# THE REPRESSION-SENSITIZATION DIMENSION AND THE DISCREPANCY BETWEEN VERBAL AND PHYSIOLOGICAL MEASURES OF AROUSAL

by

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## ABSTRACT

This study examined two main hypotheses. The first hypothesis was that Byrne's Repression-Sensitization scale, Ullman's Facilitation-Inhibition scale, Edwards' Social Desirability scale and Taylor's Manifest Anxiety scale have the observed properties of the repression-sensitization dimension. The second hypothesis was that discrepancies between verbal and autonomic indices of anxiety correlate better with the Facilitation-Inhibition scale than with any of the other scales mentioned above. Verbal anxiety was indexed by the anxiety scale of the Multiple Affect Adjective Check List constructed by Zuckerman and Lubin; autonomic anxiety was indexed by skin resistance, skin potential and pulse volume. The data substantiated the first hypothesis. There was only partial confirmation of the second hypothesis.

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# CHAPTER I

## INTRODUCTION

The present study was designed to investigate the relation among four personality scales derived from the MMPI, and to examine the relation of these scales to the personality dimension of repression-sensitization. The four scales are the Social Desirability scale (Edwards,1957b), Manifest Anxiety scale (Taylor,1951), Repression-Sensitization scale (Byrne, 1961) and the Facilitation-Inhibition scale (Ullman,1962). It is hypothesized that although the theoretical concepts underlying these scales are divergent, their observed properties can be accounted for by a single common trait which corresponds to the personality dimension of repression-sensitization.

The repression-sensitization dimension emphasizes the role of cognitive distortion in the process of sustaining psychological defence mechanisms. Both the repressor and the sensitizer are equally susceptible to a given stress stimulus. But they differ radically in the manner through which they seek to combat the anxiety. The repressor seeks tension reduction by rationalization, avoidance behavior, or the denial of the presence of threat. The sensitizer attempts to overcome anxiety through the approach of the threatening stimulus, intellectualization, obsessive behavior or rumination (Chabot, 1973). It should be noted that the "threat" which has been refered to so far is considered to be mainly of a psychological nature rather than a physical one. The repression-sensitization concept further states that a sensitizer, in contrast to a repressor, tends to emphasize the deficiencies of the self and to report negative feelings towards the self and others (Byrne, Barry & Nelson,1963; Byrne,1964). With respect to autonomic reactivity, current research on the repression-sensitization dimension suggest that individuals who utilize repression exhibit a higher level of autonomic reactivity than those classified as sensitizers (Lazarus & Alfert,1964; Lazarus,1968; Lazarus, Averill & Opton,1970). Thus, according to the repression-sensitization concept, the two extreme groups along the dimension can be differentiated from one another and normals in terms of the sign and magnitude of the discripancy between their verbal and autonomic indices of reactivity. That is, in response to a stressor, repressors are hypothesized to report a lower level of anxiety and exhibit a higher level of autonomic reactivity than neutrals, while the opposite is expected to be true of sensitizers. The autonomic indices with which the present study is concerned are the GSR and pulse volume.

It should be noted here that the present study is concerned mainly with the normal range of personality, which includes only a relatively small proportion of individuals whose scores on the above mentioned four scales are extreme enough to classify them as potential psychiatric patients.

The plan in the present study is as follows: The Facilitation-Inhibition (F-I) and the Repression-Sensitization (R-S) scales will be discussed jointly in chapter 2, because they represent the same personality dimension (Byrne et al., 1963; Ullman,1962). Chapters 3 and 4 will present a review of the literature with respect to the Social Desirability (SD) and Manifest Anxiety (MA) scales, respectively. The techniques for the recording of the pulse volume and the GSR (both skin resistance and skin potential) and the properties of these indices are discussed in chapters 5 and 6, respectively. Chapter 7 will present Experiment 1 which was designed to investigate whether the common variance among the SD, MA, R-S, and F-I scales can effectively be accounted for by a single factor. Chapter 8 will present Experiment 2 which was designed to test for the presence of discrepancy between the levels of reported anxiety and autonomic reactivity in response to a stress stimulus, and to investigate the extent to which this discripancy can be accounted for by each of the SD, MA, R-S, and F-I scales.

# CHAPTER II

# THE REPRESSION-SENSITIZATION & THE FACILITATION-INHIBITION SCALES

The R-S scale (Byrne,1961) and the F-I scale (Ullmann, 1962) are presented together in this chapter because they have been considered by their respective authors to measure the same personality construct. In this respect, Ullmann (1962, p. 127) stated that "the words sensitization-repression seem to be favored in work with college students while the words facilitation-inhibition seem to be favored in work with psychiatric patients. Operationally, these concepts seem to be identical." An opinion which is similar in this respect was also expressed by Byrne (1961). Furthermore, Ullmann (1962) indicated that the F-I scale was intended to be a refined version of the R-S scale rather than an indix of an independent personality dimension. The data for experiments 1 and 2 reported in chapters 7 and 8, respectively, do in fact indicate that the F-I scale is a slightly more reliable version of the R-S scale. However, in the present study reference will be directed mainly to the R-S scale because it has been the one mentioned more often in the literature. Hence, the plan of the present chapter is to describe the construction of the R-S scale, the construction of the F-I scale, and the various personality characteristics associated with the repression-sensitization dimension. The main themes in the discussion will relate to differences between repressors and sensitizers regarding discripancy between verbal and physiological indices of anxiety induced by a stressor, level of psychological adjustment, and types of behavioral patterns perceived as desirable.

## The R-S Scale

### Theoretical Background

The origin of the repression-sensitization dimension can be traced to the late 40s when experiments by Bruner and Postman (1947a,1947b) and Postman, Bruner & McGinnies (1948) indicated individual differences in the perceptual threshold for anxiety-inducing stimuli presented by means of a tachistoscope. From later studies carried out in the 50s it gradually became apparent that individual differences regarding perceptual threshold to anxiety-arousing stimuli can be described by a personality dimension where one extreme is characterized by the tendency to repress or deny the presence of the noxious stimulus as demonstrated by a relatively high perceptual threshold, while the other extreme is characterized by intellectualization, and obsessional and vigilant behaviors associated with a relatively lower perceptual threshold for the same noxious stimulus. Hence, while one extreme group seeks anxiety reduction by approaching the noxious stimulus and employs ego-defensive behaviors characterized by intellectualization and sensitization, the other extreme group tries to combat stress by avoiding the stressor, and adopts defensive mechanisms characterized by denial and repression.

In general, sensitization was associated with better recall of failures (Lazarus & Longo,1953), a shorter latency for aggressive words on a word-association task (Eriksen & Lazarus,1952), production of a larger number of emotional words on TAT protocols (Ullmann,1958), a greater tendency to admit personal inadequacy and to resort to intellectualization (Wiener, Carpenter and Carpenter,1956), and to be "sharpeners" rather than "levelers" in a neutral psychophysical task (Holzman & Gardner,1959). On the other hand, repression is associated with the forgetting of anxiety-inducing Blacky pictures (Perloe,1960), the expression of less sexuality and hostility (Lazarus, Eriksen & Fonda,1951) and the use of denial (Carpenter, Weiner & Carpenter,1956) on a sentence-completion task. However, while Lazarus et. al.(1951) reported a correlation between repressive and sensitizing responses on a perceptual task and the rating of case history and interview data for these two traits, Kurland (1954) reported the absence of such a relationship.

Scale Construction

The R-S scale which Byrne(1961) developed is a derivative of a previous scale constructed by (Altrocchi, Parsons & Dickoff,1960). Altrocchi et al. sought to measure the repression-sensitization dimension by combining a number of MMPI scales which were used in previous studies to differentiate between the extreme groups along the continuum. The index developed by Altrocchi et al. consisted of subtracting the total of the D, Pt and Welsh Anxiety scores from the total scores for the L, K and Hy scales. A positive score on this index represented repressive behavior. But the main defficiency of the index is that the six scales consisted of a number of overlaping items, and items which are inconsistantly scored in two or more scales.

To eliminate the shortcomings of the above mentioned index, Byrne (1961) constructed the R-S scale where items from the same six scales used by Altrocchi et al. were combined in a more appropriate manner. Overlaping items were screened so that each item was scored only once. Furthermore, items which were inconsistently scored in two or more scales were excluded. This procedure resulted in 156 keyed items, of which 40 items were scored "False". To these 156 items there was added 26 buffer items. This scale is to be differentiated from its revised format either by the term "original" or the date of its publication.

To determine the internal consistancy of the scale, Byrne (1961) administered it to 60 male and 73 female college students. The split-half reliability coefficient corrected by the Spearman-Brown formula was 0.88. For a new sample of 37 male and 38 female students, the test-retest reliability coefficient over a six-week period was equal to 0.88. The normative data was obtained from the R-S scores of 394 male and 230 female students. For males, the range, mean and standard deviation were 10-119, 63.08 and 17.71, respectively. For the female sample, the same statistics were 20-119, 61.80 and 16.20, respectively. There were no significant sex differences. For the combined sex groups, the 20th, 50th, and 80th percentiles were 42.14, 55.25 and 73.0, respectively. Since the mean was 62.44 for the total sample of 624 students, the distribution is somewhat positively skewed.

Byrne et. al. (1963) performed item analysis on the original set of 182 items to increase the homogeniety of the R-S scale. The protocols of 426 male and 314 female students were randomly divided into two equal groups. For each group, the biserial correlations were computed between the true/false responses to each item (including the buffers) and the total R-S score for those in the upper and lower 27% of the distribution. Those items which yielded correlations significant at the 0.001 level in both groups were retained in the rèvised scale. The revised scale consisted of 127 keyed items plus 55 buffer items. The MMPI numbers and the key for the 127 non-buffer items are given in Appendix A.

For a sample of 58 male and 76 female students, the split-half reliability coefficients corrected by the Brown-Spearman formula for the original and revised scoring keys were 0.91 and 0.94, respectively. For a sample of 32 males and 46 females from the same group, the test-retest reliability coefficient over a 3-month period was 0.82 for the revised scale compared to 0.83 for the original one. For a sample of 733 males administered the revised scale, the range, mean and standard diviation were 0-109, 42.25 and 20.10, respectively.

For a sample of 571 females the same statistics were 0-109, 42.68 and 18.66, respectively. There was no significant difference between the mean scores for the two sex groups. The mean score for the total sample of 1304 students was 42.46. For the total sample, the 20th, 50th and 80th percentiles were 24.83, 40.29 and 58.79, respectively. Since the mean and the median are approximately equal, the distribution can be considered non-skewed.

Regarding face validity, both the original and the revised scales were responded to in the direction of repression by a group of nine clinicians. Agreement among seven of the nine judges constituted the criterion on concurrence. On this basis, the judges reached consensus on 90% of the items for the revised scale in comparison with 72% for the original scale.

## The F-I Scale

The construction of the F-I scale can be considered as an extension to the R-S scale for a number of reasons suggested by Ullmann (1962). While in the case of the R-S scale items were selected from only six of the MMPI scales and the sample was limited to college students, Ullmann screened all 566 MMPI items, selected a psychiatric sample and used criterion groups selected on the bases of case history material to validate the items. The method for selecting criterion groups according to case history material was described by

Ullmann and Lim (1962).

