adults they persevered doggedly often against insuperable obstacles. When promoted to executive positions they encountered difficulties because they could not asert themselves or make others follow their orders. They were overconscientious and too responsible. Their conscientiousness only increased their feelings of resentment at self-imposed tasks.

The onset of hypertension was brought about by events that mobilized hostility and the urge for self-assertion but at the same time prohibited their free expression.

About 40% of the hypertensive patients were correctly diagnosed by nine judges. Male hypertensives were more often correctly diagnosed than female ones. This study attests to the fact that these criteria may not be correct in all patients, especially women. It suggests that patients with essential hypertension are psychologically heterogeneous. The psychological heterogeneity of hypertensive patients may reflect the physiological heterogeneity and

stage of the disease. Alexander's study was an attempt to validate his formulations about aggressive conflicts and how they are expressed. A better research strategy is to predict before onset who will develop essential hypertension. But, as has been noted, no criteria for predicting who is at risk for the disease have been developed, except that it occurs more frequently in children of parents with hypertension.

The hypothesis of a "hypertensive personality" was critically reviewed by Glock and Lennard (1957). They concluded that the hypothesis has neither been consistently formulated by different investigators nor theoretically integrated. The major difficulty was that the psychological components of the "hypertensive personality" were not described with sufficient precision to permit objective measurement by investigators. Finally, supporting evidence was limited, particularly with respect to the hypothesis that certain personality traits are specific to hypertensive patients.

Thus, the concept of a "hypertensive personality" remains ambiguous and lacks both experimental support and theoretical meaning. The study of personality characteristics in potentially hypertensive subjects and hypertensive patients has contributed little to the understanding of how individuals interact with their environment, and how the interaction is related to the development of hypertension. Behavioral responses to environmental situations may differentiate hypertensive from non-hypertensive groups. However, the evidence is incomplete and limited to select groups of subjects (Gutman & Benson, 1971). In terms of motivation theory, they have a strong need for

power (n Power) (Winter, 1973), but are inhibited in expressing it directly (McClelland, 1976). Men strongly motivated by n Power think more about affecting others by aggressive or other means, report that they get into arguments more often, and are focused on controlling or expressing anger, depending on the stage of their maturity (McClelland, 1975).

McDonough (1964) investigated whether unexpressed aggression, as measured by a special use of the Rosenzweig Picture Frustration (PF) Test and a perceptual defense task involving neutral and aggressive words, differs between hypertensive and normotensive patients. Each subject was administered the Rosenzweig PF Test. For the first half of the test he was instructed to reply "as you think you really would if you were in that situation--sometimes you feel like saying something but don't actually say it--write what you think you would really say." For the second half of the test (which was administered during the same session) S was told "write down what you would feel like saying if you were in that situation--whether you think you would actually say it or not, just write what you'd feel like saying." S's score was his total E (extra-punitive) score on the second half of the test minus his total E score on the first half. It was assumed that the difference in directions for the two halves of the test would result in some release of aggression in the second half which has been inhibited in the first half. McDonough's results indicated that there was no evidence to suggest any difference between the two groups of patients in regard to difficulty in dealing with aggression. He concluded that the lack of difference between the

hypertensives and controls on the PF score may be attributed to inability to tap the deep-rooted aggressive needs.

Lee, Carstairs, and Pickersgill (1971) attempted to measure repressed hostility by using a recall task of pin figures which illustrated needs. The authors assumed that repressed needs would show a significant tendency to be recalled later. Their findings indicated no significant differences between hyptertensives and controls.

Critique of Non-Objective Procedures

Early investigations using interview methods were rather consistent in their emphasis of the role of anger and hostility in essential hypertension. Nevertheless, methodological weaknesses limit the strength of the argument for an etiological role of hostility. First, the formulations of the "hypertensive personality" were not well integrated. The specificity of both the personality pattern and Alexander's "central conflict" to the hypertensive population is open to question. Control groups of other "psychosomatic" patients or physically well persons were not typically used, a strategy needed to confirm the specificity of the personality or conflict hypotheses.

Second, observations were gathered on a limited number of psychiatrically referred cases, raising serious questions about generalizability. Although rather large samples were employed relative to most other psychiatric studies at the time, the basis for conclusions was rarely explicit.

Third, age, sex, and socioeconomic status were often not reported

(Glock & Lennard, 1957). Given the heterogeneity in the hypertensive population and the aforementioned progression in the course of the illness, such factors are of obvious relevance.

Fourth, because personality traits and conflicts were assessed concurrently with blood pressure levels, the direction of causality is unclear. Weiner (1977) advocated a conservative position permitting only the inference that personality variables seem to covary with pressure. According to Harrell (1980) the projective techniques, and more esoteric techniques like dream analysis and psychodrama, have tended to reveal strong hostility and resentment at deeper layers of the personality. A global portrait drawn from these findings would depict the hypertensive as a conflicted individual ridden with hostility and resentment, constantly guarding against impulse expression, with distancing, suppression, submission, and/or compliance.

Research on Objective Tests That Examined the Relationship Between Anger, Hostility and Other Personality Variables and Essential Hypertension

Crane (1981) conducted a review of the literature regarding the use of objective tests in essential hypertension research. Portions of this section are abstracted from that review:

> Recent research relating anger, hostility, and aggression to hypertension has employed more objective measurement rather than interpretative reporting of clinical cases or projective techniques. Three preliminary studies using the questionnaire methodology were reported quite early in the hypertension literature (Ayman, 1933), in what may be the earliest study using a questionnaire, compared 95 young and old hypertensive patients with 87 general medical patients.

His 15-item questionnaire included anger and anxiety items. Fifty-three percent of the hypertensives stated that they were "unusually quick-tempered" compared to only 13 percent of the controls. Hypertensives also reported that they had been "unusually high-strung" and that they had "worried unusually easily over little things throughout their lives."

In a second early study, Hamilton (1942) found that high blood pressure college students reported losing their temper more rapidly than low BP college controls (as measured by a life history questionnaire). There was also a nonsignificant trend for high BP subjects to be more susceptible to anger as measured by their anger rating scale. On the basis of these findings, one would expect that individuals who were more susceptible to anger would report being annoyed more frequently in different situations. Surprisingly, however, Hamilton found control subjects to experience more frequent annoyance, as measured by the Harsh Annoyance Inventory.

In the third early questionnaire study, Storment (1951) found no significant differences between hypertensives and controls on the 13 personality variables of the Guilford-Martin Inventory, which included a nervousness and irritability scale but no anger or aggression scales. There was, however, a trend indicating that hypertensives were more critical of others than controls.

Thus, findings from early studies using an objective methodology are inconsistent. Hypertensives have been found to be more susceptible to anger (Ayman, 1933; Hamilton, 1942) but also to experience less annoyance in different situations (Hamilton, 1942). Additionally, Ayman (1933) found hypertensives to be more anxious, while Hamilton (1942) found them to be less anxious, than controls. Furthermore, Storment (1951) found no differences in "nervousness" and "irritability" between hypertensives and controls. It should be noted, however, that these early studies used different control groups as well as different measures of anger and anxiety which makes comparability of the results difficult.

In subsequent studies, this state of affairs has improved very little. Robinson (1962) used the Pressley Cross-Out List of Annoyances and the Maudsley Personality Inventory and found hypertensives more neurotic than normal controls. Unfortunately, his combined test of neuroticism did not provide information about the contribution of scores of the annoyance test which seems to tap the anger dimension. In other studies, global measures of personality traits which

include few items that measure anger have been used. Kidson (1973) found hypertensives significantly more depressed, angry and anxious on the Cornell Medical Index, while Berglund, Ander, Lindstrom, and Tibblin (1975) found that high blood pressure nonpatients scored higher in aggression than hypertensive patients and normal blood pressure controls as measured by the aggression scale of the Cesarek-Marke Personality Schedule.

Some studies measured the expression of hostility with the Foulds and Caines Hostility and Direction of Hostility Questionnaire (HDHQ), and compared hypertensives with other medical patients (Schonecke, Schuffel, Shafer, & Winter, 1972; Mattson, 1975) or with nonpatient controls (Cochrane, 1972; Mann, 1977). Using surgical outpatients as controls, Schonecke, et al. (1972) found that hypertensives scored significantly higher on "criticism of others" (extrapunitiveness scale). Cochrane (1973) found no evidence that high blood pressure is related to emotional instability (neuroticism) or the repression of hostility, while Mann (1977) found high blood pressure nonpatients to score significantly higher in "acting out hostility" and lower in "self-criticism." Inconsistent results using the same measure and similar control goups may be due to the fact that the HDHQ was originally designed to be used with psychiatric patients and the validity of its use with a non-psychiatric population has not been well established.

In one study, Mattson (1975) examined hostility and aggression in Blacks with essential hypertension using the Gottschalk-Gleser Content Analysis Scales and the Hostility and Direction of Hostility Questionnaire. It was hypothesized that hypertensive patients have greater inward hostility and less outward aggression than normotensives who are diabetic, diabetic hypertensives, and general medical patients. Furthermore, it was predicted that within the hypertensive group, measures of inward hostility would correlate positively with blood pressure, and measures of outward aggression would correlate negatively with blood pressure. The findings of the study indicated no overall differences between groups in the amount of hostility or

aggression. In the hypertension and general medical control groups, negative correlations of up to -.52 were found between measures of outward hostility and outward aggression and blood pressure readings. Positive correlations to $\underline{r}$ = .43 were found in the diabetic and diabetic hypertension groups between outward hostility and blood pressure. Measures of inward hostility did not correlate significantly with blood pressure.

In a study (Belfrage, 1979) that examined defensive styles associated with essential hypertension and peptic ulcer [utilizing the Defense Mechanism Inventory (DMI), the Embedded Figures Test (EFT) and the Distraction Contexts Test I (DCT I)] the obtained global defensive style profile for the hypertensive subjects indicated that they were more likely to direct hostility and aggression, and probably other strong negative affective reactions, onto themselves rather than outwardly. The two medical groups were found to be field dependent on the Embedded Figures Test when compared to matched control subjects. The finding that the hypertensive subjects were depending on a global defensive style and were field dependent provided additional evidence for a relationship between global defensiveness and field dependence. The authors concluded that "this frequent finding of field dependence for medical groups suggests some relationship between psychosomatic illness and global cognitive functioning." Shansky (1976) conducted a study to explore the relationship between the cognitive and perceptual behaviors measured by field dependence-independence and the psychosomatic disease of hyptertension. A Standard Rod and Frame Test was utilized to measure

this trait. In addition, the study measured the relationship between essential hypertension and various factors of personality measured by Cattel's 16 PF Test. Anger and hostility items were not included in this personality measure. The relationship of field dependence to hypertension was statistically confirmed, demonstrating a generalized level of inadequate functioning in the hypertensive group. The field dependent subjects performed poorly on the intelligence factor of the 16 PF, showing them to be more concrete and rigid. Field dependent subjects were also shown to be more "conservative, respecting traditional ideas," relying on external norms for self-definition. They were also shown to be astute, polished, and socially aware, assets which were said to be useful to individuals dependent on others because of their own emotional and perceptual limitations.

In a study conducted in Great Britain, Bulpitt, Hoffrand, and Dollery (1976) administered a slightly modified Middlesex Hospital Questionnaire to 946 patients with hypertension who were receiving treatment at two hospital clinics. The response rate was 90%. The variables measured by this instrument were free floating anxiety (FFA), phobic anxiety (PHO), obsessionality (OBS), depression (DEP), and hysteria (HYS). Compared with previously published results for the general population the hypertensive patients scored significantly higher on free-floating anxiety, phobic anxiety and depression. Male but not female hypertensive patients also scored high on obsession and hysteria. The high scores for hypertensive patients could not be closely correlated with any particular drug therapy with the possible exception of phobic anxiety and propranol in women but not

in men. There was a weak but statistically significant correlation between systolic blood pressure and both somatic complaint rate and phobic anxiety.

The hemodynamics of 12 male hypertensive subjects were studied (Pilowsky, et al., 1973) in a cardiac catheter laboratory before and after autonomic blockage. Blood pressure, heart rate, and total peripheral resistance levels were correlated with scores on the Edwards Personal Preference Schedule (EPPS), the IPAT Anxiety Questionnaire, the Cornell Medical Index (CMI), and a sentence completion test designed to assess aggressive feelings. The CMI consists of 195 questions relating to somatic and psychological functioning. Significant correlations were derived which indicated a relationship between hemodynamic measures and the "deference" scales of the EPPS, the IPAT Anxiety Score, and the CMI score. These findings support previous studies which have emphasized the role of suppression of emotions in the genesis of hypertension.