Originally, three criterion groups were selected and these were externalizers, acters-out and internalizers. The externalizers were those patients whose principal mode of tension reduction involved projection. Patients whose main defensive mode was the expression of impulsive and socially disapproved behavior constituted the acters-out group, while those who resorted to inappropriate denial of threat or conflict were classified as internalizers. On the bases of previous findings by Ullmann (1958, 1960) and Ullmann & Lim (1962), externalizers and acters-out were combined to form the facilitator criterion group, and internalizers were retained as the inhibitor criterion group.

Data for the construction of the scale was collected from two sets of facilitators and inhibitors. The first set (S1) consisted of 38 facilitators and 24 inhibitors screened by Ullmann. The second set (S2) was composed of 48 facilitators and 22 inhibitors who were screened by Lim.

For the total sample of 86 facilitators and 46 inhibitors, item analysis was performed on the MMPI profiles, and those 88 items which differentiated between the two criterion groups at the 0.025 level (two-tail test) were retained. The 88 items were then cross validated within each sample. The procedure resulted in 21 "primary" items which differentiated between the criterion groups within one sample at the 0.05 level (two-tail test) and at the 0.05 level (one-tail test) within the other. This technique in significance testing was adopted to reduce the effect of Type II error. Of the 88 items there were also 27 items which were significant at the 0.10 level (two-tail test) for one sample and at the 0.10 level (one-tail test) for the other. The 27 items were cross validated once more on a new sample of 61 MMPI protocols scored in terms of the 21 "primary" items. The procedure resulted in 23 "secondary" items which were significantly associated with the "primary" items. These 44 "primary" and "secondary" items constituted the final version of the F-I scale.

Scale Reliability & Cross-Sample Statistics

For 90 patients, the split-half reliability coefficient corrected by the Spearman-Brown formula was 0.96. The test-retest coefficient was 0.881 for 26 cases with from one to six months between testings, and 0.882 for 22 cases with a time lapse of seven to eighteen months between testings.

For the sample of 90 patients mentioned above, the mean and standard deviation were 25.74 and 11.22, respectively, for the earlier set of the protocols. The same statistics were 25.40 and 11.91 for the later set of protocols. The mean and standard deviation for another sample of 64 patients were 25.39 and 11.44, respectively. For a sample of 47 male college students the mean and standard deviation were 29.38 and 6.50, respectively. Students seem to show more homogeniety than psychiatric patients.

For a sample of 64 college students, the F-I correlated

-0.76 with the original R-S scale (Byrne,1961). It should be noted that the two scales had 20 common items, and one item which was inconsistantly scored on the two scales. But when the same scales were administered to a psychiatric sample, the correlation was 0.94. Ullmann (1962) attributed this difference to the lower variance for both scales in the student population.

## Behavioral Correlates of the R-S Dimension

### Self-Concept & Self-Ideal Ratings

If sensitizers, in comparison with repressors, are more prone to remember failure experiences and to admit feelings of inadequacy as was previously suggested, then they are expected to obtain lower scores on measures of self-concept and to report a higher level of self-ideal discripancy.

Byrne (1961) reported that for a sample of 37 male and 20 female students, the correlation between the original R-S scale and the self-concept scores obtained on the Warchel's Self Activity Inventory (SAI) to be 0.74 ($p<.01$). The R-S scale also correlated 0.55 ($p<.01$) with self-ideal discripancy scores and -0.08 (n.s.) with self-ideal scores. For another sample of 48 male and 50 female students the R-S scale correlated 0.62 ($p<.01$) with the self-ideal discripancy scores.

For a sample of 32 male and 45 female students, the final version of the R-S scale (Byrne et. al.,1963) correlated 0.63

with self-ideal discrepancy and 0.68 with negative self-discription scores on a modified format of the SAI.

While the R-S scale is significantly correlated with negative self-concept and self-ideal discrepancy, it is unrelated to self-ideal scores. Both repressors and sensitizers seem to share views regarding the characteristics of "ideal" behavior. It may be noted that the MA scale (chapter 3) showed similar relations to self-concept, self-ideal and self-ideal discrepancy scores as the R-S scale.

<u>Relative Emphasis of Positive & Negative Affect</u>

Since sensitizers utilize vigilance and resort to obsessive behavior to achieve tension reduction, they are expected to attribute more personal significance to negative emotions than repressors who utilize repression.

Merbaum and Kazaoka (1965) tested the hypothesis that sensitizers differ from repressors in their tendency to attribute greater personal significance to negative affective material than to positive affect material elicited during an interview.

From a group of 200 college students, 10 sensitizers and 10 repressors with extreme scores on the R-S scale were selected. Each group consisted of an equal number of males and females. The sensitizer group had a mean score of 65.30 and a range of 52-86. The repressor group had a mean score of 16.10 and a range of 10-21. The mean score for the sensitizer group is well within the upper 20th percentile of the R-S score distribution reported by Byrne et. al. (1963). The mean score for the repressor group is within the lower 20th percentile of the same R-S score distribution.

The experimental procedure consisted of two sessions. During the first session, the experimenter conducted a semi-structured interview where the subjects could pursue themes regarding emotional reactions towards family, sex, academic performance and other miscellaneous topics. The experimenter conducting the interview was not acquainted with the subect's R-S scores. The interview material was recorded on one channel of a stereo tape recorder. The subject was provided with a push button to press whenever he felt what he was saying had personal emotional significance, whether positive or negative. The push button simultaneously activated and recorded on the other stereo channel an auditory signal (AS) which was inaudible to both experimenter and subject.

During the second session, which took place one week following the first one, the subject listened to the interview material through headphones and pressed the push button once whenever feeling the material reflects content with emotional significance.

The coding procedure consisted of counting the number of ASs for each subject in each session, categorizing the verbal material associated with every AS into a positive or negative affect category, and classifying the direction of the verbal material into one of the following 5 divisions:

family, self, peer, other toward self, and self toward others.

To assess the reliability of the ratings, a second judge rated six randomly selected interviews with respect to the positive-negative affect dimension as well as the directionality of the affect. The interjudge correlations ranged between 0.92 and 0.97.

A summary of the data for repressors and sensitizers in sessions 1 and 2 is given in Table 2.1.

Table 2.1*

Means and Standard Deviations for the Frequency of Positive and Negative Emotional Responses in Sessions 1 and 2 for Both Sensitizers and Repressors

| | SESSION 1 | | SESSION 2 | |
|---|---|---|---|---|
| | POSITIVE | NEGATIVE | POSITIVE | NEGATIVE |
| SENSITIZERS (N = 10) | | | | |
| Mean | 5.90 | 19.60 | 15.20 | 33.50 |
| Standard deviation | 4.75 | 3.38 | 11.66 | 9.59 |
| REPRESSORS (N = 10) | | | | |
| Mean | 14.60 | 6.30 | 23.70 | 11.60 |
| Standard deviation | 5.66 | 5.64 | 14.41 | 6.29 |

*From Merbaum and Kazaoka, 1967, p. 103

Differences between and within groups were tested for by series of t-tests and, therefore, the reported levels of significance are an over-estimate of what would have been obtained if an analysis of variance was performed.

An analysis of the data in Table 2.1 show that there is no significant difference between repressors and sensitizers with respect to the total number of ASs in either session. But both groups identified a larger number of emotional responses in the second session ($p < .005$). It is possible that in the first session the subject was occupied with factors such as reactions of experimenter, attempts to provide a coherent view, etc. which could have interfered with the task of analysing one's verbal reports.

In both sessions, sensitizers gave more emphasis to negative affect than did repressors ($p < .01$).

In the first session, sensitizers emphasized more negative than positive material ($p < .005$), while repressors gave more ASs positive than for negative feelings ($p < .005$). However, between sessions, repressors identified more negative material than in the first session ($p < .005$); and sensitizers identified more positive material ($p < .005$). The authors (p. 103) suggested "this would indicate that positive material was available to the sensitizer, but was seemingly ignored or discounted as emotionally meaningful during the first session." If it is assumed that the subject experienced more stress in the first session when he was confronting the experimenter with emotionally significant material, it seems that sensitizers emphasize more negative affect when placed in a stressful situation. The opposite seems to be true of repressors. This factor is expected to further increase the difference between repressors and sensitizers with respect to the verbal report of anxiety following the stressful stimuli.

With respect to the expression of emotions, a series of chi-square tests showed that sensitizers expressed more negative feelings than did repressors ($p < .01$) regarding each of the five directional categories in both sessions.

From further discussion in the present chapter it will become apparent that sensitizers, in comparison with repressors, equate the admission of negative affect with "honesty" and perceive it as a more desirable behavioral pattern. It is suggested here that sensitizers, like repressors, seek social approval, but differ in terms of the behavioral characteristics which they consider to be social desirable.

<u>TAT Scores for Sexual & Aggressive Content & Frequency of Emotional Words</u>

It is doubtful if words with sexual content constitute a taboo anymore. Yet, the following study is worth noting for the presence of other variables. Byrne (1961) hypothesized that repressors who refrain from the expression of emotions and seek to maintain a socially acceptable poise are less likely, in comparison with sensitizers, to express sexual, aggressive or emotional responses to the TAT. From a group of 213 students who were administered the R-S scale, Byrne selected a group of sensitizers (scores 78-110) and another group of repressors (scores 18-47). The sensitizer group consisted of 22 males and 7 females, while the repressors consisted of 18 males and 6 females. Two judges rated the TAT protocols for sexual and aggressive content, and the frequency of emotional words. The correlations between the ratings for these variables by the two judges were 0.94, 0.87 and 0.99, respectively. The data show that male sensitizers expressed more sexual material than male repressors ($t=2.86$, $df=38$, $p<.01$). But repressors and sensitizers of either sex showed no significant differences regarding aggressive material or the frequency of emotional words.

It is suggested in the present chapter that both repressors and sensitizers seek social approval, but differ in what they judge as desirable. Accordingly, it is possible that male sensitizers, unlike their repressor counterpart, consider sexual expressions as masculine characteristics. On the other hand, both repressor and sensitizer females may consider such expressions to be inconsistant with the social demands made on them. If this interpretation is true, female repressors and sensitizers should express significantly less sexual material than male repressors. Byrne did not investigate this possibility.

It is possible that the magnitude of aggression scores is a function of the experimental context, and if there is no stimulus to induce aggressive behavior, repressors and sensitizers are not expected to differ on this variable. But the absence of a difference between repressors and sensitizers regarding the frequency of emotional words is difficult to explain, and it does conflict with the data which Ullmann (1958) reported.

Adjustment & Social Desirability

The relationship between the R-S dimension and indices of adjustment will be given a detailed discussion here because it is in the principal theme in the present study, and it constitutes the main hypothesis in Experiment 2. Byrne (1961) considered both extreme groups on the R-S dimension to be maladjusted, and to differ from one another mainly in terms of the ego defensive mechanisms adopted in response to a stressor. That is, repressors utilize denial while sensitizers resort to vigilance and obsessive patterns of behavior. In view of this theoretical frame of reference, it is hypothesized in Experiment 2 that repressors will verbally underplay the level of anxiety indicated autonomic reactivity, and sensitizers will report an anxiety level which is out of proportion with their level of autonomic arousal.

If both repressors and sensitizers are maladjusted to the extent that they have to resort to ego defensive behavior to combat anxiety, then both extreme groups on the R-S dimension should exhibit a higher level of maladjustment than the neutral group scoring halfway on the dimension. But most of the studies mentioned in the literature report a negative correlation between the R-S dimension and adjustment. This means that repressors are more adjusted than sensitizers as well as neutrals. It should be noted that these studies equated adjustment with high scores on questionnaires which define psychological stability in terms of high self-concept and the expression of socially desirable characteristics in general. But it has already been stated that repressors seek anxiety reduction by denying personal weaknesses and attributing to the self socially acceptable characteristics. That the endorsement of these attributes is a defensive behavior rather than "real" is indicated by the fact that these attributes are at variance with the objective ratings carried out by an observer. It is, therefore, not surprising that when tested by means of questionnaires, repressors seem more adjusted than neutrals and sensitizers. It might also be noted that the studies which investigated the presence of a curvilinear relation between the R-S and adjustment scales did not use a quadratic equation. Instead, Pearson's product correlation was computed to test for a zero correlation, and samples were either dichotomized or trichotomized to test for the significance of the difference between the means. Because of the interaction between the R-S scale and personality questionnaires, it becomes apparent that the content of a verbal report is an inappropriate index of adjustment. A more valid criterion of adjustment would be the magnitude of the discripancy between reported self-appraisal and ratings obtained through objective methods such as performance on a task, evaluation by a clinician, or autonomic reactivity to a stressor. The discussion which follows suggests that both repressors and sensitizers are maladjusted to the extent that they differ from neutrals in terms of the qualitatively different behavioral patterns each extreme group perceives as socially desirable, and the extent to which they will go in claiming these characteristics to obtain social approval. The term "socially desirable behavior" is defined here in terms of the individual's concept of "the ideal" behavior. This frame of reference does not necessarily imply that the concept of social desirability is multidimensional. Two individuals who agree about the desirability of a characteristic they lack may seek social approval in two opposite ways: one by endorsing it emphatically, and the other by exagerating his deficiency to appear "at least honest". This frame of reference is congruent with the observation that repressors and sensitizers differ with respect to self-concept but not self-ideal.

Studies by Lefcourt (1966), and Merbaum & Badia (1967) presented in the following discussion suggest that both repressors and sensitizers seek social approval to the same extent, though each in his own way.

Byrne, Golightly & Sheffield (1965) tested for the presence of a curvilinear relation between the R-S dimension and adjustment as defined by scores on the 18 scales of the CPI. In spite of the fact that most studies have so far indicated a negative, linear relation between the R-S dimension

Table 2.2 +

Correlation Between the R-S Dimension

and the 18 CPI Scales

| CPI SCALES | TOTAL SAMPLE N=91 | MALES N=43 | FEMALES N=48 |
|---|---|---|---|
| Dominance | -.18 | -.21 | -.16 |
| Capacity for Status | -.25* | -.29 | -.22 |
| Sociability | -.30** | -.32* | -.29* |
| Social Presence | -.31** | -.24 | -.43** |
| Self-acceptance | -.11 | -.08 | -.15 |
| Sense of well being | -.49** | -.43** | -.61** |
| Responsibility | -.17 | -.14 | -.24 |
| Socialization | -.26* | -.22 | -.32* |
| Self-Control | -.44** | -.38* | -.53** |
| Tolerance | -.41** | -.45** | -.39** |
| Good Impression | -.45** | -.39** | -.52** |
| Communality | -.14 | -.11 | -.23 |
| Achievements via Conformance | -.46** | -.46** | -.46** |
| Achievement via Independence | -.21* | -.33* | -.07 |
| Intellectual efficiency | -.39** | -.32* | -.52** |
| Psychological-mindedness | -.18 | -.21 | -.16 |
| Flexibility | -.15 | -.24 | -.07 |
| Femininity | .13 | .18 | .10 |

+ From Byrne et al., 1965, p. 587

* $p < .05$

** $p < .01$

and adjustment, Byrne et. al. found the topic worth persuing because, logically, "neither obsessional concern with conflicts nor selective forgetting of them" (p. 586) can be indicative of adjustment. The CPI was preferred to MMPI derived scales because it was designed for the total population and, therefore, it is more appropriate for testing the curvilinarity hypothesis.

The sample consisted of 43 male and 48 female college students. The intercorrelations between the R-S and CPI scales for the whole sample as well as for each sex group separately are given in Table 2.2.

Regarding the data in Table 2.2, there are three issues which deserve comment:

1. The fact that certain CPI scales correlate with the R-S scale for one sex group and not the other indicates the presence of an interaction between the sex factor and the traits measured by the R-S and CPI scales. In this respect, Byrne et. al. (1965, p. 588) suggested that "rather than interpret any of the discripancies between males and females in the data as an indication of sex differences, one would probably be on safer ground simply to interpret the groups as two independent samples of subjects." This argument is superfluous because, although the correlations for males and females differ from one another in terms of their significance from zero, they are not significantly different from one another.

2. In spite of the high level of significance reported for most correlations in Table 2.2, these correlations are relatively small in magnitude and account for little of the variance common to the R-S and CPI scales. It is, therefore, doubtful whether the data constitute sufficient evidence for the presence of a linear relation between the R-S dimension and adjustment.
3. Byrne defined adjustment in terms of scores on the CPI because its content is more relevant to a normal population. But the R-S dimension hypothesizes that repressors seek to place themselves in a favourable light while responding on a questionnaire, to an interviewer and during their daily normal activities. Therefore, it is doubtful whether the performance of repressors on the CPI is due to adjustment or repression.

Tempone and Lamb (1967) sought to investigate the presence of a curvilinear relation between the R-S scale and the degree of adjustment. If both extreme repressors and sensitizers are equally affected by a stressor and differ only in that one group utilizes denial while the other resorts to intellectualization and obsessive behavior, one will expect a U-shaped relation between the R-S scale and measures of psychological adjustment. In line with the hypothesis made in the present study, Tempone and Lamb suggested that individuals with medium scores on the R-S scale are more adjusted than those with extreme scores on either end of the scale. The problem, however, is to find a way to measure adjustment which is independent of the factors of repression and sensitization. To deal with the situation, Tempone and Lamb devise two approaches which are supposed to be free of the shortcomings of the paper-and-pencil tests previously used to measure adjustment.

In the first study, Tempone and Lamb defined maladjustment in terms of willingness to seek psychiatric aid. That is, those with extreme repression or sensitization scores are more likely to seek psychiatric aid than those with intermediate scores. To test the hypothesis, the authors compared the R-S scores for 459 college students with those for 175 psychiatric patients. The size of each sex group within each sample, and the corresponding mean, median and standard diviation are given in Table 2.3.

Table 2.3*

Means, Medians, and Standard Deviations of College and Clinical Samples on the R-S Scale

| | COLLEGE SAMPLE | | | CLINICAL SAMPLE | | |
|---|---|---|---|---|---|---|
| | MALE | FEMALE | TOTAL | MALE | FEMALE | TOTAL |
| N | 165 | 294 | 459 | 64 | 111 | 175 |
| Median | 34.17 | 34.28 | 35.01 | 52.66 | 63.00 | 61.75 |
| Mean | 37.03 | 36.60 | 36.75 | 50.44 | 62.54 | 58.11 |
| Standard deviation | 19.01 | 19.30 | 19.18 | 26.03 | 22.24 | 24.34 |

* From Tempone & Lamb, 1967, p. 133

Before discussing the implications of the data, it is worth noting that the statistics for the college sample are similar to those reported by Byrne et. al. (1963). The differences between the mean scores for the college and clinical samples are significant at 0.001 level. It is unlikely that the differences between the samples are due to extraneous factors such as age, education, etc. because for 30 college students in the clinical sample the mean score was 57.60 in comparison with that of 58.22 for non-college patients. It is worth noting that while in the college sample there is not a significant sex difference, in the clinical sample females had a significantly higher mean score than the males ($p < .01$, $Z = 3.10$).

There are three criticisms which are relevant to the design of the above mentioned experiment. First, the authors did not state whether the clinical patients sought psychiatric aid voluntarily. If that was the case, then it is expected that the whole sample will score high on sensitization because a repressor will not admit personal maladjustment in the first place. It follows that if a repressor is likely to end up in a psychiatric setting only when his behavior is so bizar that he has to be committed by a second party. If that is the case, then there should be a larger proportion of repressors among those classified as psychotics than those with milder symptoms such as neurosis. But the authors note that this was not the case because when the case histories were trichotomized by two judges into the categories of "present environmental stress", "neurotic condition", and "psychotic condition", there was perfect agreement between the judges on 82% of the cases, but the three groups were unrelated to scores on the R-S scale.

The second criticism, which the authors observed, is that dicotomizing the subjects along the dimension of adjustment could have obscured the presence of a curvilinear relation between the R-S dimension and the adjustment index. A curvilinear relationship can better be tested for either by means of a correlational analysis or by trichotomozing the whole sample into normals, psychiatric repressors and psychiatric sensitizers and comparing the mean scores for the latter two groups with that for normal.

A third factor which Tempone and Lamb neglected is that because of the manner in which the concepts of repression and sensitization are defined, and the fact that the R-S scale is derived from the MMPI, the choice of a psychiatric sample is inappropriate for testing the relation between the R-S scale and adjustment. The R-S dimension states that there are individuals who deny or underestimate the degree of their maladjustment, and there are those who exagerate such symptoms. If neither of the processes of repression and sensitization are operating, the individual is considered to be adjusted and to have a realistic view of himself. But having a realistic view of one's self does not necessarily imply adjustment. A phobic who seeks counseling knows that his fears are not justified by the enviromental factors and in this sense he is realistic in evaluating himself, but such a person can not be described as well adjusted. In fact, what makes the R-S scale a suitable measure of repression and sensitization among a non-psychiatric population is that the content of the items is not actually characteristic of a normal population, and, accordingly, individuals have the opportunity to underestimate or overestimate their negative attributes by endorsing different numbers of items. In other words, if the items endorsed by a repressor actually describe the behavior of the respondent, then - by definition - such a person is not utilizing denial and should not be classified a repressor as defined in the concept of repression-sensitization. Going back to the study by Tempone and Lamb, it should be noticed that the R-S scale is derived from the MMPI whose content reflects symptoms reported by patients as well as those observed by clinicians. Accordingly, when a psychiatric patient obtains a high R-S score he need not be a sensitizer because the behavioral characteristics he endorsed could well be substantiated by clinical ratings.

In a second study the Tempone and Lamb defined maladjustment in terms of the endorsement of logically incongruent items on the Incomplete Sentence Blank (ISB). The correlation between the R-S scale and the ISB for 58 psychiatric patients was 0.73 ($p < .01$). The test for linearity of regression showed that deviation from the linear model was not significant.

The authors interpreted the data as indicating sensitizers experience more incongruent feelings than do repressors and they are, therefore, less adjusted. But the use of the ISB once more brings up the problem associated with the use of paper-and-pencil tests in the measurement of adjustment. Reference to a study by Heinemen (1953) shows that those who score high on the MAS rate the admission of anxiety as more desirable than do those with low MAS scores. It is, therefore, quite conceivable that both repressors and sensitizers experience incongruent feelings, but only the latter group admits the presence of incongruent feelings because of the belief it is more desirable or "honest" to do so.