Better methodology has been used in a study conducted by Harburg, Erfurt, Havenstein, Chape, Schull, and Schork (1973). They selected samples of black and white males, ages 25 to 60, from different areas of Detroit, with areas chosen for variation in terms of high and low socioecological stress conditions. The expression of anger was assessed using the "anger in-anger out" scale, in which the predominant reaction of inwardly directed anger, combined with guilt, to various situations of attack by authority figures constituted the operational definition of suppressed hostility. These items were structured as follows: Attack by Policeman--"Now imagine that you

were doing something outside and a policeman got angry or blew up at you for something that wasn't your fault, how would you feel?" and, Attack by Houseowner--"Now imagine that you were searching to find another place to live in, and finally found one for sale or rent which you liked, but the owner told you that he would not sell or rent to you because of your religion or national origin or race. How would you feel about that?" The response categories for both items were as follows: 1. I'd get angry or mad and show it; 2. I'd get annoyed and show it; 3. I'd get annoyed, but would keep it in; 4. I'd get angry or mad, but would keep it in; 5. I wouldn't feel angry or annoyed." Results of this investigation indicated that the systolic and diastolic BP averages (adjusted by age, weight, and other variables) for black high stress males were significantly higher than other race-stress male groups. In this study, suppressed hostility referred to a coping process of inhibiting negative attitudes in situations where the person is the target of appraised noxious stimuli (attack) from a source of power. Operationally, suppressing hostility to such an attack involved (a) not overtly displaying hostility to the attacker, and (b) feeling that such display should arouse guilt. Suppressed hostility was related to hypertensive blood pressure for high-stress black and white males.

Also, using the "anger in-anger out" scale (Harburg, 1973) Esler, Julious, Zweifler, Randall, Harburg, Gardiner, and De Quattro (1977) compared high and normal renin hypertensives with a control group of normal BP nonpatients. The Buss-Durkee Hostility Inventory and the IPAT Anxiety Scales were also administered. Plasma renin

activity is elevated in some patients with essential hypertension--either very mild hypertension, or severe or accelerated disease. In severe high-renin essential hypertension hypertensive retinopathy is invariably present, and renal function is commonly impaired: the elevated plasma renin activity is presumably an expression of arteriolar damage in the kidney. With the Buss-Durkee, suppressed hostility was inferred from low scores on "aggressive actions" combined with normal or high scores on "hostile feelings." Esler, et al. (1977) found that high renin hypertensives scored significantly higher in suppressed hostility as measured by the anger in-anger out scale. Hypertensives also scored higher than the other groups in the Buss-Durkee Resentment and Suspicion Scales (hostile feelings), and lower in the Verbal and the Irritability Scales (aggressive actions).

Esler, et al. (1977) concluded that suppressed anger, through its effects on the sympathetic nervous system leads to hypertension. Suppressed anger had been previously found to be responsible for sustained blood pressure elevations (Baker & Schaie, 1969; Gambaro & Rabin, 1969; Hokanson & Sheler, 1961; Hokanson & Stone, 1969; Oken, 1960). Results from the anxiety scales indicate that normal renin hypertensives score higher than the other groups in anxiety.

More recently, Baer, Collins, Bourianoff, and Ketchel (1979) devised what they considered the first self-report instrument designed specifically for the study of a relationship between personality and essential hypertension. Sixteen of their 39 item Self-Report Inventory items significantly discriminated between two samples of hypertensives and controls and three additional cross-validation groups of

hypertensive and control patients. A discriminant function analysis based on these 16 items correctly reclassified 72% and 68% of the controls. Six of these items were directly related to anger while five were related to anxiety, suggesting that anger and anxiety may both be related to hypertension. Moreover, in the factor analysis, three of the four factors that significantly discriminated hypertensives from controls were hostility, anger arousal, and anxiety. Resentment and attention seeking items failed to discriminate between these two groups of subjects. There were no depression items included in this inventory. Interestingly, Baer, et al. concluded that hypertensives were significantly higher in anger and hostility, which does not accord with the notion of suppression in the form of denial. It should be noted, however, that the items in Baer's questionnaire seemed to tap feelings of anger rather than the expression of anger, a conceptual distinction that the authors did not make.

Most of the studies that have related anxiety to hypertension have measured anxiety and correlated it with blood pressure levels. Friedman and Bennett (1977) found that the diagnosis of anxiety was significantly associated with elevated diastolic blood pressure. Similar results have been reported by Heine, Sainsbury, and Chynoweth (1969). Banahan, et al. (1979), using the State Trait Anxiety Inventory, calculated partial coefficients (trait anxiety was partialed out) between the STAI scale scores and blood pressure levels of medicated and non-medicated subjects with elevated blood pressure. This analysis revealed that state anxiety was positively related to blood pressure while trait anxiety was not. Whitehead, Blackwell,

De Silva, and Robinson (1977) also found that the correlations of state anxiety and diastolic and systolic blood pressure were greater than the correlations between blood pressure and the Buss-Durkee total hostility and the BD hostile attitudes and hostile behavior factors. Their sample consisted of 29 patients with borderline to moderate hypertension and of predominantly middle-class socioeconomic background. Thirteen were females, and two were black. No control group was utilized in this study. The overall median correlations were as follows: Anxiety vs. systolic = .36 ($p < .01$), Anxiety vs. diastolic = .27 ($p = .01$), Anger vs. systolic = .19 ($p < .01$), Anger vs. diastolic = .17 ($p < .01$). Whitehead's hypertensive sample was comprised of subjects who responded to a newspaper advertisement of people with high blood pressure and feelings of nervousness, which suggests that the contribution of anxiety to hypertension, as compared with anger and hostility, may have been overestimated. Crane (1981) compared levels of trait and state anger and anxiety and the expression of anger in 86 male VA patients diagnosed as essential hypertensives, with a control group of 47 general medical patients with no history of hypertension and/or heart disease. Hypertensive patients scored significantly higher than the controls on the State Trait Personality Inventory Trait Anger Scale, the State-Trait Personality Inventory T-Angry Reaction Subscale, the State Trait Personality Inventory State Anger Scale, and on measures of both trait and state anxiety. The hypertensives also scored higher on the Buss-Durkee Irritability and Resentment Scales.

Critique of Objective Procedures

Collectively, the studies reviewed in this section suggest that anger, hostility and anxiety may be prominent personality characteristics among essential hypertensives. Nevertheless, the causal or etiological significance of emotional factors is difficult to pinpoint. In many of the studies cited, conceptual ambiguity was a major source of difficulty in operationalizing and measuring anger and its expression. This has led to the proliferation of poorly validated instruments. Some investigators used instruments developed for the study (e.g., Ayman, 1933; Hamilton, 1942; Harburg, et al., 1973; Lee, et al., 1971), the validity of which was not previously established. In other cases, researchers used global measures of personality traits which included few items that measured hostility (e.g., Berglund, et al., 1975; Kidson, 1973). It should be noted that only three studies, Esler, et al., (1977), Whitehead, et al. (1977), and Crane (1981), used the Buss-Durkee Hostility Inventory, which is the most widely used measure of hostility.

In Crane's (1981) review, which addressed similar issues involving hypertension research, she remarks as follows:

> A second problem was the heterogeneity of controls used which also rendered comparability of the results in previous studies difficult to evaluate. Normal BP nonpatients, psychosomatic patients, and patients with physical illness have all been used as controls. Thus the poorly validated instruments and the diversity of controls may be responsible for some of the inconsistent results of the studies using the questionnaire methodology in the empirical examination of the role of anger, hostility and anxiety in essential hypertension.

In summary, the most significant conclusions that can be drawn

from these twenty five studies regarding the relationship between emotions and essential hypertension are as follows: hypertensives are significantly angrier (4 out of 5 studies), more hostile (4 out of 5 studies), more aggressive (4 out of 4 studies), more anxious (trait and state anxiety) (9 out of 9 studies), and more depressed (2 out of 2 studies) than the control groups that were utilized in these studies.

Given the inadequacy of many of the studies discussed above, it is of interest to examine some of the better conducted ones. Table 1 summarizes 11 out of the 25 studies cited that examined the role of anger, hostility and anxiety in essential hypertension. These 11 studies were selected because they met at least two of the following three important criteria in this type of research: (1) the selection of carefully matched control groups (primarily on age, sex and socio-economic status); (2) the utilization of standardized, valid personality instrumets; (3) the utilization of personality scales that measured anger, hostility, aggression and/or anxiety. The majority of these studies indicate that the dysphoric emotions play a prominent role in hypertensive disease.

Summary and Rationale for the Present Study

Although the process is not entirely clear due to an incomplete understanding and methodological inadequacies on the part of researchers, psychophysiological studies have provided empirical support connecting emotional arousal and elevated blood pressure. Interview and projective procedures were less convincing, primarily

TABLE 1

Summary of Studies Using Objective Measures in Essential Hypertension Research

Study	Nature of Scale	Subjects	Findings
Schonecke (1972)	Hostility and Direction of Hostility Questionnaire	43 hypertensive and 23 surgical outpatients matched with regard to age, sex and SES	Hypertensives scored significantly higher on "criticism of others" (extrapunitiveness scale).
Cochrane (1973)	Eysneck Personality Inventory (EPI) and HDHQ	64 control and 32 hypertensive patients. Average age = 52 years.	No evidence that high pressure is related to emotional instablility or the repression of hostility.
Harburg (1973)	Harburg's "Anger-In and Anger-Out" Scale. Item: Attack by House-owner-- "Now imagine that you were searching to find another place to live in and finally found one for sale or rent which you liked, but the owner told you that he would not sell or rent to you because of your religion or national origin or race. How would you feel about that?	125 married males in each stress area living with their spouses. Ages 25-60.	Results indicated that the systolic and diastolic BP averages (adjusted by age, weight, and other vari-variables) for black high stess males was significantly higher than race-stress male groups and suppressed hostility was related to hypertensive blood pressure category for high stress black and white males.

TABLE 1 (continued)

Study	Nature of Scale	Subjects	Findings
Kidson (1973)	16 Personality Factor Questionnaire, Form C, The Eysneck Personality Inventory (EPI) and the Cornell Medical Index (CMI)	40 male hypertensive patients and 110 non-patient controls from a work force of an industrial and scientific organization.	Hypertensives were significantly more depressed, angry and anxious than the control group.
Mattson (1975)	Gottschalk-Gleser Content Analysis Scales and the Hostility and Direction of Hostility Questionnaire	Four groups of Black medical patients were compared: hypertensives, diabetics, diabetic hypertensives and general medical controls.	Findings indicated no overall differences between groups in the amount of hostility or aggression. Measures of inward hostility did not correlate significantly with blood pressure.

TABLE 1 (continued)

Study	Nature of Scale	Subjects	Findings
Berglund (1975)	Cesarek-Marke Personality Schedule is a Swedish questionnaire which includes 165 statements to be answered yes or no. The statements are grouped into 11 scales of 15 statements each. Every scale is intended to measure one psychogenic need. There is also one scale measuring the tendency to answer yes or no, irrespective of the nature of the statement, "acquiescence". Every statement is included in only one scale.	80 50-year old males with hypertension and 35 untreated, hypertensive males.	Hypertensive nonpatients scored higher in aggression than hypertensive patients and normal blood pressure controls.

TABLE 1 (continued)

Study	Nature of Scale	Subjects	Findings
Pilowsky (1975)	Edwards Personal Preference Schedule (EPPS), the IPAT Anxiety Questionnaire, the Cornell Medical Index (CMI), and a sentence completion test designed to assess aggressive feelings.	12 male hypertensive subjects.	Significant correlations were derived which indicated a relationship between hemodynamic measures and the "deference" scales of the EPPS, the IPAT Anxiety score, and the CMI score. These findings support previous studies which have emphasized the role of suppression of emotions in the genesis of hypertension.
Mann (1977)	General Health Questionnaire, 30 items and 3 subscales of the HDHQ	108 subjects between 35 and 64 years of age with diastolic blood pressure between 90 and 109 mm Hg.	Subjects scored significantly higher in "acting-on-hostility" and lower in "self-criticism."

TABLE 1 (continued)

Study	Nature of Scale	Subjects	Findings
Esler (1977)	The "Anger-In-Anger-Out" Scale of Harburg and the IPAT 16 Personality Factor Questionnaire. The Buss-Durkee Hostility Inventory was also administered.	16 patients with mild high-renin essential hypertension, 15 hypertensive patients with normal plasma renin activity and 20 normal subjects.	High-renin hypertensives scored significantly higher in suppressed hostility as measured by the "Anger-In-Anger-Out Scale". Hypertensives also scored higher than the other groups in the BD Resentment and Suspicion Scales and lower in the Verbal and Irritability Scales.
Baer (1979)	16 item brief, self-report hypertension instrument. Items: 1) Other people seem to get angrier than I under similar circumstances. 2) I calm down faster than most other people. 3) Some people view me as tense and nervous.	335 normotensives and 332 essential hypertensives. All subjects were Caucasian from upper lower to upper middle class in SES. Mean age, 44.3 for hypertensives and 43.4 for normotensives. Males and females were equally divided.	Hypertensives were significantly higher in anger and hostility of an enhanced degree, which did not accord with the notion of suppression in the form of denial. The items in Baer's questionnaire seemed to tap feelings of anger rather than the expression of anger.