A study by Lefcourt (1966) suggests that the interpretations of the significance of R-S scores by the subject and the experimenter need not be congruent with one another.

A sample of 14 male and 14 female students were administered the R-S scale. The subjects were then asked to state what they believed the test measured, as well as to describe what sort of a person will respond to the scale in exactly the opposite manner. These evaluative responses were dicotomized by the experimenter, without reference to the subject's R-S score, as "pertaining to mental illness" or "non-evaluative personality characteristics". Regarding the R-S scores, the mean, median and standard diviation were 61.14, 60.00 and 15.82, respectively. Those 15 subjects who scored below the median were classified as repressors, and the 12 subjects with scores above the median were categorized as sensitizers. The analysis showed that 12 of the 15 repressors associated the scale with the measurement of "mental health" and "adjustment". Nine of the 12 sensitizers considered the test to measure "emotionality", "honesty" and seriousness. Also, one's score determined how he perceived a person scoring exactly opposite to himself. Repressors described sensitizers as "ill", "abnormal" and "away from reality". Sensitizers viewed repressors as "liars", "happy go lucky", "conservative" and "not too bright". It is apparent that while the R-S dimension describe sensitizers as those who unnecessarily place themselves in an unfavourable light, sensitizers view themselves as being honest and perceptive.

According to the above stated interpretation of R-S scores, it follows that both repressors and sensitizers seek to place themselves in a favourable light, and the two groups differ from one another only in terms of what each of them defines a "desirable" behavior. Lefcourt (1966, p. 445) states that "most subjects seem to believe that the R-S scale pertains to one's affects and feelings. Repressors may, therefore, be viewed as interpreting the admission of emotionality as a sign of instability, while sensitizers view such admissions as revealing honesty with oneself, and a lack of fear of self-disclosure." The data does not conflict with the finding that sensitizers exhibit a more negative self-concept and higher ideal-self discrepancy than repressors, because sensitizers and repressors may interpret such response patterns as indicative of "honesty" and "mental health", respectively. This interpretation is in line with Heineman's (1953) data which showed individuals with high MAS scores viewed the verbalization of anxiety to be more desirable than did those with low MAS scores. Lefcourt suggests that the R-S score is determined partially by the presence of a particular personality trait as well as by the individual's perception of the purpose of the test. Similar arguments regarding the interaction between personality traits and cognitive factors while responding to questionnaires was also suggested by Jessor and Hammond (1957), Lazarus (1954) and Rotter (1960).

According to Lefcourt, if the experimental situation is so designed as to equate emotionality with maladjustment, sensitizers may inhibit the expression of emotionality to the extent that their mean score becomes very similar for that for repressors. Lefcourt administered the Bendig Emotionality Scale, and the TAT to measure the frequency of affect-ideation words than they did in the first one. Repressors, however, were stable under both conditions. In fact, Lefcourt attributes the lack of a correlation between the TAT and the F-I scale (Ullmann, 1958) to the use of psychiatric patients who inhibited the expression of emotions because of their suspicion of the experimental situation. Lefcourt attributed the lack of correlation between the R-S scale and the frequency of emotional words (Byrne, 1961) to the subjects' doubts regarding the purpose of the experiment.

At this point it is worth considering the effect of the subject's interpretation of the purpose of the test on the R-S scores reported in Experiment 2, chapter 10. The opinion here is that sensitizers were unlikely to have inhibited their emotional responses because the instructions on the questionnaire indicated the purpose of the experiment was to compare a number of personality tests with one another rather than to measure any specific personality trait.

Merbaum and Badia (1967) investigated differences in detection thresholds and tolerance levels for repressors and sensitizers in response to varying electric shock levels. The study is of importance because it demonstrates changes in the defensive mechanisms for the two groups from a situation where the noxious stimulus is defined in terms of perceptual and cognitive variables to that where it assumes physical properties.

The sample consisted of 84 male and 116 female college students. Each sex group was divided into equal quartiles according to scores on the R-S scale. The means, standard diviations, and score reanges for males and females are given in tables 4 and 5, respectively. The procedure consisted of gradually increasing the shock level till the subject reported the detection threshold, after which the shock level was reduced to zero. The same process was repeated to measure "moderate" and "painful" levels. In the fourth trial the subject was encouraged to withstand an increase in shock level as much as possible. The means and standard deviations in milliamperes for the 4 shock levels for each of the male quartiles are given in Table 2.4. The same statistics for the female sample are given in Table 2.5.

Table 2.4*

Mean and Range of R-S Scores, and the Associated Means and Standard Deviations in Milliamperes Across Four Shock Levels for 84 Males Divided into Equal Quartiles According to Scores on the R-S Scale

| | QUARTILES | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| R-S mean scores | 15.8 | 32.2 | 45.9 | 58.8 |
| Range of R-S scores | 1-24 | 25-39 | 40-51 | 52-80 |
| Recognition (1) | | | | |
| Mean | 1.06 | 1.08 | 0.91 | 1.02 |
| Standard deviation | 0.43 | 0.39 | 0.23 | 0.43 |
| Moderate (2) | | | | |
| Mean | 2.10 | 1.85 | 1.82 | 1.49 |
| Standard deviation | 0.88 | 0.68 | 0.80 | 0.57 |
| Pain (3) | | | | |
| Mean | 3.03 | 3.03 | 2.69 | 2.33 |
| Standard deviation | 1.30 | 1.07 | 1.34 | 0.88 |
| Encouraged (4) | | | | |
| Mean | 3.80 | 3.82 | 3.75 | 3.27 |
| Standard deviation | 0.89 | 0.83 | 0.77 | 0.67 |

* From Merbaum and Badia, 1967, p. 350

Table 2.5*

Mean and Range of R-S Scores, and the Associated Means and Standard Deviations in Milliamperes Across Four Shock Levels for 116 Females Divided into Equal Quartiles According to Scores on the R-S Scale

| | QUARTILES | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| R-S mean scores | 17.0 | 32.5 | 43.6 | 63.7 |
| Range of R-S Scores | 1-25 | 26-37 | 38-51 | 52-85 |
| Recognition (1) | | | | |
| Mean | 0.80 | 0.81 | 0.83 | 0.79 |
| Standard deviation | 0.22 | 0.24 | 0.24 | 0.18 |
| Moderate (2) | | | | |
| Mean | 1.25 | 1.53 | 1.54 | 1.31 |
| Standard deviation | 0.27 | 0.71 | 0.50 | 0.38 |
| Pain (3) | | | | |
| Mean | 1.98 | 2.33 | 2.25 | 1.90 |
| Standard deviation | 0.50 | 0.95 | 0.73 | 0.51 |
| Encouraged (4) | | | | |
| Mean | 2.99 | 3.27 | 3.25 | 2.93 |
| Standard deviation | 0.55 | 0.60 | 0.60 | 0.55 |

* From Merbaum and Badia, 1967, p. 350

Significant differences between the quartiles for each sex group were tested for by the Duncan's range test. The data in table 2.4 shows that there are no significant differences between the quartiles for the male sample. But for the second and fourth shock levels, the difference between quartiles 1 and 4 was significant at the 0.05. Also, for the fourth shock level, the difference between quartiles 2 and 4 was significant at the 0.05 level. Regarding the third shock level, each of the first and second quartiles differed from the fourth quartile at the 0.10 level. Hence, as far as the male sample is concerned, repressors tolerated higher shock levels than repressors.

Merbaum and Badia sought to interpret the data in terms of social desirability and acquiescence to social demands. In view of the high negative correlation between the R-S and SD scales, and in view of the finding by Silber and Baxter (reported in Byrne, 1964) which indicates that repressors are more likely to acquiesce to social demands, the authors suggested that repressors might have considered it more masculine and socially desirable to endure relatively higher levels of physical pain. On the other hand, sensitizers who resisted social acquiescence endured lower shock levels.

Before accepting the data interpretation given by Merbaum and Badia, reference should be made to Heineman (1953) who reported that those with high MAS scores considered it more desirable to verbalize anxiety symptoms than did those with low MAS scores. Similarly, Lefcourt (1966) has shown that sensitizers endorsed R-S items because they equated this response pattern with "honesty". But repressors who interpreted the endorsement of the items to indicate maladjustment obtained low scores. Hence, Merbaum and Badia were correct in attributing the high endurance levels for repressors to the desire to appear masculine and have a positive social image. But they missed the point when they attributed the low endurance levels for sensitizers to the desire to resist social acquiescence. From the findings by Heineman and Lefcourt, it is conceivable that sensitizers reported discomfort or pain earlier than repressors because of the conviction that doing otherwise is "pretentious" and "dishonest". It follows that the negative relationship between the R-S scale and shock tolerance is not due to the invalidity of the R-S scale as Hoffman (1970) suggested, but rather to the fact that repressors and sensitizers have different conceptions regarding how to respond to a stressor.

Reference to Table 2.5 shows that there is a curvilinear relation between the R-S dimension and shock tolerance at the second, third and fourth shock levels. At the second shock level, the difference between quartile 1 and each of quartiles 2 and 3 is significant at the 0.05 level. At the third shock level the difference between quartiles 2 and 4 is significant at the 0.05 level. The same is true for the difference between quartile 4 and each of quartiles 2 and 3 at the fourth shock level.

The curvilinear relation obtained for the female sample is better explained in terms of differences in perceived social desirability of certain behavioral patterns than in terms of acquiescence or resistance to the social demands of the situation as the authors have suggested. Hence, the female sensitizer, like the male counterpart, may perceive it more "honest" to report discomfort at an early stage. But the female repressor, unlike the male counterpart, may also consider it more congruent with her feminine image and more socially desirable to report discomfort at an equally early stage as the female sensitizer.

From the above discussion it becomes apparent that the curvilinear relationship between the R-S dimension and adjustment suggested by Byrne (1964) can be explained in terms of the extent to which social approval is sought, the qualitative difference between the behavioral characteristics perceived desirable when responding to a stressor, and the extent to which the implementation of these behavioral characteristics is carried out. It is obvious that the third characteristic follows from the first one - i.e. the more the individual needs social approval, the more he is likely to exagerate the behavioral pattern which he perceives as socially desirable. In other words, one way in which both extreme groups on the R-S dimension differ from the median group is in terms of the behavioral patterns they consider desirable when responding to a stressor. While the median group tends to maintain a balance between the verbalization and the repression of personal shortcomings, experience of pain, anxiety, etc., sensitizers perceive it desirable to exagerate these common symptoms and repressors perceive it more desirable to deny them as much as possible. Secondly, the two extreme groups on the R-S dimension are similar to one another, but differ from the median group, in terms of their relatively greater need for social approval and, therefore, the extent to which they will exagerate that behavioral pattern perceived to be desirable.

### Discrepancy Between Self-Appraisal and Clinicians' Ratings

It was previously suggested that a valid criterion of adjustment is the absence of discrepancy between self-appraisal and one's behavioral characteristics as rated by others. The studies reported in this section provide further evidence that repressors report a lower level of negative affect such as anger, hostility and anxiety than that attributed to them in clinical ratings. The opposite seems to be true of sensitizers.