TABLE 1 (continued)

Study	Nature of Scale	Subjects	Findings
Crane (1981)	STPI, MMPI Lie Scale, Buss-Durkee, Rosenzweig Picture-Frustration Study	88 male VA patients diagnosed as essential hypertensives and 47 general medical patients with no history of hypertension and/or heart disease.	Hypertensive patients scored significantly higher than the controls on the STPI Trait Anger Scale, the STPI T-Angry Reaction Subscale, and on measures of both trait and state anxiety. The hypertensives also scored higher on the Buss-Durkee Irritability and Resentment Scales.

due to their poor formulations of what constituted "the hypertensive personality" and the failure of researchers to employ control groups in their studies. From the 11 objective studies cited in Table 1, only one (Crane, 1981) adequately met the three important criteria for conducting hypertension research, in addition to measuring the three primary negative emotions. The present study sought to expand upon this design by measuring a wide range of emotional constructs, including the three primary emotions of fear, anger, and sadness. This study also adequately met each of the three criteria hypertension research critics have cited as lacking in many of the studies conducted in this area, namely (1) the selection of carefully matched control groups (primarily on age, sex and socioeconomic status); (2) the utilization of standardized, valid personality instrumets; (3) the utilization of personality scales that measured anger, hostility, aggression and/or anxiety.

The scales that were utilized in the present study were formally and reliably standardized instruments which measure different aspects of the major dysphoric emotions, namely, anger, sadness, and anxiety. In addition to the Buss-Durkee, which has been frequently used in hypertenstion research, this study employed for the first time the Anger-Fear Depression Scale (AFD) and the Primary Emotions and Traits Checklist (PETS) (Epstein, 1983) in hypertension research. These two personality scales, along with the Buss-Durkee, have acceptable levels of reliability and construct validity. The AFD is a 94-item scale for measuring aggression, anxiety, and depression. It has more scales associated with anxiety and hostility than most of the

scales that have previously been used and allowed these emotions to be explored in a different way. The anxiety and hostility scales and some of the items on each are as follows: Conflict Over Hostility, e.g., some of the hostile thoughts I have really frighten me; Proneness to Anger and Aggression, e.g., I am quick to express anger; Hostility Avoidance, e.g., I believe we are rarely justified in being hostile toward others.; General Physiological Arousal, e.g., my finger tips or other extremities often become cold; Cognitive Anxiety, e.g., I have many frightening dreams; and Muscle Tension, e.g., I have pains in the back of my neck. It was expected that the scale of Conflict Over Hostility, for example, would be more characteristic of hypertensives than other scales of hostility. The Primary Emotions and Traits Scales is an 85-item questionnaire which examines how frequently one endorses having certain emotions along a 5-point scale. The scales included in this questionnaire are as follows: Positive state-Negative state; Happy-Depressed; Ego-strength; Neuroticism; Calm-Anxious; Vigorous-Fatigued; Extroverted-Introverted; Self-esteem; Agreeable-Angry; Integrated-Disorganized; Caring-Uncaring. This instrument covers all the major emotions plus some higher order factors that may be relevant to hypertension.

Statement of the Problem

The goals of the present study were to explore the following emotions and their expression in patients diagnosed as essential hypertensives and in a control group of friends and/or relatives of the patients who have no history of hypertension or heart disease:

sadness, anger, and anxiety. In general, hypertensives were expected to experience more angry feelings, anxiety and sadness than control subjects. Although hypertensive patients were expected to experience more angry feelings, they were also expected to suppress these feelings, resulting in less overt expression of anger. The following predictions were tested by scores on the AFD, the Primary Emotions and Traits Scales and the Buss-Durkee Hostility Inventory:

Prediction 1: Hypertensive patients will report experiencing anger, sadness and anxiety more frequently than controls as evidenced by their scores on the AFD and the Primary Emotions and Trait Scales.

Prediction 2: Hypertensive patients will give evidence of greater inhibition of expression of aggression as indicated by indirect expression of aggression manifested in elevated scores on the Conflict Over Hostility and Hostility Avoidance scales of the AFD and the Resentment scale of the Buss-Durkee.

CHAPTER II

METHOD

Subjects

The subjects for this study were white male and female hypertensive patients between 25 and 74 years of age currently receiving treatment for this condition. These patients were recruited from the private practice of Michael C. Ruddy, M.D., an internist in private practice in New Brunswick, New Jersey. These patients were compared with a control group of individuals with no history of hypertension and/or coronary heart disease. Individuals were excluded from referral to this study for any of the following conditions.

1. Current or past treatment (during the last 10 years) for a neuropsychiatric problem warranting psychopathological diagnosis, extended psychotherapy or counseling, related psychotropic medication, or psychiatric hospitalization.

2. Any severely debilitating medical condition that imposes a highly restrictive life style or that precluded assessment by standard psychometric procedures (e.g., paralysis, blindness, deafness, terminal illness, etc.).

Sixty patients (30 male and 30 female) with the initial diagnosis of essential hypertension, as defined by the physician, Dr. Michael C. Ruddy, were selected for the study. Patients with a history of heart disease or serious complications secondary to hypertension such as grade III or IV eye ground changes, or severe renal or brain pathology were excluded. However, patients with minimal eye ground changes

(grades I and II), mild left ventricular hypertrophy, and/or mild to moderate renal abnormality were included in the hypertensive sample. Patients had been in treatment for at least one year and were stabilized on anti-hypertensive medication.

Selection of the Control Group

Data were collected from 60 individuals (30 male and 30 female) who were utilized as controls. They were recruited from the friends and/or relatives of the hypertensive patients and were matched for sex, age and socioeconomic status.

Dr. Ruddy selected the male and female patients from his hypertensive population who met the required criteria. These patients were sent a letter on the University of Medicine and Dentistry of New Jersey stationery, informing them about the nature, purpose and author of this research project. A self-addressed postcard was enclosed requesting them to indicate their willingness to participate in this study. Those patients who agreed to participate were mailed the following materials: the AFD, PETS and BD questionnaires and OPSCAN answer sheets; the Informed Consent Form; a self-addressed postcard requesting participants to indicate their interest in receiving the results of this study after it had been analyzed; a return envelope for the completed questionnaires and Informed Consent Form to be returned in. A brief written summary of this project was mailed to the interested participants.

The hypertensive volunteers were requested to approach friends and relatives regarding their willingness to serve as controls in

this study. These volunteers, who had no history of or currently received treatment for hypertension, heart disease or serious psychiatric illness, were within 10 years of the age of the hypertensive patients. These volunteers were mailed the identical materials as the hypertensive subjects.

Initially, 140 hyptertensive patients who were provided by Dr. Ruddy were recruited by mail. Ninety-seven patients returned the postcards expressing a willingness to participate in this research project and seventy-two actually completed and returned the questionnaires and OPSCAN answer sheets that were mailed to them. These original ninety-seven patients also provided the names and addresses of ninety-one friends and relatives who expressed an interest and willingness to serve as control subjects. Eighty-five controls actually completed and returned the questionnaires and OPSCAN answer sheets that were mailed to them. From this original pool of 157 subjects, 37 (22 controls and 15 hypertensives) had to be discarded because of insufficient or inappropriate SES data and/or incomplete answers on one or more subscales on the OPSCAN sheets. Also, from among the pool of 37 discarded subjects, eight (6 controls and 2 hypertensives) were removed from the extreme ends on the age and SES dimensions in order to achieve 60 hypertensive and control subjects matched on age, sex and SES.

Socioeconomic status was determined by Hollingshead's (1958) Occupational and Education Scale, rated from one to seven. For example, on the Occupational Scale executives and proprietors of large concerns, and major professionals were given scores of (1) and

unskilled workers were given scores of (7). On the Educational Scale, persons who completed a recognized professional course which led to the receipt of a graduate degree were given a score of (1). Individuals who had not completed the seventh grade were given the same scores (7), irrespective of the amount of education they had received.

The means, standard deviations, and ranges for age and SES for the four groups are presented in Tables 2 and 3. Tables 4 and 5 report the Analysis of Variance completed for Age and SES, respectively, for both groups and sexes. It can be seen that there are no significant differences.

TABLE 2

Mean Age, Standard Deviation and Range for Male and Female Hypertensive and Control Subjects

($\underline{N}$ = 30 per group)

	Hypertensives			Controls		
	Mean	S.D.	Range	Mean	S.D.	Range
Male	46.80	9.67	25-74	48.17	9.02	31-72
Female	47.00	8.81	35-69	47.00	9.51	31-73

TABLE 3

Mean SES, Standard Deviation and Range for Male and Female Hypertensive and Control Subjects

(N = 30 per group)

	Hypertensives			Controls		
	Mean	S.D.	Range	Mean	S.D.	Range
Male	48.57	14.91	14-85	47.67	15.10	23-70
Female	50.67	13.84	14-84	50.73	16.87	23.79

TABLE 4

Analysis of Variance for Age for Hypertensive and Control Subjects for Both Sexes

Source of Variation	DF	F	Significance of F
Hypertension	1	.108	.743
Sex	1	.054	.817

TABLE 5

Analysis of Variance for SES for
Hypertensive and Control Subjects for Both Sexes

Source of Variation	DF	F	Significance of F
Hypertension	1	.014	.904
Sex	1	.554	.454

Measurement Instruments

The following psychometric instruments were employed in the study: (a) the Anger Fear Depression Scale (AFD) (Epstein, 1979); (b) the Primary Emotions and Trait Scales (PETS) (Epstein, 1983); and, (c) the Irritability and Resentment subscales of the Buss-Durkee Hostility Inventory.

Anger Fear Depression Scale (AFD)

The AFD is a 94-item questionnaire developed by Epstein (1979) to measure hostility, fear, sadness and anxiety. Subjects are required to rate, on a five-point scale, how frequently they feel these emotions. The scales are as follows: Conflict Over Hostility; Proneness to Anger and Aggression; Hostility Avoidance; General Physiological Arousal; Cognitive Anxiety; Muscle Tension; Total Anxiety; Defensiveness; Happiness; Sadness; Direction of Affect (Happiness-Sadness); and Reactivity (Happiness + Sadness).

The Primary Emotions and Trait Scales

The Primary Emotions and Trait Scales is an 85-item questionnaire developed by Epstein (1983) which examines how frequently one experiences certain emotions along a 5-point scale. This scale includes scores on extroversion, neuroticism, anxiety, anger, sadness, fatigue, disorganization, neuroticism, and ego-strength. Unpublished research has established that it has acceptable levels of reliability and validity.

Buss-Durkee Hostility Inventory

The Buss-Durkee Inventory is a 75-item true-false questionnaire developed in 1957 to assess the following non-overlapping hostility dimensions: (a) assault, (b) indirect hostility, (c) irritability, (d) negativism, (e) resentment, (f) suspicion, and (g) verbal hostility. Only the Irritability and Resentment scales were administered.

CHAPTER III

RESULTS

Comparison of Hypertension and Control Subjects on the AFD, PETS and Buss-Durkee with Hypertension, Sex and SES Group as the Three Factors

The data from this study were analyzed by an analysis of variance of each of the scales. In one set of analyses, the independent variables consisted of hypertensive versus controls and males versus females. In another, socioeconomic level, with subjects divided at the median, was substituted for sex of subject. Tables 6, 7 and 8 present the results for each of the tests on the main-effect comparisons of the hypertensives and controls. Summaries of the complete analysis with subjects divided by sex and socioeconomic level are presented in the Appendix. It can be seen in Table 6 that significant differences between hypertensives and controls occur on the AFD scales of Hostility Avoidance (.01 level) and Physiological Arousal (.05 level). The differences between hypertensives and controls approached significance (.053) on the Total Anxiety scale of the AFD. In all cases, the hypertensives received higher scores.

On the PETS, it can be seen in Table 7 that significant differences between hypertensives and controls (.05) level occur on the Non-Neuroticism, Calm-Anxious and Agreeable-Angry scales. The hypertensives were higher than the controls on neuroticism, anxiety and anger. The differences between the scores approached significance (.052) on the Caring-Uncaring scale, with the hyptensives tending to

TABLE 6

Means and Results of Analysis of Variance for Hypertensives and Controls, Controlling for SES, on the Anger Fear Depression Scale

(N = 120 Subjects)

Variable	Hypertensives Mean	Controls Mean	F (1, 116 df)
Direction of Affect	13.82	15.90	1.0
Emotional Reactivity	61.88	60.60	1.72
Conflict Over Hostility	20.98	20.97	.09
Proneness to Anger and Aggression	23.00	21.08	2.42
Hostility Avoidance	32.93	30.07	7.05**
Physiological Arousal	19.15	16.93	4.75*
Cognitive Anxiety	26.85	25.67	.97
Muscle Tension	20.07	17.90	3.50
Total Anxiety	66.07	60.50	3.82
Defensiveness	39.63	39.43	.00
Happiness	37.85	38.25	.19
Sadness	24.03	22.35	1.70

* .05 level of significance
** .01 level of significance

TABLE 7

Means and Results of Analysis of Variance for Hypertensives and Controls, Controlling for SES, on the Primary Emotions and Traits Scales

(N = 120 Subjects)

Variable	Hypertensives Mean	Controls Mean	F (1, 116 df)
Non-Neuroticism	40.39	43.33	5.04*
Ego-Strength	49.04	48.86	.08
Happy-Depressed	44.13	45.02	.52
Extroversion-Introversion	45.44	45.90	.28
Vigorous-Fatigued	22.89	24.24	2.15
Calm-Anxious	19.68	21.85	4.89*
Caring-Uncaring	34.00	31.91	3.87
Self-esteem	21.73	21.15	.38
Integrated-Disorganized	22.65	21.91	.13
Consistency of Response	.77	.67	.98
Positive Affect-Negative Affect	74.97	74.03	.01
Agreeable-Angry	23.26	24.78	5.00*

* .05 level of significance
** .01 level of significance

be more caring.

Table 8 presents the results comparing the hypertensives and controls on the Buss-Durkee scales. No significant findings were obtained on this scale.

TABLE 8

Means and Results of Analysis of Variance for Hypertensives and Controls, Controlling for SES, on the Buss-Durkee

(N = 120 Ss)

Variable	Hypertensives Mean	Controls Mean	F (df = 1,116)
Irritability	4.72	4.90	1.84
Resentment	1.95	2.22	.92

Table 9 presents the AFD and PETS items which yielded significant correlations at the .10 level with hypertension. The correlations were computed by assigning a weight of "1" to normotensives, and "2" to hypertensives--this was then correlated with the rating assigned by each subject to each item. Similar items were grouped into categories, and categories that included at least two items were selected for further consideration. There were three such categories, one of which, Impulsive Anger, contains the following items: "I fly off the handle easily," "I have a terrible temper," and "People know that they have to watch out for my quick temper." Another, Anxiety and Physiological Arousal, contains the following six items: "I have

TABLE 9

Pearson Correlation Coefficients on AFD and PETS Items--r and P Values

Variable--AFD Item Number		r	P
2.	I fly off the handle easily.	.19	.04
3.	I have headaches in which my head feels as if it were caught in a vise or as if there were a tight band around it.	.17	.06
8.	I have a terrible temper.	.16	.08
10.	I find it hard to refuse favors, even to people I dislike.	.30	.001
17.	I feel guilty whenever I express my anger whether or not it is justified.	.21	.02
26.	I think it is wrong to seek revenge since two wrongs don't make a right.	.16	.09
33.	I would rather take excessive abuse than get into a heated argument.	.18	.04
35.	I sometimes have trouble getting my breath, for no special reason.	.17	.07
36.	I gossip.	.18	.05
39.	I believe that aggressive feelings should be expressed.	-.17	.06
50.	People know they have to watch out for my quick temper.	.17	.06
55.	I wake up earlier than usual, and have trouble getting back to sleep.	.21	.02
67.	When I express my anger, I am usually sorry afterwards.	.17	.06
70.	My mouth frequently feels dry.	.26	.004

TABLE 9 (continued)

Variable--AFD Item Number	r	P
76. I notice my heart pounding.	.28	.002
85. In the absence of physical action my heart beats wildly.	.21	.02

Variable--PETS Item Number	r	P
43. Capable	.21	.02
69. Clear-minded	.23	.01
76. Helpful	.25	.005

headaches in which my head feels as if it were caught in a vise or as if there were a tight band around it," "I sometimes have trouble getting my breath, for no special reason," "I wake up earlier than usual, and have trouble getting back to sleep," "My mouth frequently feels dry," "I notice my heart pounding," and "In the absence of physical action my heart beats wildly." The third category, Guilt and Inhibition over Hostility, contains the following five items: "I find it hard to refuse favors, even to people I dislike," "I feel guilty whenever I express my anger whether or not it is justified," "I think it is wrong to seek revenge since two wrongs don't make a right," "I would rather take excessive abuse than get into a heated argument," and "When I express my anger, I am usually sorry afterwards.

There were some significant main effects, of no particular interest, for sex and SES, that are summarized in Tables 10 and 11 in the Appendix.

CHAPTER IV

DISCUSSION

As indicated in the Introductory section, the studies conducted during the 1950s and 1960s, utilizing projective personality measures, tended to confirm Alexander's hypotheses regarding the role of anger and hostility in essential hypertension. Subsequently, the use of valid objective measures and advances in the conceptualization of anger and hostility has provided more meaningful tests of Alexander's hypotheses. This study produced further documentation in this direction.

This study utilized standardized objective measures with several subscales that measured the negative emotions of anger, sadness, and anxiety. In this study, the control group, which has been a problem in previous research, was carefully matched to the hypertensive group on age, sex, and socioeconomic status.

In this study Hypothesis I predicted that hypertensive subjects would report experiencing anger, sadness and anxiety more frequently than controls as evidenced by their scores on the AFD and the Primary Emotions and Traits Scales. As predicted, the hypertensive patients indicated greater negative emotions than the controls on the following scales: Calm-Anxious and Agreeable-Angry subscales of the PETS, thus providing support for Hypothesis I. The hypertensives also scored higher than the controls on the Total Anxiety subscale but the difference only approached significance ($p = .053$).

The finding that the hypertensive subjects experienced anger

more frequently than controls replicated the outcome of several earlier studies conducted with objective personality tests (Ayman, 1933; Baer, 1979; Crane, 1981; Esler, 1977).

The higher scores achieved by the hypertensive subjects on the Calm-Anxious and Total Anxiety scales were generally consistent with the results of previous studies using objective measures of this trait (Ayman, 1933; Saul, 1939; Kidson, 1973; Pilowsky, 1975; Crane, 1981).

Sadness is one of the negative emotions that has not been adequately researched in terms of its relationship to hypertension. Since no significance diference was found between hypertensives and controls on this subscale of the AFD, this portion of Hypothesis I was not supported.

Hypothesis II predicted that hypertensives will give evidence of greater inhibition of expression of anger and aggression as manifested in elevated scores on the Conflict Over Hostility and Hostilty Avoidance scales of the AFD and the Resentment scale of the Buss-Durkee. The hypertensive subjects scored significantly higher than the normotensives on the Hostility Avoidance Scale of the AFD, but did not differ on the AFD Conflict Over Hostility Scale and on the Buss-Durkee scale of Resentment. Analysis of individual items revealed that hypertensives reported greater inhibition and guilt over the expression of anger and aggression than controls, and had a lower threshold for the arousal of anger. The overall results are thus supportive of the hypothesis.

Although the predicted differences between hypertensives and

controls were not found on the Resentment Scale, questions have been raised about whether the Buss-Durkee scales actually measure the particular aspects of hostility that they purport to measure. The results of factor studies of the Buss-Durkee items have indicated that the factor structure for the scale does not correspond to the *a priori* definition of the subscale (Crane, 1981). The significant differences between hypertensives and controls on the Physiological Arousal Scale was not predicted. However, this finding supports previous research (Cohen, et al., 1951; Sapir, 1973; Thaler, 1957; Weiner, et al., 1962) cited in Chapter II dealing with the psychophysiological correlates of blood pressure and essential hypertension. Also, the significant difference between hypertensives and controls on the Neuroticism Scale of the PETS was not predicted but is also generally consistent with the findings of numerous studies regarding the relationship between hypertension and neuroticism. An interesting and instructive controversy began when Sainsbury (1960) reported that scores on the Neuroticism Scale of the Maudsley Personality Inventory were higher in hypertensives than in normotensives. Robinson (1962) failed to find such differences in outpatient hypertensives and normotensives with respect to neuroticism and attributed earlier positive findings of differences to the side effects of the hypertension medication used at that time. Moreover, Davis (1970) reported an inverse relationship between diastolic pressure and neuroticism. He proposed that the suppression of strong emotions by hypertensives accounted for the negative correlation. Finally, Kidson (1973) reported elevated neuroticism scores in

treated hypertensive patients but not in untreated hypertensives. His findings can be taken to indicate that neuroticism is not part of a predisposition to hypertension. Kidson's findings also suggest either that contact with treatment regimens leads to elevated scores or that hypertensives with elevated neuroticism scores may tend to seek treatment more readily. The controversy raised by these conflicting findings is instructive, as it points up how frustrating attempts to correlate blood pressure with personality can be. After over a decade of research, the manner in which this particular personality variable may enter into the total picture of hypertension is unclear. If it is a factor in hypertension at all, it may (a) predispose one to have the disease (Sainsbury, 1969), (b) exist in only some hypertensives but lead those individuals to seek treatment for the disease (Kidson, 1973), or (c) be influenced by the treatment itself (Cochrane, 1969; Kidson, 1973).

Based upon the twenty five studies cited in the literature review (particularly the eleven studies reported in Table 1), and the results obtained in this research project, there appears to be a relationship between certain negative emotions and essential hypertension. The literature, though not entirely consistent, supports the view that at least a subset of hypertensives are prone to anger, conflicted about anger expression, and tend to be overtly submissive and compliant while nurturing considerable resentment. This study confirmed the findings of previous research regarding the role of anger and anxiety in essential hypertension and introduced Hostility Avoidance as an additional emotional construct relevant to this

disorder. The issue that this finding raises is whether avoidance of hostility produces hypertension or is merely correlated with it. Based upon an examination of the AFD items listed in Table 9 (pp. 52-53) which yielded significant positive correlations with hypertension, there appears to be a connection between essential hypertension and the tendency to avoid hostile confrontations. Items 10, 26, 33, 39, and 67 are the Hostility Avoidance subscale items which support previous research in this regard (Alexander, 1939, 1968; Harburg, 1973), as they depict hypertensives as submissive, compliant, self-abasing, non-assertive and resentful individuals. The emotional dynamics and conflicts in the area of hostile feelings is further elucidated by the statistical analysis of individual items, which indicated that hypertensives report a greater degree of guilt and inhibition associated with the expression of anger and aggression than controls. One possibility is that these patterns of thinking and behaving had their origins in the upbringing of the hypertensive individuals and became ingrained and internalized in their personality and contributed toward these individuals' developing hypertensive disease. Another possibility is that because these individuals are hypertensive they are motivated to control and/or suppress their anger in an effort to keep their hypertension under control. Inspection of the content of the specific items, e.g., "I find it hard to refuse favors even to people I dislike," and "I feel guilty whenever I express my anger whether or not it is justified," supports the first interpretation, which is not to deny that the second one may also be correct.

The significant positive correlations reported in Table 9 on

AFD items 70, 76 and 85 (Physiological Arousal) suggest a tendency towards dysfunctional physiological reactions in hypertensive patients. One interpretation of this finding is that hypertensives are prone to high levels of physiological arousal, which contributed to their development of hypertension. Another is that their hypertension is a source of concern and anxiety, which contributes to their high levels of physiological arousal.

Problems and Limitations

As in any research, the current investigation entails special considerations. One bias in this study is that the hypertensive subjects were not randomly selected from the total hypertension population but were selected on the basis of age, sex and SES and matched with a comparable control group. Therefore, the subjects used in this study could be more accurately described as constituting a sample of convenience rather than a random sample. Along these lines, another issue to be considered is that individuals with essential hypertension who volunteer to participate in this type of research may be an atypical group of hypertensive patients who may have more or less difficulty in handling anger, anxiety and hostility than the average hypertensive patient. When significant findings are obtained on personality measures the researcher must be cautious about the conclusions he arrives at regarding which subset of hypertensives his/her findings apply to.

Another difficulty is that invesigators tend to disregard the course of hypertensive illness, overlooking the possibility that

borderline and sustained hypertension may have different emotional correlates (Diamond, 1982). A number of reviewers (Cochrane, 1971; Glock & Lennard, 1957; Weiner, 1977) have raised the possibility that both personality variables and essential hypertension might derive from some third variable, such as hormonal imbalance. Although such a caveat cannot be disregarded, no evidence has been offered in support of such a contention. Furthermore, the logic of this argument must be considered in the light of data suggesting the presence of internal conflict in hypertensives. Although emotional lability might be related in some way to a biological substrate, it seems unlikely that conflict between passive, submissive tendencies and rebellious, hostile impulses is so related. This latter point does not consider the probable role of genetic-constitutional precursors in essential hypertension (Weiner, 1977). Despite the potential importance of hereditary factors, few researchers have inquired as to the presence of family history of hypertension.

One of the primary issues that future research must address is heterogeneity within the hypertension population. This issue must be managed by controlling for age, sex, SES, phase of disorder, and individual differences in physiological parameters (e.g., renin levels). The most intriguing and stubborn psychosomatic issue is, at bottom, an issue related to individual differences (Harrell, 1980). Why is it that only in certain individuals (Harburg, et al., 1973; Whitehead, et al., 1977) are large blood pressure elevations associated with stressful emotions? Rather than relegate this question to the realm of individual-response stereotypy (Sternbach, 1966), future

research should systematically examine it.

Finally, one of the therapeutic and practical applications of the findings from this investigation could be the establishment of a psychological treatment program for hypertensive patients who have difficulty in handling negative emotions. With the cooperation of the medical administration and staff, patients in a hypertension clinic could be enrolled in a behavioral medicine program involving cognitive restructuring, assertiveness and/or relaxation training, to supplement their chemotherapy. Patients would be requested to answer personality scales similar to those used in this study. The hypertensives that scored significantly high on these scales could be urged to participate in a psychological intervention program in order to help them deal more effectively with their emotions. Pre- and posttreatment blood pressure measures and subjective reports could be utilized to assess the effectiveness of this treatment strategy.