Byrne and Sheffield (1965) compared the affective responses of repressors and sensitizers to passages with sexual content.

From a pool of 150 college males, the authors selected 44 repressors (mean = 41.55, range = 31-48) and 44 sensitizers (mean = 77.60, range = 67-105). Several weeks after responding to the R-S scale, members of each category were assigned to either an experimental or a control condition. The experimental group was required to read a booklet consisting of a number of passages with vivid sexual content selected from certain novels. The control group was assigned neutral passages from the same books. Following the presentation of the material, each subject rated on a 5-point scale his reactions in terms of anxiety, sexual arousal, disgust, entertainment, boredom and anger.

Analysis of variance showed the difference between the experimental and control conditions was significant at the 0.001 level for both repressors and sensitizers. Regarding anxiety, the condition effect was significant at the 0.01 level, and the group X condition interaction effect was significant at the 0.05. For sensitizers, sexual arousal correlated with "entertainment" ($r=.33$, $p<.05$), "anxiety" ($r=.67$, $p<.01$) and "boredom" ($r=-.57$, $p<.01$). For repressors, arousal correlated with "disgust" ($r=.34$, $p<.05$) and "anger" ($r=.36$, $p<.05$). The authors suggested that the attempt by repressors to deny anxiety resulted in the experience of frustration which gave rise to hostility.

If repressors seek tension reduction by avoiding anxiety arousing stimuli, then they are likely to undergo (experientially as well as behaviorally) a higher level of anxiety in comparison to sensitizers when they are confronted by a situation where the anxiety stimulus is rather difficult to avoid. Following this trend of thought, Lomont (1965) tested the hypothesis that while repressors score low on self-report measures of anxiety, they will express more verbal signs of disturbance than sensitizers when required to recall unpleasant responses on a word-association test.

The sample consisted of 24 hospitalized acute schizophrenic patients and 11 hospitalized nonpsychotic patients with no previous psychiatric hospitalization. All subjects were screened for organic ailments. The sample was administered the IPAT Self-Analysis Form to measure self-reports of anxiety, the R-S scale and the Shipley-Hartford Test for vocabulary. The word-association test consisted of a list of 66 words which included material related to sex, hostility, "commonly unpleasant" experiences, and seemingly neutral topics. The subject gave a verbal response for each of the 66 words presented orally. The subject was then instructed to recall the original association as quickly as possible in response to the presentation of the associated word. Each response was scored for any of the 31 signs of disturbance specified by Rapaport et al. Anxiety signs included reaction time exceeding 2.5 sec., blocking, vulgar responses, reproduction failure, etc. The total number of words eliciting one or more anxiety signs constituted the individual's disturbance score on recall.

To check the scoring reliability of the disturbance score, the word-association protocols for 20 patients (apparently not from the sample) were independently rated by two judges. The two rating sets correlated 0.99.

The correlation between the R-S and the IPAT, with the age-effect partialled out, was 0.76 ($p < .001$). There was no significant age or sex effect. The vocabulary test correlated approximately zero with the R-S, IPAT and age. When the age effect was partialled out, the R-S scale and the DS correlated -0.45 ($p < .01$, two-tailed test). Hence, repressors initially claimed a lower level of general anxiety, but showed a higher level of disturbance when confronted with a negative stimulus situation which was not readily avoidable.

Parsons and Fulgenzi (1968) compared R-S scores with hostility scores from self ratings, ratings of others, and from the Rorscach test. The sample consisted of 120 male students selected from a total of 510 students who responded to the R-S scale. The sample was trichotomozed into upper, middle and lower groups according to their R-S scores. The number of subjects in each group was 48, 24 and 48, respectively. The mean scores for the groups were not given. Three clinicians rated each subject in a group-interaction situation. The interjudge reliability coefficients were also not given. At the end of the session each subject described those in his discussion group on the Minnesota-Ford items.

A series of t-test showed no significant differences between the three groups on the Elizur Rorschach Hostility test. Clinicians rated repressors as more hostile and aggressive than sensitizers ($X^2$=6.07, df=1, $p<.01$). Furthermore, sensitizers described repressors as above the median with respect to hostility and aggression, while repressors described sensitizers as below the median on these two variables ($X^2$= 10.10, df=1, $p<.01$). But in self-evaluation, repressors described themselves as less hostile and aggressive than did the sensitizer group.

The above discussion indicates that self-discription by the extreme groups on the R-S scale are inversely related to the ratings assigned to them by clinicians.

Discrepancy Between Verbal and Autonomic Indices of Anxiety

The relation between the personality trait of repression and the discrepancy between verbal and autonomic indices of anxiety in response to a stressor film was investigated in a few studies, mainly by Lazarus and his associates. But the exact relation of the R-S dimension to the verbal and autonomic anxiety indices remains obscure either because in some studies the personality scales used to measure repression did not include the R-S scale, or because in those studies where the R-S scale was included there were flaws in the experimental design which throw doubt on the validity of the reported data.

Lazarus and Alfert (1964) sought to investigate the relative effectiveness of an introductory statement preceeding, and a commentary accompanying, the presentation of a stressor film in reducing experienced stress when the content of both the introductory statement and the commentary employ the same defence mechanism characteristic of the individual in concern.

The sample consisted of 69 male students who were divided into three experimental conditions. In one condition a silent version of the "Subincision" film was presented. The film describes the innitiation ceremony in an aboriginal Australian tribe, it depecits six stressful episodes, and it lasts for 17 minutes. It is worth noting that the intervals between these six episodes are not totally free of gory material, and it is in this respect the film is inferior to another stressor film called "It did not have to happen" which is sometimes used in studies of this type. In the second condition, the subjects listened to an introductory statement utilizing denial prior to the film presentation. The film was then accompanied by a commentary employing denial, too. In the third condition, the film was preceeded by the commentary used in the second condition but which was rewarded in the present tense.

The physiological indices of anxiety were skin conductance (SC) and heart rate (HR), which were scored at 15-second intervals throughout the film duration. However, at the beginning of the session there was an allowance of 15 minutes for dehydration and 3 minutes for base-line recording.

Following the film presentation, subjects were administered the Nowlis Adjective Check List of Mood (NACLM) which was scored for concentration, aggression, pleasantness, egotism, social affection, activation-deactivation, depression and anxiety. This was followed by the administration of two 5-point scales on which the subject rated normal tension level and tension experienced as a result of the film presentation. The difference between these two ratings constituted the tension rating score. The subjects were also required to rank 10 statements in the order which best describes their cognitive appraisal of the film content "as they felt they would recall it a month later", (p. 197). The purpose of the latter rating scale was to measure the effectiveness of the orienting statements associated with each experimental condition. The rating scale related to concepts which included "denial", "distress" and "realistic description" of film content. Finally, the MMPI profile for each subject was scored for the K scale, Denial (Dn; Little & Fisher, 1958), Repression (R) and the R-S scale (Byrne, 1961). The data relating to the autonomic variables, three of the NACLM variables and components of the 10-point rating scale for the three experimental conditions are given in Table 2.6.

For each of the four of the Dn, K, R and R-S scales the score distribution was divided at the median after randomly deleting one subject from each condition. For each of the SC and HR variables, F tests were performed on the mean the difference between those scoring above and below the median on each scale for the three experimental conditions. Analysis of covariance was used in this procedure to adjust the autonomic data for base-line level. The relation between the SC and each of the four personality scales is given in Table 2.7. The data associated with the HR is presented in Table 2.8. It is hoped that the comparison of the SC and HR data will shed light as to why there are significant differences in autonomic reactivity for those scoring above and below the median on the K scale but not the R-S scale.

The data in Table 2.6 shows that both the denial commentary and the denial orientation conditions effectively reduced autonomic reactivity in terms of SC and HR, as well as feelings

Table 2.6*

Mean Responses for the Autonomic and Nowlis Mood Variables, and Cognitive Appraisal of Film Content Across Three Experimental Conditions

| EXPERIMENTAL CONDITION | AUTONOMIC VARIABLES a | | NOWLIS MOOD VARIABLES | | |
|---|---|---|---|---|---|
| | SC | HR | CONCENTRATION | PLEASANTNESS | DEPRESSION |
| Silent Film | 13.89 | 77.0 | 21.78 | 10.22 | 14.91 |
| Denial Comment | 12.93 b | 74.1 c | 23.30 b | 14.39 c | 10.57 b |
| Denial Orientation | 10.78 | 73.4 | 25.96 | 16.78 | 12.13 |

(Table continued on next page)

Table 2.6 continued

| EXPERIMENTAL | COGNITIVE APPRAISAL OF FILM EVENTS b | | |
|---|---|---|---|
| CONDITION | DENIAL f | DISTRESS g | REALISTIC DESCRIPTION h |
| Silent Film | 6.4 | 6.2 | 1.7 |
| Denial Comment | 4.3 | 8.0 | 3.5 |
| Denial Orientation | 4.2 | 8.0 | 3.3 |
| | d | e | d |

a. Means adjusted for baseline effect through analysis of covariance.

b. F approaches significance at the 0.10 level.

c. F significant at the 0.05 level.

d. F significant at the 0.001 level.

e. F significant at the 0.01 level.

f. Low mean ranks indicate acceptance of denial-orienting statements.

g. Low mean ranks indicate higher level of distress.

h. Low mean ranks indicate realistic perception of the painful procedure of subincision.

* This Table is presented as it was reported by Lazarus and Alfert, 1964, p. 198, except for the deletion of the intellectualization component of the "Cognitive Appraisal" Variables.

Table 2.7*

Skin-Conductance Interactions Between Experimental Conditions and the Four MMPI-Derived Scales

| EXPERIMENTAL CONDITION | Dn | | K | | R | | R-S | |
|---|---|---|---|---|---|---|---|---|
| | HIGH | LOW | HIGH[a] | LOW[a] | HIGH[b] | LOW[b] | HIGH | LOW |
| Silent Film | 4.54 | 0.26 | 5.20 | -0.40 | 5.09 | -0.29 | 3.98 | 0.81 |
| Denial Commentary | 2.22 | 1.17 | 3.41 | -0.02 | 0.99 | 2.40 | 1.38 | 2.01 |
| Denial Orientation | -0.22[c] | 0.82[c] | 0.65 | -0.05 | 0.82[d] | -0.23[d] | 0.66 | -0.07 |

a. Personality main effect F significant at 0.01 level.

b. Personality main effect F significant at 0.10 level.

c. Interaction F approaches significance at 0.10 level.

d. Interaction F significant at 0.05 level.

* From Lazarus & Alfert, 1964, p. 200.

Table 2.8*

Heart Rate Interaction Between Experimental Conditions

and the Four MMPI-Derived Scales+

| EXPERI-MENTAL CONDI-TIONS | Dn | | K | | R | | R-S | |
|---|---|---|---|---|---|---|---|---|
| | HIGH[a] | LOW[a] | HIGH[b] | LOW[b] | HIGH | LOW | HIGH | LOW |
| Silent Film | 2.66 | -3.04 | 0.90 | -1.28 | -0.37 | -0.01 | -0.46 | -0.84 |
| Denial Commentary | -2.91 | -3.75 | -3.56 | -3.10 | -4.04 | -2.62 | -3.18 | -3.47 |
| Denial Orientation | -1.51[c] | -4.10[c] | -0.89 | -4.72 | -1.32 | -4.29 | -0.86 | -4.76 |

+ Data was adjusted for baseline effect by analysis of covariance.

a. Personality main effect F significant at 0.05 level.

b. Personality main effect F significant at 0.10 level.

c. Interaction F approaches significance at 0.10 level.