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A P P E N D I C E S

A P P E N D I X A

RECRUITMENT LETTERS AND INFORMED CONSENT FORMS

October 17, 1983

Dear Mr. Smith:

I am a doctoral student in clinical psychology who is interested in conducting research to determine if a relationship exists between emotions and high blood pressure. I obtained your name and address from your physician, Dr. Michael C. Ruddy.

It is believed by some experts in this field that emotions may play some part in causing and/or sustaining high blood pressure. I am interested in determining whether they are correct and therefore would like to investigate how you and other hypertensive patients experience various emotions by having you answer three brief questionnaires. These questionnaires will require approximately thirty minutes to complete. Your responses will be kept confidential and will not even be identified by your name.

I am enclosing a self-addressed postcard for you to check off whether or not you are interested in participating in this research project. Please place a check mark in the appropriate place and return the card immediately. The questionnaires will be mailed to you shortly if you agree to participate. Because this is a controlled study, it would be helpful to me (but not mandatory) if you could recruit a friend or relative who does not have high blood pressure and is not receiving medications for high blood pressure. This person should be the same race and sex as you and be within 10 years of your age. We would ask such a person to complete questionnaires identical to yours. We can discuss further how this can be expedited by telephone once you decide whether or not you will participate. Thank you for your cooperation.

Sincerely,

Ronald Boutelle, M.S.
Doctoral candidate in
clinical psychology
University of Massachusetts
at Amherst

November, 1983

Dear Sir or Madam:

I am a doctoral student in clinical psychology who is interested in conducting research to determine if a relationship exists between emotions and high blood pressure. I obtained you name from , who informed me that you would be willing to participate in this research project.

It is believed by some experts in this field that emotions may play some part in causing and/or sustaining high blood pressure. In order to confirm if any relationship exists between emotions and high blood pressure, I am interested in comparing the ways in which patients with high blood pressure handle their emotions with individuals who do not have this disorder, such as yourself. I will gather this data by requesting you and other individuals to answer three different questionnaires. These questionnaires will require approximately thirty minutes to complete. Your responses to these questionnaires will be kept anonymous.

This is an important area of research and I would greatly appreciate your cooperation. Your participation would make an important contribution to hypertension research and may be helpful to physicians and psychologists in treating this disorder. Please return these questionnaires as soon as possible. Thank you for your interest and cooperation.

Sincerely,

Ronald Boutelle, M.S.
Doctoral candidate in
clinical psychology
University of Massachusetts
at Amherst

INFORMED CONSENT FORM

(CONTROL GROUP)

In this research project I understand that I will be answering three different questionnaires dealing with my emotional reactions in different situations. This project is being conducted in order to ascertain if any of these reactions are related to high blood pressure. I realize that the researcher, Ronald Boutelle, will be evaluating my responses to these questionnaires to determine if any relationship exists between these emotions and high blood pressure. He will use these findings as part of the research requirements to complete his doctoral degree in clinical psychology.

I undertand that at no time will my name be associated with any of the questionnaires. These questionnaires are for research purposes only and nobody will have access to these questionnaires or their results except the researcher.

Ronald Boutelle's signature as experimenter indicates his promise that this study will be done exactly as it has been described. My signature as volunteer indicates that I have asked whatever questions I might have at this point and that I have decided to participate in this study under the conditions described, which include my right to withdraw from the study at any time, without penalty.

_____ _____

Volunteer Experimenter

_____ _____

Date Date

INFORMED CONSENT FORM

(EXPERIMENTAL GROUP)

In this research project I understand that I will be answering three different questionnaires dealing with my emotional reactions in different situations. This project is being conducted in order to ascertain if any of these reactions are related to high blood pressure. I realize that the researcher, Ronald Boutelle, will be evaluating my responses to these questionnaires to determine if any relationship exists between these emotions and high blood pressure. He will use these findings as part of the research requirements to complete his doctoral degree in clinical psychology. My medical treatment will continue to be supervised by Dr. Michael C. Ruddy, irrespective of my participation in this project.

I understand that at no time will my name be associated with any of the questionnaires. These questionnaires are for research purposes only. They will not be included in my medical folder and nobody will have access to these questionnaires or their results except the researcher.

Ronald Boutelle's signature as experimenter indicates his promise that this study will be done exactly as it has been described. My signature as volunteer indicates that I have asked whatever questions I might have at this point and that I have decided to participate in this study under the conditions described, which include my right to withdraw from the study at any time, without penalty. My decision to participate in this study has absolutely no bearing on the kinds of medical treatment that Dr. Ruddy will be providing me.

_____ _____

Volunteer Experimenter

_____ _____

Date Date

A P P E N D I X B

MEASUREMENT INSTRUMENTS

ADF Personality Questionnaire
(FORM SE 979)

The following are some statements on feelings, attitudes, and behavior. Score "1" if the statement is definitely false; "5" if it is definitely true. A rating of "2" will indicate that the statement is mainly false; a rating of "4" that it is mainly true. Use "3" only if you cannot decide if the item is mainly true of false.

Be honest, but do not spend too much time over any one statement. As a rule, first impressions are as accurate as any.

Please do not mark this questionnaire. Write all your responses on the answer sheet provided.

Definitely False	Mostly False	Undecided or Neither False nor True	Mostly True	Definitely True
1	2	3	4	5

1. I tend to take things in stride.

2. I fly off the handle easily.

3. I have headaches in which my head feels as if it were caught in a vise or as if there were a tight band around it.

4. I have met people who were supposed to be experts who were no better than I.

5. I am a happy person.

6. Although I know someone has purposely hurt me, I rarely say or do anything about it.

7. My head sometimes feels tender to the point that it hurts when I comb my hair or put on a hat.

8. I have a terrible temper.

9. It is rare for me to feel depressed.

10. I find it hard to refuse favors, even to people I lislike.

Definitely False	Mostly False	Undecided or Neither False nor True	Mostly True	Definitely True
1	2	3	4	5

11. There are some activities which I enjoy very much.

12. People who know me consider me to be aggressive.

13. I feel that I have a bright future ahead of me.

14. I feel that I am about to go to pieces.

15. I wonder why I act so nice to people I can't stand.

16. I sometimes say things that are not completely true.

17. I feel guilty whenever I express my anger whether or not it is justified.

18. I do not have serious thoughts about suicide.

19. I sometimes fear that I will not be able to control my angry feelings.

20. I have lost my interest in other people.

---

21. I sometimes have trouble with my hand shaking when I write.

22. I try not to let things upset me because I have such a terrible temper.

23. I sleep as well as usual.

24. Some of the hostile thoughts I have really frighten me.

25. I have trouble with my muscles twitching and jumping.

26. I think it is wrong to seek revenge since two wrongs don't make a right.

27. I often feel tired and worn out.

28. I am quick to anger.

29. I believe anyone would tell a lie to keep out of trouble.

Definitely False	Mostly False	Undecided or Neither False nor True	Mostly True	Definitely True
1	2	3	4	5

30. Although I do not express my hostility, I am frightened by the intensity of my hostile thoughts and feelings.

---

31. I like to know some important people because it makes me feel important.

32. I seem not to enjoy things as much as I used to.

33. I would rather take excessive abuse than get into a heated argument.

34. My table manners are not quite as good at home as when I am out in company.

35. I sometimes have trouble getting my breath, for no special reason.

36. I gossip.

37. My hand shakes when I try to do something.

38. I believe a great many people exaggerate their misfortune in order to gain the sympathy and help of others.

39. I believe that aggressive feelings should be expressed.

40. I have pounding headaches in which I can feel a definite beat.

---

41. My appetite is not as good as it used to be.

42. I become very angry.

43. I take things hard.

44. I feel sorry after telling people off, even if they deserve it.

45. My feelings are easily hurt.

46. I am an optimistic person.

47. I am a relaxed person.

48. I have daydreams about hurting someone I don't like.

Definitely False	Mostly False	Undecided or Neither False nor True	Mostly True	Definitely True
1	2	3	4	5

49. I am a nervous person.

50. People know they have to watch out for my quick temper.

---

51. I become irritable about little things.

52. When someone annoys me, my first impulse is to tell him (her) off.

53. I feel I have little to look forward to.

54. I often break out in a sweat which is not the result of heat or physical exertion.

55. I wake up earlier than usual, and have trouble getting back to sleep.

56. The muscles of my back often ache, as if they were tied in knots.

57. Life has its ups and downs, but mainly I enjoy it.

58. My friends would be surprised if they knew the intensity of my angry feelings.

59. I read every editorial in the newspaper.

60. I sometimes have a hard time swallowing.

---

61. At election I vote for men about whom I know very little.

62. My sleep is fitful and disturbed.

63. There are many times when physical violence is justified.

64. My finger tips or other extremities often become cold.

65. It is foolish to be nice to those who are inconsiderate.

66. I have pains in the back of my neck.

67. When I express my anger, I am usually sorry afterwards.

68. The muscles in my neck often ache as if they were tied in a knot.

Definitely False	Mostly False	Undecided or Neither False nor True	Mostly True	Definitely True
1	2	3	4	5

69. I would rather win than lose in a game.

70. My mouth frequently feels dry.

---

71. When things go wrong, I tend to blame myself.

72. I am troubled by discomfort in the pit of my stomach.

73. I often feel like smashing things but I never do.

74. I have frequent stomach aches.

75. I believe that it takes a lot of argument to convince most people of the truth.

76. I notice my heart pounding.

77. I laugh at dirty jokes.

78. I am easily frightened.

79. My interest in sex is as high as ever.

80. My uncontrolled anger gets me into trouble.

---

81. I feel I am <u>not</u> as attractive as I used to be.

82. I worry about little things.

83. I often feel blue or sad.

84. I fail to defend myself when I should, and I get overly aggressive when I shouldn't.

85. In the absence of physical action my heart beats wildly.

86. My anger reaches such intensity that I dare not express it even slightly.

87. What others think of me does not bother me.

Definitely False	Mostly False	Undecided or Neither False nor True	Mostly True	Definitely True
1	2	3	4	5

88. I have sensations of burning, tingling, or crawling in certain parts of my body.

89. I sometimes put off until tomorrow what I ought to do today.

90. I often feel like crying for no good reason.

---

91. I am quick to express anger.

92. I have many frightening dreams.

93. I have lots of energy.

94. I believe we are rarely justified in being hostile toward others.

FREQUENCY OF FEELINGS

Instructions: How frequently do you have each of the following feelings? Work rapidly, first impressions are as good as any. The same item is never repeated, so there's no need to check for consistency. Please do not mark this form. Enter your answers on the opscan sheet provided, using the following scale:

1	2	3	4	5
Almost Never	Occasionally	Sometimes	Often	Nearly Always

1. sad
2. hopeless
3. alert
4. worthy
5. restless
6. hopeful
7. caring
8. charged up
9. unreactive
10. angry-with-someone-or-something
11. happy
12. at ease
13. shaky
14. calm
15. pleased-with-self
16. weak
17. inhibited
18. loving
19. agitated
20. helpless
21. exhausted
22. conflicted
23. unspontaneous
24. lonely
25. cheerful
26. worried
27. peaceful
28. joyous
29. optimistic
30. disgusted-with-self
31. wide awake
32. confused
33. energetic
34. gloomy
35. strong
36. suppressed
37. unconcerned
38. angry-at-self
39. annoyed-with-someone-or something
40. ashamed
41. organized
42. serene
43. capable
44. pessimistic
45. displeased-with-self
46. disgusted-with-someone-or-something
47. tired

1	2	3	4	5
Almost Never	Occasionally	Sometimes	Often	Nearly Always

48. frightened
49. unenthusiastic
50. guilty
51. unhappy
52. powerful
53. warm-hearted
54. bored
55. tense
56. depressed
57. jittery
58. relaxed
59. uninhibited
60. proud
61. disorganized
62. spontaneous
63. all-together
64. anxious
65. in-control-of-events
66. blue
67. friendly
68. furious
69. clear-minded
70. withdrawn
71. enthusiastic
72. weary
73. cooperative
74. irritable
75. fatigued
76. helpful
77. unexcitable
78. vigorous
79. resentful
80. disinterested
81. understanding
82. uncaring
83. efficient
84. good-natured
85. shy

BUSS-DURKEE INVENTORY

Sex: M ___ F ___

Occupation: _____

Age: _____

Education: Circle highest grade completed
1 2 3 4 5 6 7 8 9 10 11 12

College: 1 2 3 4 5 6 7 8 9

DIRECTIONS

A number of statements which people have used to describe themselves when they become upset or angry are given below. Read each statement carefully and then check on the appropriate line to the right of the statement whether it is true or false as it applies to you. Each person is different so there are no right or wrong answers. Check off only one answer for each question. If you change your mind, erase the check mark completely.