* From Lazarus and Alfert, 1964, p. 201.

of depression and distress. This is particularly true in condition 3 where the denial set was presented prior to the film. The fact that the denial commentary and orientation statements were accepted in the second and third conditions suggest that this ego-defence mechanism was characteristic of most of the sample. This observation is based on the fact that the experimentally induced defence mechanism is perceived as plausible and is effective in reducing tension only if it is congruent with the individual's habitual mode of defensive behavior - Lazarus (1968), Speisman, Lazarus, Mordkoff & Davison (1964), and Lazarus, Opton, Nomikos & Rankin (1965). Although the statistics for the distribution of R-S scores are not given, it is suggested here that the distribution was positively skewed. This argument indicates the inadequancy of using only denial-oriented statements if the R-S score distribution is to be dichotomozed into high and low groups. But it does not explain the presence of a significant difference at the 0.01 level in terms of SC between those scoring above and below the median on the K scale but not the R-S scale, especially in view of the demonstrated similarity between these two scales (Edwards, 1957b). However, reference to the data in tables 2.7 and 2.8 indicates that the relationship between the personality scales and the physiological variables is characterized by the absence of a consistant pattern. For example, for individuals above and below the median on the K scale the difference in the mean

SC was significant at the 0.01 level while the difference in mean HR was significant at the 0.10 level only. The same is true of the R and Dn scales. It is accepted here that the success of an autonomic variable to differentiate between conditions or individuals depends in part on the experimental conditions under which the measurements are taken (Lazarus, Speisman, Mordkoff & Davison, 1962). But it should be noted that here a within-subject design is used, and the four personality scales are considered to measure the same construct. In view of the discrepancy between the data in tables 2.7 and 2.8, the R-S scale can not be ruled out at this stage as inferior to the K scale in terms of differentiating between high and low deniers along the physiological continuum.

The most important aspect of the data relevant to the present study is the discrepancy between the verbal and autonomic indices of anxiety for both high and low deniers indicated by the K, Dn and R-S scales. Data in tables 2.7 and 2.8 show that individuals with high K and Dn scores, in comparison with low scorers, exhibited higher levels of SC and HR activity. This trend is particularly emphasized under the "silent" condition. On the other hand, those scoring high on the Dn scale reported less anxiety ($p < .001$), depression ($p < .10$) and tension level ($p < .10$). Similarly, those with high scores on the K and R-S scales reported a lower anxiety level ($p < .10$). Individuals with high scores on the R-S scale also scored lower on Depression ($p < .10$), and social affection ($p < .05$).

The findings and criticisms of the above mentioned experiment are presented below in point form for the sake of clarity and future reference:

1. An orientation statement which coincides with the individual's defence pattern is more effective when presented prior to the stressor than in conjunction with it. Apparently, in the former case the individual is provided with sufficient warning period to formulate a cognitive evaluation of the forthcoming situation (Lazarus et. al., 1962).
2. The presentation of the two forms of the 5-point scale for rating general and specific tension levels simultaneously following the film could have resulted in a confusion between the ratings for the two tension levels. This confusion in ratings can account for the low significance level for the tension scores given in Table 2.6. It would have been more appropriate if the base-line affect was rated prior to the film presentation.
3. Presentation of the NACLM only following the film prevented the measurement of base-line affect. It is hardly adequate to discuss the individual's affect level following a stressor if the level of his everyday affect is unknown.
4. There is a discrepancy in the pattern of mean scores for the two autonomic variables associated with the median splits on the four personality scales. This can be

considered a sufficient reason for not deleting the R-S scale as an inefficient index of repression at this stage.

Lazarus et. al. (1962) reported data which supports the hypothesis stated in Experiment 2, chapter 8 regarding variations in verbal and autonomic anxiety indices along the dimension of repression.

The sample consisted of 35 male and 35 female students with an age range of 18-35 and a median of 19. The sample was scored for denial on the Hy scale, obsessive-compulsive behavior on the Pt scale, control of affective behavior on Block's Ec scale, and for dominance, capacity for status, self-acceptance and social presence on the CPI. The group was also administered Schlesinger's Picture-Sorting Test, and the Stroop Color-Word Test. The previously-mentioned tests were administered in the first session. During the second and third sessions the subjects were shown the control film "Corn Farming in Iowa" and the stressor film "Subincision", respectively while continuous recordings were made for heart rate (HR) and skin resistance (SR). Sometimes during the analysis reference was made to skin conductance (SC) instead of SR. At the end of each of sessions 2 and 3, every subject was administered the Nowlis Adjective Check List of Mood (NACLM) and an interview questionnaire designed by Lazarus et. al. to measure negative affect. The NACLM was scored for concentration, aggression, unpleasantness, activation, egotism, social unaffection, depression and anxiety. Autonomic reactivity for a given subject was represented by a single score computed by summing the standard scores for six HR and SC subvariables associated with either the control or the stressor condition. The six autonomic subvariables were SC mean level, SC variability, SC lability, HR mean level, HR variability and beat-to-beat variability.

The results of the experiment, however, evade a clear interpretation and sometimes they are at variance with the principal hypothesis stated in Experiment 2. For the sake of clarity, the findings of Lazarus et. al. are presented below in point form:

1. One group (G1) "shows comparable levels of autonomic reactivity under the control film condition, but reacts less under the stressor condition" (p. 22). This group scored high on dominance, capacity for status, self-acceptance, and social presence on the CPI. They also scored high on the Hy denial and low on the Ec scales. Low Ec scores are indicative of undercontrol of affective behavior. The second group (G2) showed comparable autonomic reactivity under the control condition, but exhibited a higher level of autonomic arousal under the stressor condition. G2 was characterized by high scores on socialization and achievement via independence on the CPI and high scores on the Ec scale.

   The question which should be raised here is how come G2 which showed more autonomic reactivity under the stressor condition, scored high on achievement via independence & socialization CPI scales which are logically associated with traits such as dominance, self-acceptance and social presence on which G1 obtained high scores? Perhaps the answer to this question is given in a statement by Lazarus et. al. (1962, p. 23) to the effect that "the inferences made above are highly speculative considering that they are based on the flimsy significance levels noted in Table 2.9." Although the significance levels varied between 0.10 and 0.05, the discrepancy in the data interpretation did not completely escape the attention of Lazarus et. al.

2. Regarding the interview variables, G1 which scored high on dominance and social presence reported the same level of disturbance as G2 under the control condition, but under the stressor condition G1 verbalized a lower level of anxiety than G2. Hence, the data for the interview variables support the view that repressors report a lower anxiety level under stress, provided we make the assumption that G1 and G2 are characterized by repression and sensitization, respectively. But the validity of such an assumption is questionable because of the reason already mentioned in "1" above.

3. Regarding the NACLM, G1 - which scored high on capacity for status, self-acceptance and Hy denial - had scores similar to those for G2 under the control condition. But under the stress condition, G1 showed significantly more

dysphoric responses on the NACLM variables, especially for unpleasantness, social unaffection and anxiety.

The data for the NACLM are out of phase with the hypothesis stated in Experiment 2, chapter 8, as well as with the data for the interview variables mentioned in "2" above. That is, each of G1 and G2, which Lazarus et. al. associated with different CPI traits, exhibited different levels of negative affect on both the NACLM and interview material.

The discrepancy in the above mentioned study can be due to lack of validity of the NACLM, the interview questionnaire or the distinction made between G1 and G2 on the bases of the CPI variables.

The studies reviewed in this section indicate that the interrelationship between the R-S scale, the trait of repression, and the discrepancy between verbal and autonomic indices of anxiety in response to a stressor has not been adequately treated in the literature and, therefore, deserve further investigation. In other respects, the literature shows that repressors and sensitizers differ in terms of self-concept, self-ideal discrepancy, emphasis of positive and negative emotion, discrepancy between self-report and clinical ratings of negative affect such as hostility and aggression. Differences between repressors and sensitizers on these variables are in the same direction as that stated in the personality construct of repression-sensitization (Byrne, 1961).

The review of the literature has also indicated that the view regarding the approach-avoidance tendencies of repressors and sensitizers in response to a stressor which were described by Byrne (1961) should be expanded to account for the observation that both repressors and sensitizers equally seek more social approval than neutrals, but each extreme group has a different conception of what constitutes a desirable <u>response</u> to a stressor. The term "response" is emphasized here to distinguish it from conceptual personal attributes found in the content of scales measuring ideal-self along which repressors and sensitizers are similar.

The review of the literature has also suggested that the relation between the R-S dimension and adjustment is best described in terms of the strength of the need for social approval, and the balance maintained between the denial and the admittance of negative affect and attributes by both extreme groups on the dimension. It is suggested here that the comparison between the R-S dimension and the concept of adjustment is more accurately done in terms of the discrepancy between verbal reports and autonomic reactivity or clinical ratings rather than in terms of paper-and-pencil tests.

# CHAPTER III

## SOCIAL DESIRABILITY

The purpose of this chapter is to discuss the concept of social desirability presented by Edwards (1957b), the construction of Edwards' SD scale, and the criticism that has been associated with it. Furthermore, reference will be made to the findings of other studies reported in the literature in an attempt to show that Edwards' concept of social desirability trait is similar to the repression-sensitization dimension proposed by Byrne (1961).

In the present study, the trait "social desirability" refers to the tendency to respond to an item in terms of its social desirability or undesirability in a self-assessment situation; and this tendency is considered to be spontaneous rather than a premeditated behavior designed to attain a specific goal. This distinction between spontaneous and premeditated behavioral tendencies was noted by Meehl and Hathaway (1946). Social desirability is viewed as a trait that has developed over an extended period of social learning, and which is persistant even in the absence of a specific object to be achieved. The respondent actually believes in the qualities attributed to the self, and would become defensive or surprised when confronted with the discrepancy between self-rating and actual performance.

A distinction is observed between the "personal desirability" and the "perceived social desirability" of a behavioral characteristic (Rosen, 1956). The term "personal desirability" can be equated with the concept of "ideal-self" which represents the behavioral model towards which the person strives. In the case of social deviants, the perceived social desirability and personal desirability ratings are expected to be out of phase with one another. The term "self-appraisal", on the other hand, represents the person's self-concept. The concepts of "personal desirability" and "self-appraisal" do not relate to "faking", whether positive or negative, conscious or unconscious. But the term "perceived social desirability" represents what the person believes to be expected of him by those whose opinion he may seek to influence either positively or negatively. In this manner, the concept of perceived social desirability is equivalent to that of social desirability as defined above.