1. I lose my temper easily but get over it quickly. _____ True _____ False
2. I don't seem to get what's coming to me. _____ True _____ False
3. Sometimes people bother me just by being around. _____ True _____ False
4. Other people always seem to get the breaks. _____ True _____ False
5. I am irritated a great deal more than people are aware of. _____ True _____ False
6. I don't know any people that I downright hate. _____ True _____ False
7. I am always patient with others. _____ True _____ False
8. When I look back on what's happened to me, I can't help feeling mildly resentful. _____ True _____ False
9. It makes my blood boil to have somebody make fun of me. _____ True _____ False
10. Almost every week I see someone I dislike. _____ True _____ False

11. I often feel like a powder keg ready to explode. _____ True _____ False

12. Although I don't show it, I am sometimes eaten up with jealousy. _____ True _____ False

13. I sometimes carry a chip on my shoulder. _____ True _____ False

14. If I let people see the way I feel, I'd be considered a hard person to get along with. _____ True _____ False

15. I can't help being a little rude to people I don't like. _____ True _____ False

16. At times I feel I get a raw deal out of life. _____ True _____ False

17. If someone doesn't treat me right, I don't let it annoy me. _____ True _____ False

18. I don't let a lot of unimportant things irritate me. _____ True _____ False

19. Lately, I have been kind of grouchy. _____ True _____ False

APPENDIX C

TABLE 10

Means and Significant F-ratios for SES from Analysis of Variance of AFD and PETS Scales

Variable--AFD	1	2	3	F (2, 115 df)
Proneness to Anger and Aggression	19.74	23.51	23.05	3.45*
Total Anxiety	57.48	67.62	65.21	3.71*
Physiological Arousal	15.95	19.46	18.87	3.94*
Muscle Tension	17.10	20.92	19.08	3.02

Variable--PETS	1	2	3	F (2, 115 df)
Agreeable-Angry	25.19	22.82	23.94	3.81*
Ego-strength	49.98	46.70	50.10	3.74*
Integrated-Disorganized	22.51	20.55	23.76	4.70*

TABLE 11

Means and Significant F-ratios for SES from Analysis of Variance of PETS and Buss-Durkee

(N = 60 Subjects per Group)

Variable--AFD	Males	Females	F (1, 116 df)
Cognitive Anxiety	24.18	28.33	9.16**
Total Anxiety	59.32	67.25	5.30*

Variable--PETS	Males	Females	F (1, 116 df)
Extroversion-Introversion	44.23	47.11	4.53*
Caring-Uncaring	20.82	35.09	23.90**

Variable--Buss-Durkee	Males	Females	F (1, 116 df)
Irritability	4.25	5.37	4.73*

(SES LF 37) SES GR = 1
(SES GT 37) and LF 60 SES GR = 2
(SES GT 60) SES GR = 3

* .05 level of significance
** .01 level of significance

A P P E N D I X D

ANALYSES OF VARIANCE FOR DEPENDENT VARIABLES

Dependent Variable: Conflict Over Hostility

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	107.945	4	26.986	.4[illegible]	.739
HYPTENS	.491	1	.491	.009	.925
SEX	2.520	1	2.520	.048	.829
SESGP	102.728	2	51.364	.944	.392
2-WAY INTERACTIONS	230.957	5	46.191	.848	.518
HYPTENS SEX	.373	1	.373	.007	.934
HYPTENS SESGP	72.843	2	36.422	.669	.514
SEX SESGP	161.635	2	80.817	1.485	.231
3-WAY INTERACTIONS	88.977	2	44.489	.818	.444
HYPTENS SEX SESGP	88.977	2	44.489	.818	.444
EXPLAINED	427.879	11	38.898	.715	.722
RESIDUAL	5877.046	108	54.417		
TOTAL	6304.925	119	52.983		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

- -

MARY,DOLORES,AQUILLA,PAT

FILE NONAME (CREATION DATE = [illegible])

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

ANGAGG
BY HYPTENS
SEX
SESGR

* *

Dependent Variable: Proneness to Anger and Aggression

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	519.995	4	129.999	2.324	.061
HYPTENS	135.575	1	135.575	2.424	.122
SEX	37.147	1	37.147	.664	.417
SESGR	386.279	2	193.139	3.457	.035
2-WAY INTERACTIONS	95.177	5	19.035	.344	.885
HYPTENS SEX	33.540	1	33.540	.600	.440
HYPTENS SESGR	36.039	2	18.019	.322	.725
SEX SESGR	43.509	2	21.754	.389	.679
3-WAY INTERACTIONS	12.644	2	6.322	.113	.893
HYPTENS SEX SESGR	12.644	2	6.322	.113	.893
EXPLAINED	628.716	11	57.156	1.022	.432
RESIDUAL	6040.076	108	55.927		
TOTAL	6668.792	119	56.040		

Dependent Variable: Irritability

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			56.467	4	14.117	1.947	.109
HYPTENS			.350	1	.350	.048	.827
SEX			34.305	1	34.305	4.732	.032
SESGR			18.051	2	9.025	1.245	.292
2-WAY INTERACTIONS			13.703	5	2.741	.378	.863
HYPTENS	SEX		4.411	1	4.411	.608	.437
HYPTENS	SESGR		1.113	2	.557	.077	.926
SEX	SESGR		10.234	2	5.117	.706	.496
3-WAY INTERACTIONS			21.482	2	10.741	1.482	.232
HYPTENS	SEX	SESGR	21.482	2	10.741	1.482	.232
EXPLAINED			91.652	11	8.332	1.149	.331
RESIDUAL			782.939	108	7.249		
TOTAL			874.592	119	7.350		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

- -

MARY,DOLORES,AQUILLA,PAT

FILE NONAME (CREATION DATE = 84/07/13.)

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

RESENT
BY HYPTENS
SEX
SESGR

* *

Dependent Variable: Resentment

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			7.050	4	1.763	.522	.720
HYPTENS			3.104	1	3.104	.919	.340
SEX			.214	1	.214	.063	.802
SESGR			4.617	2	2.308	.684	.507
2-WAY INTERACTIONS			15.365	5	3.073	.910	.477
HYPTENS	SEX		.093	1	.093	.027	.869
HYPTENS	SESGR		11.147	2	5.573	1.650	.197
SEX	SESGR		4.070	2	2.035	.603	.549
3-WAY INTERACTIONS			18.051	2	9.025	2.673	.074
HYPTENS	SEX	SESGR	18.051	2	9.025	2.673	.074
EXPLAINED			40.465	11	3.679	1.089	.377
RESIDUAL			364.701	108	3.377		
TOTAL			405.167	119	3.405		

Dependent Variable: Hostility Avoidance

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	374.633	4	93.673	3.294	.014
HYPTENS	200.697	1	200.697	7.055	.009
SEX	9.352	1	9.352	.329	.568
SESGR	114.826	2	57.413	2.019	.138
2-WAY INTERACTIONS	131.683	5	26.337	.926	.467
HYPTENS SEX	10.350	1	10.350	.364	.548
HYPTENS SESGR	47.343	2	23.672	.832	.438
SEX SESGR	73.914	2	36.957	1.299	.277
3-WAY INTERACTIONS	159.931	2	79.966	2.812	.065
HYPTENS SEX SESGR	159.931	2	79.966	2.812	.065
EXPLAINED	666.313	11	60.574	2.130	.024
RESIDUAL	3071.687	108	28.442		
TOTAL	3738.000	119	31.412		

121 CASES WERE PROCESSED.
1 CASES ([illegible] PCT) WERE MISSING.

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MARY,DOLORES,AQUILLA,PAT

FILE NONAME (CREATION DATE = 84/07/13.)

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

PHYSAROSL
BY HYPTENS
SEX
SESGR

* *

Dependent Variable: General Physiological Arousal

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	577.641	4	144.410	3.843	.006
HYPTENS	178.623	1	178.623	4.751	.031
SEX	110.561	1	110.561	2.942	.089
SESGR	295.325	2	147.662	3.928	.022
2-WAY INTERACTIONS	271.251	5	54.250	1.444	.215
HYPTENS SEX	59.923	1	59.923	1.594	.209
HYPTENS SESGR	155.387	2	77.693	2.068	.131
SEX SESGR	22.223	2	11.111	.296	.745
3-WAY INTERACTIONS	83.561	2	41.780	1.112	.333
HYPTENS SEX SESGR	83.561	2	41.780	1.112	.333
EXPLAINED	932.452	11	84.768	2.256	.016
RESIDUAL	4058.341	108	37.577		
TOTAL	4990.792	119	41.939		

Dependent Variable: Cognitive Anxiety

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	743.173	4	185.793	3.381	.009
HYPTENS	58.411	1	58.411	.626	.430
SEX	473.722	1	473.722	9.164	.003
SESGP	181.491	2	90.746	1.755	.179
2-WAY INTERACTIONS	434.395	5	86.879	1.915	.098
HYPTENS SEX	54.182	1	54.182	1.048	.308
HYPTENS SESGP	223.394	2	111.697	2.161	.120
SEX SESGP	172.781	2	86.391	1.671	.193
3-WAY INTERACTIONS	269.026	2	134.513	2.602	.079
HYPTENS SEX SESGP	269.026	2	134.513	2.602	.079
EXPLAINED	1504.096	11	136.736	2.645	.005
RESIDUAL	5582.436	108	51.689		
TOTAL	7086.532	119	59.555		

Dependent Variable: Muscle Tension

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	553.749	4	138.437	2.519	.046
HYPTENS	194.776	1	194.776	3.545	.064
SEX	68.433	1	68.433	1.245	.267
SESGP	335.592	2	167.791	3.053	.053
2-WAY INTERACTIONS	150.951	5	30.190	.543	.743
HYPTENS SEX	24.338	1	24.338	.442	.508
HYPTENS SESGP	64.267	2	32.134	.578	.563
SEX SESGP	44.337	2	22.168	.390	.677
3-WAY INTERACTIONS	135.225	2	67.613	1.217	.301
HYPTENS SEX SESGP	135.225	2	67.613	1.217	.301
EXPLAINED	845.935	11	76.904	1.384	.191
RESIDUAL	6000.062	108	55.556		
TOTAL	6845.997	119	57.529		

Dependent Variable: Total Anxiety

SOURCE OF VARIATION		SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS		5113.494	4	1270.623	4.129	.004
HYPTENS		1184.471	1	1184.471	3.822	.053
SEX		1644.497	1	1644.493	5.307	.023
SESGR		2300.727	2	1150.363	3.712	.028
2-WAY INTERACTIONS		2239.413	5	450.881	1.446	.201
HYPTENS SEX		454.396	1	454.855	1.306	.256
HYPTENS SESGR		1134.331	2	567.166	1.833	.165
SEX SESGR		510.704	2	255.352	.824	.441
3-WAY INTERACTIONS		1355.468	2	677.734	2.197	.117
HYPTENS SEX	SESGR	1355.468	2	677.734	2.197	.117
EXPLAINED		8772.985	11	797.542	2.574	.006
RESIDUAL		33467.421	108	309.883		
TOTAL		42240.367	119	354.961		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

- -

MARY,DOLORES,GOLILLA,PAT

FILE NONAME (CREATION DATE = 84/07/13.)

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

DEFENS
BY HYPTENS
SEX
SESGR

* *

Dependent Variable: Defensiveness

SOURCE OF VARIATION		SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS		185.439	4	46.375	1.113	.354
HYPTENS		.135	1	.135	.003	.955
SEX		99.235	1	99.235	2.382	.126
SESGR		79.766	2	39.883	.957	.387
2-WAY INTERACTIONS		369.215	5	73.843	1.772	.125
HYPTENS SEX		240.697	1	240.697	5.777	.018
HYPTENS SESGR		134.455	2	67.227	1.614	.204
SEX SESGR		29.267	2	14.633	.351	.705
3-WAY INTERACTIONS		117.517	2	58.759	1.410	.249
HYPTENS SEX	SESGR	117.517	2	58.759	1.410	.249
EXPLAINED		672.232	11	61.112	1.467	.155
RESIDUAL		4499.635	108	41.663		
TOTAL		5171.867	119	43.461		

Dependent Variable: Happiness Scale

SOURCE OF VARIATION		SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS		[illegible]	4	13.[illegible]	.[illegible]	.791
HYPTENS		5.[illegible]	1	[illegible].116	.167	.683
SEX		44.733	1	44.733	1.44[illegible]	.233
SESGR		4.01[illegible]	2	2.0[illegible]	.065	.937
2-WAY INTERACTIONS		1[illegible]5.[illegible]	5	[illegible]	[illegible]	.[illegible]
HYPTENS SEX		[illegible]	1	[illegible]	.[illegible]	.[illegible]
HYPTENS SESGR		[illegible]	2	10.[illegible]	.621	.[illegible]
SEX SESGR		[illegible]	2	61.353	1.[illegible]	.144
3-WAY INTERACTIONS		[illegible].025	2	41.513	1.335	.268
HYPTENS SEX	SESGR	[illegible]3.025	2	41.513	1.335	.268
EXPLAINED		[illegible]2.643	11	[illegible].240	.973	.476
RESIDUAL		[illegible].057	10[illegible]	[illegible].102		
TOTAL		[illegible]1.700	119	[illegible]		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

\- -

MARY,DOLORES,[illegible],PAT

FILE NONAME (CREATION DATE = [illegible])

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * *

SAD
BY HYPTENS
SEX
SESGR

* *

Dependent Variable: Sadness Scale

SOURCE OF VARIATION		SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS		126.483	4	31.[illegible]	.660	.615
HYPTENS		10.[illegible]	1	[illegible]	1.7[illegible]7	.194
SEX		24.135	1	24.1[illegible]	.5[illegible]	.477
SESGR		14.799	2	7.[illegible]	.156	.[illegible]
2-WAY INTERACTIONS		255.[illegible]	5	51.[illegible]	1.[illegible]	.375
HYPTENS SEX		39.648	1	[illegible]	.83[illegible]	.362
HYPTENS SESGR		59.[illegible]	2	29.[illegible]	.[illegible]	.535
SEX SESGR		126.[illegible]	2	63.033	1.330	.269
3-WAY INTERACTIONS		94.394	2	47.197	.996	.373
HYPTENS SEX	SESGR	94.394	2	47.197	.996	.373
EXPLAINED		477.267	11	43.388	.916	.528
RESIDUAL		5117.325	108	47.383		
TOTAL		5594.592	119	47.013		

Dependent Variable: Positive - Negative State

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	295.752	4	73.941	.55?	.6??
HYPTENS	131.512	1	131.512	.99?	.3??
SEX	134.6??	1	134.6??	1.???	.?4?
SESGR	22.?45	2	11.27?	.???	.9?8
2-WAY INTERACTIONS	822.7?6	5	164.557	1.24?	.29?
HYPTENS SEX	[illegible]	1	[illegible]	.???	.38?
HYPTENS SESGR	[illegible]	3	?8.2??	.??4	.?64
SEX SESGR	481.1??	2	240.55?	1.81?	.167
3-WAY INTERACTIONS	345.0?2	2	172.501	1.30?	.275
HYPTENS SEX SESGR	345.002	2	172.501	1.30?	.275
EXPLAINED	1453.55?	11	132.35?	1.00?	.44?
RESIDUAL	14?7?.?4?	10?	13?.21?		
TOTAL	15?4?.5?2	119	13?.?01		

121 CASES WERE PROCESSED.
1 CASES (.? PCT) WERE MISSING.

- -

MARY,DOLORES,[illegible]LILLA,PAT

FILE NONAME (CREATION DATE = ?/??/??.)

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *
[illegible]
BY HYPTENS
SEX
SESGR
* *

Dependent Variable: Positive + Negative State

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	65.0??	4	16.2??	.676	.61?
HYPTENS	42.5??	1	42.5??	1.71?	.19?
SEX	3.1?1	1	3.1?1	.12?	.72?
SESGR	15.??9	2	7.?44	.30?	.7?8
2-WAY INTERACTIONS	79.527	5	15.9?5	.64?	.66?
HYPTENS SEX	5.55?	1	5.55?	.2??	.6??
HYPTENS SESGR	57.?4?	2	28.9??	1.16?	.315
SEX SESGR	15.443	2	?.222	.3??	.718
3-WAY INTERACTIONS	9.837	2	4.918	.19?	.82?
HYPTENS SEX SESGR	9.837	2	4.918	.19?	.820
EXPLAINED	155.27?	11	14.206	.574	.846
RESIDUAL	2673.7??	108	24.757		
TOTAL	2829.9?2	119	23.781		

Dependent Variable: Neuroticism

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	488.560	4	122.140	1.995	.101
HYPTENS	319.341	1	319.341	5.214	.027
SEX	91.336	1	91.336	1.492	.225
SESGP	130.666	2	65.333	1.065	.349
2-WAY INTERACTIONS	293.868	5	58.774	.958	.447
HYPTENS SEX	22.939	1	22.939	.375	.542
HYPTENS SESGP	111.246	2	55.623	.906	.407
SEX SESGP	179.412	2	89.706	1.462	.236
3-WAY INTERACTIONS	135.109	2	67.555	1.101	.336
HYPTENS SEX SESGP	135.109	2	67.555	1.101	.336
EXPLAINED	917.538	11	83.413	1.359	.203
RESIDUAL	6627.552	108	61.366		
TOTAL	7545.090	119	63.404		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

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MARY,DOLORES,SOLILLA,PAT

FILE NONAME (CREATION DATE = 84/10/13.)

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * *

EGOSTRNG
BY HYPTENS
SEX
SESGP

* *

Dependent Variable: Ego Strength/Ego Weakness

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	305.695	4	76.424	1.921	.112
HYPTENS	3.331	1	3.331	.084	.773
SEX	8.577	1	8.577	.216	.643
SESGP	297.720	2	148.860	3.741	.027
2-WAY INTERACTIONS	188.843	5	37.769	.949	.452
HYPTENS SEX	14.384	1	14.384	.362	.549
HYPTENS SESGP	128.713	2	64.356	1.617	.203
SEX SESGP	34.360	2	17.180	.432	.650
3-WAY INTERACTIONS	254.622	2	127.311	3.200	.045
HYPTENS SEX SESGP	254.622	2	127.311	3.200	.045
EXPLAINED	749.160	11	68.105	1.712	.080
RESIDUAL	4297.208	108	39.789		
TOTAL	5046.368	119	42.406		

Dependent Variable: Happy/Depressed

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	32.[illegible]	4	8.133	.186	.945
HYPTENS	22.929	1	22.929	.522	.472
SEX	8.8[illegible]	1	8.8[illegible]	.201	.655
SESGR	.246	2	.123	.003	.997
2-WAY INTERACTIONS	214.441	5	42.888	.976	.436
HYPTENS SEX	5.805	1	5.805	.132	.717
HYPTENS SESGR	157.900	2	78.950	1.795	.171
SEX SESGR	60.496	2	30.248	.688	.504
3-WAY INTERACTIONS	29.424	2	14.712	.335	.716
HYPTENS SEX SESGR	29.424	2	14.712	.335	.716
EXPLAINED	276.598	11	25.145	.572	.847
RESIDUAL	4744.138	108	43.92[illegible]		
TOTAL	5020.736	119	42.19[illegible]		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

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MARY,DOLORES,ACUILLA,PAT

FILE NONAME (CREATION DATE = 84/07/13.)

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

EXTROVRT
BY HYPTENS
SEX
SESGR

* *

Dependent Variable: Extroverted/Introverted

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	332.215	4	83.054	1.515	.203
HYPTENS	15.288	1	15.289	.279	.599
SEX	248.545	1	248.545	4.532	.035
SESGR	77.921	2	38.960	.710	.494
2-WAY INTERACTIONS	288.495	5	57.699	1.052	.391
HYPTENS SEX	35.907	1	35.907	.655	.420
HYPTENS SESGR	117.572	2	58.786	1.072	.346
SEX SESGR	165.974	2	82.987	1.513	.225
3-WAY INTERACTIONS	46.535	2	23.267	.424	.655
HYPTENS SEX SESGR	46.535	2	23.267	.424	.655
EXPLAINED	667.245	11	60.659	1.106	.364
RESIDUAL	5922.460	108	54.838		
TOTAL	6589.705	119	55.376		

Dependent Variable: Vigorous/Fatigued

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	73.994	4	18.499	.881	.478
HYPTENS	45.132	1	45.132	2.152	.145
SEX	1.230	1	1.230	.059	.809
SESCR	17.632	2	8.816	.420	.658
2-WAY INTERACTIONS	64.651	5	17.712	.668	.650
HYPTENS SEX	3.771	1	3.771	.142	.707
HYPTENS SESCR	53.498	2	26.749	1.011	.366
SEX SESCR	13.431	2	6.715	.320	.727
3-WAY INTERACTIONS	8.718	2	4.359	.206	.814
HYPTENS SEX SESCR	8.718	2	4.359	.206	.814
EXPLAINED	161.343	11	18.758	.656	.778
RESIDUAL	2268.471	108	21.004		
TOTAL	2419.814	119	20.335		

Dependent Variable: Calm/Anxious

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	347.381	4	86.845	2.687	.035
HYPTENS	158.161	1	158.161	4.893	.029
SEX	175.957	1	175.957	5.271	.023
SESCR	88.475	2	44.238	1.367	.259
2-WAY INTERACTIONS	166.664	5	33.333	1.030	.404
HYPTENS SEX	.497	1	.497	.015	.902
HYPTENS SESCR	74.834	2	37.414	1.156	.318
SEX SESCR	95.598	2	47.799	1.477	.233
3-WAY INTERACTIONS	136.335	2	68.168	2.106	.127
HYPTENS SEX SESCR	136.335	2	68.168	2.106	.127
EXPLAINED	650.380	11	59.125	1.827	.058
RESIDUAL	3495.283	108	32.364		
TOTAL	4145.662	119	34.837		

Dependent Variable: Agreeable/Angry

SOURCE OF VARIATION		SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS		218.674	4	54.669	2.971	.023
HYPTENS		91.972	1	91.972	4.998	.027
SEX		13.014	1	13.014	.707	.402
SESGP		140.353	2	70.176	3.814	.025
2-WAY INTERACTIONS		127.823	5	25.564	1.389	.234
HYPTENS SEX		30.273	1	30.273	1.645	.202
HYPTENS SESGP		54.800	2	27.400	1.489	.230
SEX SESGP		59.835	2	29.918	1.626	.202
3-WAY INTERACTIONS		50.587	2	25.294	1.375	.257
HYPTENS SEX	SESGP	50.587	2	25.294	1.375	.257
EXPLAINED		397.082	11	36.098	1.962	.039
RESIDUAL		1987.415	108	18.402		
TOTAL		2384.495	119	20.038		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

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MARY,DOLORES,AQUILLA,PAT

FILE NONAME (CREATION DATE = 04/27/83.)

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * *

CARUNCAR
BY HYPTENS
SEX
SESGP

* *

Dependent Variable: Caring/Uncaring

SOURCE OF VARIATION		SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS		807.910	4	201.978	8.934	.001
HYPTENS		87.425	1	87.425	3.867	.052
SEX		540.485	1	540.485	23.910	.001
SESGP		129.963	2	64.982	2.875	.061
2-WAY INTERACTIONS		77.589	5	15.518	.686	.635
HYPTENS SEX		17.993	1	17.993	.796	.374
HYPTENS SESGP		1.794	2	.897	.040	.961
SEX SESGP		67.191	2	33.596	1.486	.231
3-WAY INTERACTIONS		12.407	2	6.203	.274	.761
HYPTENS SEX	SESGP	12.407	2	6.203	.274	.761
EXPLAINED		897.906	11	81.619	3.611	.001
RESIDUAL		2441.241	108	22.605		
TOTAL		3339.147	119	28.060		

Dependent Variable: High/Low Self Esteem

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	59.637	4	14.909	.991	.416
HYPTENS	5.701	1	5.701	.379	.539
SEX	29.436	1	29.436	1.951	.164
SESGR	21.429	2	10.715	.712	.493
2-WAY INTERACTIONS	15.659	5	3.132	.208	.958
HYPTENS SEX	9.349	1	9.349	.622	.432
HYPTENS SESGR	2.838	2	1.419	.094	.910
SEX SESGR	4.698	2	2.349	.156	.856
3-WAY INTERACTIONS	76.669	2	38.334	2.548	.083
HYPTENS SEX SESGR	76.669	2	38.334	2.548	.083
EXPLAINED	151.965	11	13.815	.918	.526
RESIDUAL	1624.573	108	15.042		
TOTAL	1776.538	119	14.929		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

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MARY,DOLORES,LOUELLA,PAT

FILE NONAME (CREATION DATE = 84/07/13.)

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

INTISOR
BY HYPTENS
SEX
SESGR

* *

Dependent Variable: Integrated/Disorganized

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	208.474	4	52.118	2.565	.042
HYPTENS	2.668	1	2.668	.131	.718
SEX	1.277	1	1.277	.063	.803
SESGR	190.661	2	95.330	4.693	.011
2-WAY INTERACTIONS	49.521	5	9.904	.488	.785
HYPTENS SEX	21.915	1	21.915	1.079	.301
HYPTENS SESGR	6.778	2	3.389	.167	.847
SEX SESGR	20.154	2	10.077	.496	.610
3-WAY INTERACTIONS	84.978	2	42.489	2.092	.128
HYPTENS SEX SESGR	84.978	2	42.489	2.092	.128
EXPLAINED	342.973	11	31.179	1.535	.129
RESIDUAL	2193.733	108	20.312		
TOTAL	2536.715	119	21.317		

Dependent Variable: Consistent/Inconsistent Responses

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	.093	2	.047	.763	.468
HYPTENS	.001	1	.001	.018	.892
SEX	.092	1	.092	1.508	.222
2-WAY INTERACTIONS	.028	1	.028	.457	.500
HYPTENS SEX	.028	1	.028	.457	.500
EXPLAINED	.121	3	.040	.661	.578
RESIDUAL	7.098	116	.061		
TOTAL	7.220	119	.061		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

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MARY,DOLORES,AQUILLA,PAT

FILE NONAME (CREATION DATE = 84/07/18.)