The concept of social desirability which Edwards (1957b) formulated differs from the one previously defined in that it did not distinguish between intentional and spontaneous faking; and it neglected the tendency of certain individuals to attribute to the self socially undesirable qualities (Wiggins, 1958). As Edwards (1957b, p. 53) noted, "without concern for the distinction between conscious and unconscious distortion, it may be noted that a subject's response may be 'falsified' in such a way that he obtains either a higher or a lower score on a particular variable than he would if his responses were completely accurate." But the decision not to distinguish between conscious and unconscious "faking" is arbitrary because there is no evidence to suggest that the psychological processes underlying the two components are equivalent. Edwards (1957b, p. 54) further adds "since my interest is in social desirability, or faking good, I shall be concerned only with those studies of fakability in which subjects are expected to give favourable or socially desirable self-descriptions." As the discussion will show later on, Edwards' lack of concern for faking bad could be due to the nature of data he came across when he formulated his concept of social desirability.

The main issue to be noted here is that according to the conceptual framework on which the SD scale was based, low scores on the scale are equated with normalcy. An individual with a low score is viewed to be neither overestimating nor underestimating the social desirability of his attributes, willing to express his reactions to a stimulus without undue repression, and is therefore expected to show minimum discrepancy between his verbal and autonomic reactions to a noxious stimulus. How much of these assumptions can actually be substantiated will be shown in Experiment II. It should also be observed that if the tendency to give socially undesirable self-attributes is a relevant variable in personality assessment, the SD score can be due to either the presence of such a personality trait or to the abscence of undue repression.

## The SD, and the L and K MMPI scales

Since Edwards (1957b) did not distinguish between conscious and unconscious distortion, one might assume both the L and SD scales measure dissimulation. This is unlikely to be the case because the items of each scale were selected to satisfy different criteria. The L scale items were selected from a population of items which have socially desirable content but a low probability of occurance (Meehl & Hathaway, 1946). The SD items, in contrast, were selected for the social desirability of their content and irrespective of the probability of the occurance of the implied behavioral characteristics.

The K scale was designed to control for repression (Meehl & Hathaway, 1946). But while all the SD items were chosen to have socially desirable or undesirable content, and are keyed accordingly, the K scale has five items keyed in the direction of social undesirability while their content is actually socially desirable (Hanley, 1956). The SD scale is, therefore, a more pure measure of the social desirability trait (Edwards, 1957b).

## Construction of the SD Scale

The scale items were chosen from the MMPI to reflect a diversity of personality traits, so that the total score on the scale would reflect social desirability rather than a specific personality dimension (Edwards, 1957b). The F, L and K scales were considered a good source of items because they were constructed to measure traits and test attitudes which Edwards regarded similar to his concept of social desirability. Additional items were selected from the Manifest

Anxiety Scale - MAS - (Taylor, 1953) because "anxiety was believed to be a trait sufficiently vague to provide another useful pool of items" (Edwards, 1957b, p. 29). Edwards has conceded that the MAS is a measure of trait anxiety. However, he did not indicate whether the items were subtle enough to be included in the SD scale.

The L, F and K scales and the MAS consist of 15, 64, 30 and 50 items, respectively. From this item pool, the 150 non overlaping items which Edwards assumed to be heterogeneous regarding the implied traits were rated by 10 judges for social desirability. The judges were instructed to respond either "True" or "False" to each item in terms of the perceived desirability of its content (Edwards, 1957b, p. 4). The judges reached perfect agreement on 79 items. These items constituted the original SD scale to which Edwards referred in the early studies.

The 79-item scale was later administered to a sample of 106 college students. Analysis of the data yielded 39 items which differentiated best between the extreme high and low social desirability groups. No mention was made of the cutting points used in selecting the two extreme groups.

Edwards (1957b) reported for a sample of 84 male college students a mean and standard deviation of 28.6 and 6.5, respectively. For a sample of 108 female students in the same study the mean and standard deviation were 27.1 and 6.5, respectively. The medians for the male and female groups were 29.5 and 27.9, respectively. Although no attempt was made to control for the sex factor during the construction of the scale, the data for the two groups were similar. For the total sample of 192 subjects, the corrected split half reliability coefficient was 0.83.

## Construct Validity

Cronbach and Meehl (1955) considered a scale to have construct validity if the scores on the scale permit the prediction of performance on other tests measuring the same construct. If the SD scale measures what it is designed to measure, Edwards (1957b) hypothesized that it should correlate positively with scales on which high scores are considered socially desirable, and negatively with those on which high scores are socially undesirable. Table 3.1 shows the data which Edwards (1957b, p. 33) reported to establish the construct validity of the SD scale.

The data in Table 3.1 provide evidence that the SD scale satisfies the criterion of construct validity previously mentioned.

## Social Desirability Scale Value of an Item and the Probability of its Endorsement

A socially desirable response is defined as a "True" response to an item with a high social desirability scale value and a "False" response to an item with a low scale value. The social desirability scale value of an item is proportional to the average of ratings assigned to it by a group of judges.

Table 3.1*

Correlations Between the 39-Item SD Scale and Other Personality Scales for a Sample of College Counseling Center Males (N = 155)

| MMPI SCALES | PEARSON'S PRODUCT MOMENT CORRELATION |
|---|---|
| Gough's Dominance $Scale_1$ | .49 |
| Gough's Responsibility $Scale_1$ | .52 |
| Gough's Status $Scale_1$ | .61 |
| Drake's Social Introversion $Scale_2$ | -.90 |
| Taylor's Manifest Anxiety $Scale_2$ | -.84 |
| Winne's Neuroticism $Scale_2$ | -.50 |
| Cook's Hostility $Scale_2$ | -.75 |
| Navran's Dependence $Scale_2$ | -.73 |

1: High score is socially desirable.

2: High score is socially undesirable.

* A modified format of that given by Edwards, 1957b, p. 33.

A number of studies have reported that people in general are more likely to endorse a behavioral characteristic as a personal attribute the higher is its social desirability scale value - Edwards (1953, 1957b); Kenny (1956); Hanley (1956); Rosen (1956); Navran & Stauffacher (1954). The reported correlations between the two variables were all equal to or greater than 0.80.

In view of the above mentioned studies, Edwards (1957b, p. 25) concluded "that probability of endorsement of an item in a personality inventory is positively and highly correlated with the social desirability scale value of the item." In other words, there is a strong likelihood for individuals to endorse <u>only</u> items with socially desirable content, and this phenomenon is proportional to the social desirability scale value of the item. But Edwards failed to observe that in all those studies, the samples used to rate the social desirability of the items, and those used to test for the probability of the endorsement of these items were all college students. While the correlation between social desirability ratings and probability of endorsement is positive for college students, it could be zero, or even negative in other groups. Furthermore, Edwards (1957b) neglected the fact that in the studies he cited to support his hypothesis the correlation between the two variables was computed using endorsement proportions calculated by summing across individuals. This procedure could have obscured the tendency to endorse negative items by a few individuals. In support of this view, Messick (1963) reported that the within-subject biserial correlation between the scale value assigned to the item by the individual and the probability of its endorsement by him ranged between -0.58 and 0.87 for a sample of 154 college students responding to EPPS items. This evidence also substantiates the previously mentioned criticism of Edwards' concept of social desirability, because of its failure to account for the tendency to endorse socially undesirable personality items.

Pursuing his original hypothesis, Edwards, Walsh & Diers (1963, p. 255) stated that "because the relationship between probability of a True response and social desirability scale value is linear, the relationship between the probability of a socially desirable response and social desirability scale value is V-shaped." If we accept Edwards' statement, then it is possible to represent the relation between the social desirability scale value of an item and the probability of a "True" response - P(t) - by a straight line as shown in Fig. 3.1 The relation between the social desirability scale value and probability of a socially desirable response - p(SD) - is depecited in Fig. 3.2.

There are three considerations to be noted regarding the relation depecited in Fig. 3.1:

a. It is assumed that all personality items are equally discriminable as either socially desirable or undesirable. No allowance is made for items hard to judge whether

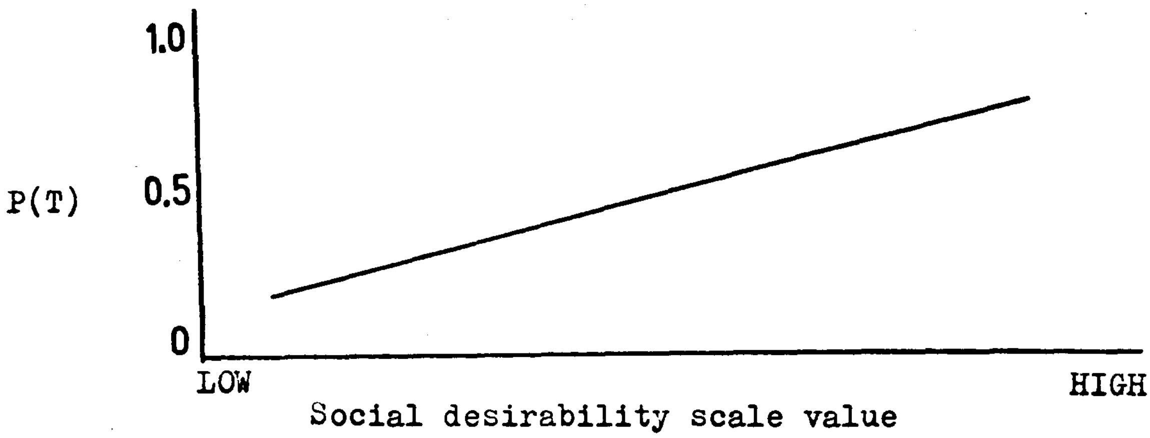


Fig. 3.1 The relation between the social desirability scale value of an item and the probability of a "True" response

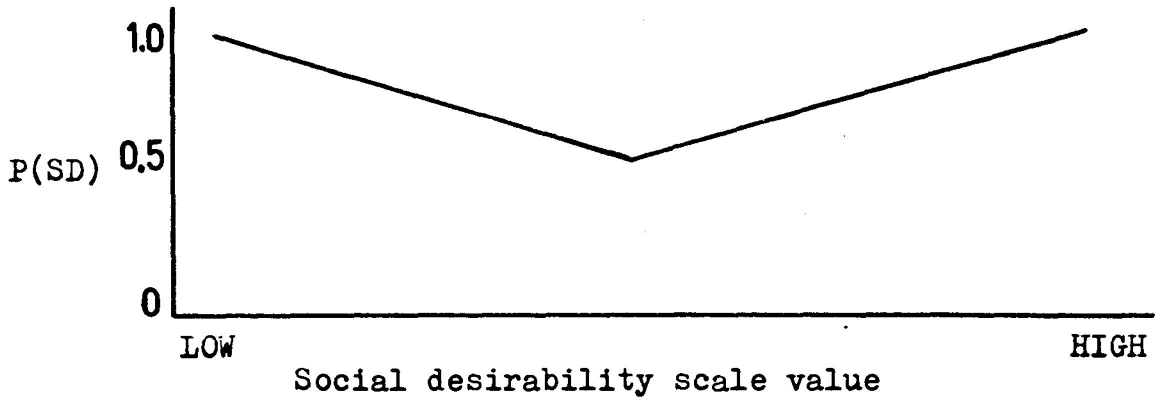


Fig. 3.2 The relation between the social desirability scale value of an item and the probability of a socially desirable response

socially desirable or not, and which would be represented by a curve whose slope is relatively small as shown by curve a in Fig. 3.3.

b. All persons are assumed to give a "True" response only to items whose social desirability scale values are relatively high as shown by curve b in Fig. 3.3. Thus, the relation in Fig. 3.1 ignores the previously mentioned tendency of certain individuals to endorse items which have low or negative scale values as shown in curve c in

Fig. 3.3

c. A person who is neutral on the social desirability dimension is likely to respond "True" with equal probability to items with high as well as low social desirability scale values. For such a person, the relation between the two variables is represented by a curve similar to curve d in Fig. 3.3. The relation in Fig. 3.1 does not account for respondents neutral on the social desirability continuum.