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * * *

POSNEGST
BY HYPTENS
SEX

* *

Dependent Variable: Positive/Negative State

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	26.433	2	13.217	.074	.929
HYPTENS	.300	1	.300	.002	.967
SEX	26.133	1	26.133	.146	.703
2-WAY INTERACTIONS	36.300	1	36.300	.203	.653
HYPTENS SEX	36.300	1	36.300	.203	.653
EXPLAINED	62.733	3	20.911	.117	.950
RESIDUAL	20741.267	116	178.804		
TOTAL	20804.000	119	174.824		

121 CASES WERE PROCESSED.
1 CASES (.8 PCT) WERE MISSING.

A P P E N D I X E

SCORING KEYS FOR THE AFD AND PETS SCALES

AFD Scoring Key

Factor Analysis

Selection of Scales

6/14/79

Hostility Items

Factor I - Conflict over Hostility: N = 10

30. (.60) - Although I do not express my hostility, I am frightened by the intensity of my hostile thoughts and feelings.

84. (.46) - I fail to defend myself when I should, and I get overly aggressive when I shouldn't.

86. (.58) - My anger reaches such intensity that I dare not express it even slightly.

24. (.61) - Some of the hostile thoughts I have really frighten me.

15. (.40) - I wonder why I act so nice to people I can't stand.

58. (.60) - My friends would be surprised if they knew the inteasity of my angry feelings.

48. (.58) - I have daydreams about hurting someone I don't like.

73. (.49) - I often feel like smashing things but I never do.

19. (.48) - I sometimes fear that I will not be ebla to control my angry feelings.

17. (.50) - I feel guilty whenever I express my anger whether or not it is justified.

Factor II - Proneness to Anger and Aggression N = 10

91. (.67) - I am quick to express anger.

22. (.54) - I try not to let things upset me because I have such a terrible temper.

2. (.80) - I fly off the handle easily.

80. (.46) - My uncontrolled anger gets me into trouble.

28. (.79) - I am quick to anger.

42. (.54) - I become very angry.

50. (.58) - People know they have to watch out for my quick temper.

8. (.69) - I have a terrible temper.

52. (.41) - When someone annoys me, my first impulse is to tell him (her) off.

12. (.31) - People who know me consider me to be aggressive.

Factor III - Hostility Avoidance (Note-Reverse scoring as indicated) N = 10

63. (-.32) - There are many times when physical violence is justified.

29. (-.30) - I believe that aggressive feelings should be expressed.

94. (+.38) - I believe we are rarely justified in being hostile towards others.

44. (+.48) - I feel sorry after telling people off, even if they deserve it.

33. (+.31) - I would rather take excessive abuse than get into a heated argument.

65. (-.30) - It is foolish to be nice to those who are inconsiderate.

67. (+.40) - When I express my anger, I am usually sorry afterwards.

6. (+.33) - Although I know someone has purposely hurt me, I rarely say or do anything about it.

10. (+.38) - I find it hard to refuse favors, even to people I dislike.

26. (+.52) -I think it is wrong to seek revenge since two wrongs don't make a right.

Anxiety Items

Factor I - General Physiological Arousal N = 10

64. (.30) - My finger tips or other extremities often become cold.

37. (.45) - My hand shakes when I try to do something.

35 (.49) - I sometimes have trouble getting my breath, for no special reason.

76 (.45) - I notice my heart pounding.

21. (.56) - I sometimes have trouble with my hand shaking when I write.

72. (.73) - I am troubled by discomfort in the pit of my stomach.

54. (.59) - I often break out in a sweat which is not the result of heat or physical exertion.

74. (.70) - I have frequent stomachaches.

60. (.31) - I sometimes have a hard time swallowing.

85 . (.46) - In the absence of physical action my heart beats wildly.

Factor II - Cognitive Anxiety (Note. - Reverse scoring as indicated) N = 10

92. (.39) - I have many frightening dreams.

51. (.65) - I become irritable about little things.

47. (-.60) - I am a relaxed person.

49. (.49) - I am a nervous person.

78. (.48) - I am easily frightened.

1. (-.43) - I tend to take things in stride.

45. (.57) - My feelings are easily hurt.

43. (.60) - I take things hard.

82. (.59) - I worry about little things.

14 . (.41) - I feel that I am about to go to pieces.

Factor III - Muscle Tension N = 10

66. (.67) - I have pains in the back of my neck.

62 . (.31) - My sleep is fitful and disturbed.

40 . (.38) - I have pounding headaches in which I can feel a definite beat.

56 . (.60) - The muscles in my back often ache, as if they were tied in knots.

88 . (.35) - I have sensations of burning, tingling, or crawling in certain parts of my body.

70 . (.35) - My mouth frequently feels dry.

68. (.64) - The muscles in my neck often ache as if they were tied in knots.

7. (.48) - My head sometimes feels tender to the point that it hurts when I comb my hair or put on a hat.

3. (.41) - I have headaches in which my head feels as if it were caught in a vise or as if there were a tight band around it.

25 . (.38) - I have trouble with my muscles twitching and jumping.

L (High score = Defensive)

(-) 61. - At elections I vote for men about whom I know very little.

(-) 31. - I like to know some important people because it makes me feel important.

(-) 34. - My table manners are not quite as good at home as when I am out in company.

(-) 77. - I laugh at dirty jokes.

(-) 36. - I gossip.

59. - I read every editorial in the newspaper.

(-) 69. - I would rather win than lose in a game.

(-) 16. - I sometimes say things that are not completely true.

(-) 80. - I sometimes put off until tomorrow what I ought to do today.

K (High score = Defensive)

(-) 38. - I believe a great many people exaggerate their misfortune in order to gain the sympathy and help of others.

87. - What others think of me does not bother me.

(-) 75. - I believe that it takes a lot of argument to convince most people of the truth.

(-) 29. - I believe anyone would tell a lie to keep out of trouble.

(-) 4. - I have met people who were supposed to be experts who were no better than I.

* Note - (-) = Reverse direction of scoring, i.e. substitute 5 for 1 and 1 for 5

Happiness Scale

46. - I am an optimistic person.

13. - I feel that I have a bright future ahead of me.

5. - I am a happy person.

18. - I do not have serious thoughts about suicide.

23. - I sleep as well as usual.

93. - I have lots of energy.

79. - My interest in sex is as high as ever.

9. - It is rare for me to feel depressed.

57. - Life has its ups and downs, but mainly I enjoy it.

11. - There are some activities which I enjoy very much.

Sadness Scale

83. - I often feel blue or sad.

53. - I feel I have little to look forward to.

32. - I seem not to enjoy things as much as I used to.

71. - When things go wrong, I tend to blame myself.

90. - I often feel like crying for no good reason.

20. - I have lost my interest in other people.

81. - I feel I am not as attractive as I used to be.

27. - I often feel tired and worn out.

41. - My appetite is not as good as it used to be.

55. - I wake up earlier than usual, and have trouble getting back to sleep.

RM 5/83

SCORING KEY FOR PRIMARY EMOTIONS AND TRAITS SCALES (PETS)

POSITIVE/NEGATIVE STATE

	11.	happy
	12.	at-ease
	14.	calm
	15.	pleased-w-self
	25.	cheerful
	28.	joyous
	29.	optimistic
	63.	all-together
	65.	in-control-of-events
	69.	clear-minded
(-)	2.	hopeless
(-)	30.	disgusted-w-self
(-)	34.	gloomy
(-)	44.	pessimistic
(-)	45.	displeased-w-self
(-)	51.	unhappy
(-)	56.	depressed
(-)	66.	blue
(-)	70.	withdrawn
(-)	72.	weary

EXTROVERTED/INTROVERTED

	8.	charged-up
	25.	cheerful
	29.	optimistic
	33.	energetic
	52.	powerful
	59.	uninhibited
	60.	proud
	62.	spontaneous
	67.	friendly
	71.	enthusiastic
(-)	9.	unreactive
(-)	17.	inhibited
(-)	23.	unspontaneous
(-)	24.	lonely
(-)	44.	pessimistic
(-)	49.	unenthusiastic
(-)	54.	bored
(-)	70.	withdrawn
(-)	77.	unexcitable
(-)	85.	shy

NEUROTICISM

(-)	1.	sad
(-)	2.	hopeless
(-)	5.	restless
(-)	10.	angry-w-someone or-something
(-)	19.	agitated
(-)	20.	helpless
(-)	22.	conflicted
(-)	30.	disgusted-w-self
(-)	36.	suppressed
(-)	38.	angry-at-self
(-)	39.	annoyed-w-someone or-something
(-)	40.	ashamed
(-)	46.	disgusted-w-someone or-something
(-)	50.	guilty
(-)	51.	unhappy
(-)	55.	tense
(-)	57.	jittery
(-)	64.	anxious
(-)	70.	withdrawn
(-)	75.	fatigued

(2)

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SCORING KEY FOR PRIMARY EMOTIONS AND TRAITS SCALES

EGO STRENGTH

3. alert
4. worthy
6. hopeful
14. calm
15. pleased-w-self
29. optimistic
35. strong
41. organized
58. relaxed
69. clear-minded
(-) 2. hopeless
(-) 9. unreactive
(-) 13. shaky
(-) 16. weak
(-) 20. helpless
(-) 30. disgusted-w-self
(-) 32. confused
(-) 44. pessimistic
(-) 48. frightened
(-) 61. disorganized

HAPPY/DEPRESSED

3. alert
4. worthy
11. happy
15. pleased-w-self
25. cheerful
29. optimistic
33. energetic
35. strong
71. enthusiastic
78. vigorous
(-) 2. hopeless
(-) 16. weak
(-) 20. helpless
(-) 34. gloomy
(-) 49. unenthusiastic
(-) 50. guilty
(-) 56. depressed
(-) 72. weary
(-) 74. irritable
(-) 75. fatigued

CALM/ANXIOUS

12. at-ease
14. calm
27. peaceful
42. serene
58. relaxed
(-) 26. worried
(-) 48. frightened
(-) 55. tense
(-) 57. jittery
(-) 64. anxious

AGREEABLE/ANGRY

25. cheerful
27. peaceful
73. cooperative
84. good-natured
(-) 10. angry-w-someone or-something
(-) 19. agitated
(-) 39. annoyed-w-someone or-something
(-) 46. disgusted-w-someone or-something
(-) 68. furious
(-) 79. resentful

(3)

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SCORING KEY FOR PRIMARY EMOTIONS AND TRAITS SCALES

CARING/UNCARING

7. caring
18. loving
53. warm-hearted
76. helpful
81. understanding
(-) 9. unreactive
(-) 37. unconcerned
(-) 70. withdrawn
(-) 80. disinterested
(-) 82. uncaring

SELF-ESTEEM

15. pleased-w-self
35. strong
43. capable
52. powerful
60. proud
(-) 16. weak
(-) 30. disgusted-w-self
(-) 38. angry-at-self
(-) 45. displeased-w-self
(-) 50. guilty

VIGOROUS/FATIGUED

3. alert
8. charged-up
31. wide-awake
33. energetic
78. vigorous
(-) 9. unreactive
(-) 21. exhausted
(-) 47. tired
(-) 56. depressed
(-) 75. fatigued

INTEGRATED/DISORGANIZED

41. organized
43. capable
63. all-together
65. in-control-of-events
69. clear-minded
83. efficient
(-) 22. conflicted
(-) 32. confused
(-) 61. disorganized

CONSISTENCY SCORE FOR PRIMARY EMOTIONS AND TRAITS TEST

Pairs of items for computing intrasubject correlation for consistency score.

2.	hopeless	-	20. helpless
7.	caring	-	53. warm-hearted
14.	calm	-	12. at-ease
15.	pleased-w-self	-	60. proud
25.	cheerful	-	11. happy
33.	energetic	-	78. vigorous
35.	strong	-	52. powerful
44.	pessimistic	-	2. hopeless
51.	unhappy	-	1. sad
75.	fatigued	-	47. tired
84.	good-natured	-	73. cooperative

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ADJUSTMENT FOR POSITIVITY FOR
PRIMARY EMOTIONS AND TRAITS SCALES (PETS)

WEIGHTS TO BE SUBTRACTED AS A FUNCTION OF POSITIVITY SCORE

POSITIVE VS NEGATIVE STATE	EXTROVERTED	LOW NEUROTICISM	EGO STRENGTH	HAPPY	CALM	AGREEABLE	CARING	VIGOROUS	HIGH SELF-ESTEEM	INTEGRATED
95-99	41	34	38	40	17	16	11	16	21	16
90-94	39	32	36	38	17	16	10	15	20	15
85-89	36	30	34	36	16	15	10	14	18	14
80-84	34	29	32	34	15	14	9	14	17	13
75-79	32	27	30	32	14	13	9	13	16	13
70-74	30	25	28	30	13	12	8	12	15	12
65-69	28	23	26	28	12	11	7	11	14	11
60-64	26	22	25	26	11	10	7	10	13	10
55-59	24	20	22	24	10	10	6	10	12	9
50-54	22	18	21	22	9	9	6	9	11	9
45-49	20	16	19	20	8	8	5	8	10	8
40-44	18	15	17	17	8	7	5	7	9	7
35-39	16	13	15	15	7	6	4	6	8	6
30-34	13	11	13	13	6	5	4	5	7	5
25-29	11	9	11	11	5	5	3	5	6	4
20-24	9	8	9	9	4	4	2	4	5	4
	INTROVERTED	HIGH NEUROTICISM	EGO WEAKNESS	DEPRESSED	ANXIOUS	ANGRY	UNCARING	FATIGUED	LOW SELF-ESTEEM	DISORGANIZED