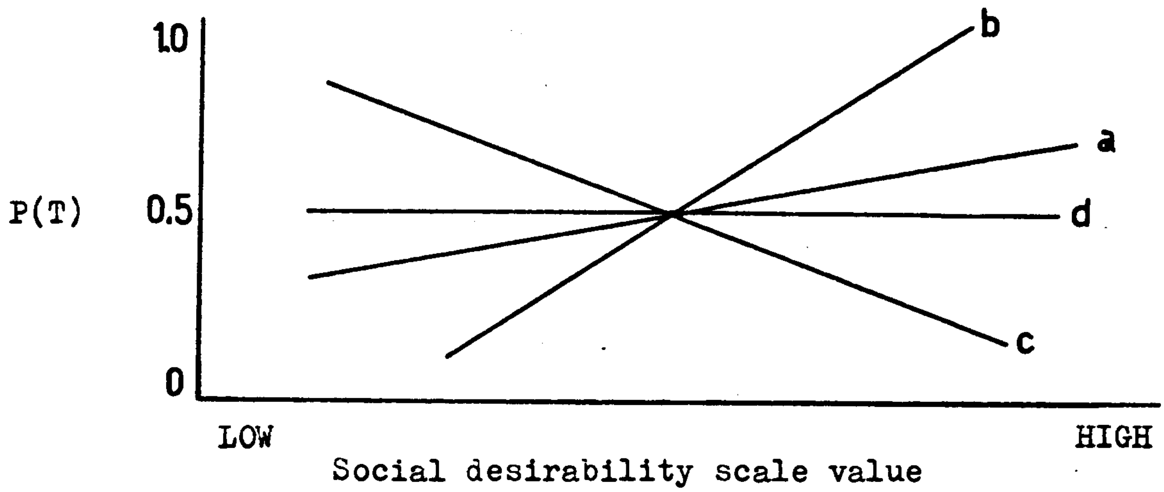


Fig. 3.3 A modification of the relation between the social desirability scale value of an item and the probability of a "True" response

From the above discussion it is apparent that the magnitude of the correlation between the scale value of an item and the probability of its endorsement is a function of the individual's personality, the ease with which the social desirability of an item can be discerned, and the extent to which a given individual shares the frame of reference adopted by the judges as to what constitutes a socially desirable behavior. Another important factor influencing the magnitude of the correlation between the two variables is the nature of the experimental design adopted in the study. In an attempt to account for the large range of correlations between the two variables reported in the literature, Rogers (1971) suggested that the issue can be investigated on any one of the three levels of analysis. The first level represents the within-group correlation between the scale values for the items and the probability of their endorsement. The second level represents the within-subject correlation between the group desirability scale values and the probability of endorsement by the individual. The third level represents the within-subject correlation between the perceived desirability of the items and the probability of their endorsement by the same individual. The studies reviewed by Rogers indicate that the two variables show a consistantly high and positive correlation only at the first level of analysis. In criticizing Edwards for not differentiating between levels one and three, Rogers (1971, p. 12) stated that "Edwards has documented a correlation of 0.87 between the desirability scale values derived from one group of subjects and the endorsement proportions of a separate group of subjects... but the exact or implied interpretation offered by Edwards and some other authors is misleading. Several authors have assumed that the 0.87 correlation applies to the individual... Such a misinterpretation is shown by Edwards who attempted to attribute the high correlation to impression management of the individual."

It is suggested in the present study that the failure of Edwards (1957b) to note there are individuals who tend to attribute to themselves socially undesirable characteristics, has lead him to ignore the importance of the phenomenon to "fake bad" in personality theory and psychological testing.

Dimensions of Social Desirability

There are suggestions that the concept of social desirability is not unidimensional, as Edwards assumed; and it may consist of a number of dimensions or "points of view" as to what is socially desirable. If the concept is multidimensional, it would be inappropriate to construct a scale by instructing a number of judges to simply identify those items with a socially desirable content from a set of 150 items. A more appropriate procedure would be to administer a vast pool of personality items to a sample as representative of the population as possible. The observed social desirability ratings should then be factor analyzed to determine the dimensionality of the concept. In the present study the concept is viewed to be unidimensional. A review of the literature indicates that the dimensionality of the concept, whenever reported, is a function of the nature of the specific scales used or the given instructions.

Klett (1957b) administered 140 items previously mentioned by Edwards in relation to the EPPS construction to 118 male neuropsychiatric patients. Eighty-nine patients were classified as psychotic and the remaining 29 as non psychotic. The sample was instructed to rate on a 9-point scale "their judgement of the desirability" of the content of each item. The desirability scale value of an item was then determined by the method of successive intervals (Edwards, 1957a). There was no significant difference between the ratings by the two groups, and the data were pooled. But the social desirability scale values for the psychiatric group correlated 0.88 with the ratings obtained for college students by Edwards (1953) and 0.87 with those for high school students (Klett, 1957a). Both correlations are significantly below that of 0.93 between the college and high school groups. Further analysis showed the differences between the psychiatirc sample and the other two groups to be related to specific needs and is not random. From these data Klett concluded there are differences between psychiatric and non psychiatric groups as to what constitutes socially desirable behavioral characteristics. But it should be noted that in spite of the reported significant differences among the correlations, the latter are sufficiently high in magnitude for us to consider the ratings by the three groups to be similar. Furthermore, the data does not bear on the question of the dimensionality of the social desirability concept within any of the groups.

Messick (1960) reanalyzed Klett's (1957b) data in a different manner. Ten of the 118 subjects were excluded because of incomplete data. From the 140 items, only 42 items were selected such that each of the 14 scales was represented by three items with high, intermediate and low median values as determined by the ratings on the 9-point scale. The ratings of the items on the 9-point scale were intercorrelated and factor analyzed by the grouping method (Thurstone, 1947). Nine factors were extracted, and the percentage of total variance accounted for by each of them was 4.03, 3.57, 3.39, 9.05, 3.19, 2.48, 2.57, 2.53 and 22.65, respectively, as shown in Fig. 3.4. The oblimax technique was used to rotate the factors to an oblique simple structure. In view of the loadings of the 42 items, Messick associated the fourth and ninth rotated factors with "Sexual Interests" and "Achievement-Oriented, Middle-Class Stereotype of desirable behavior, or a kind of Protestant Ethic", respectively. Since the intercorrelations among the 9 primary factors were too low to permit the emergence of a general desirability factor at the second-order level, Messick concluded that the social desirability concept is multidimensional and nine dimensions are required to account for the "different views" of desirability among the psychiatric sample.

To test for Messick's assumption regarding the absence of a second order factor, principal component analysis was performed on the intercorrelation matrix of the nine primary factors which the author reported (Messick, 1960, p. 283).

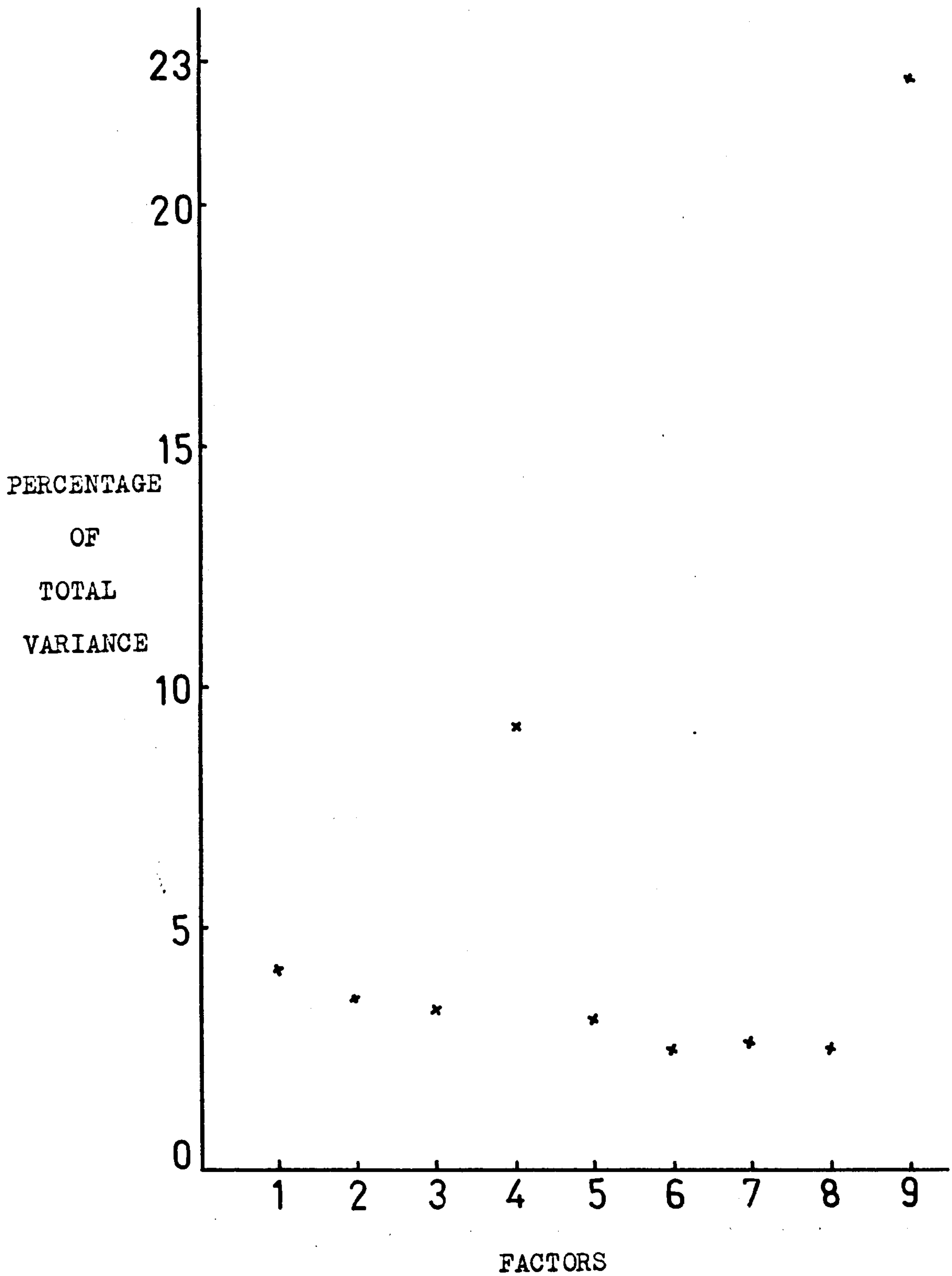


Fig. 3.4 9 factors extracted through the grouping method and the corresponding percentages of total variance accounted for.

Nine factors were extracted, and these were plotted against their corresponding eigenvalues as shown in Fig. 3.5. The relatively smooth decline in the magnitude of the eigenvalues across factors does exclude the probability of the presence of a second order factor.

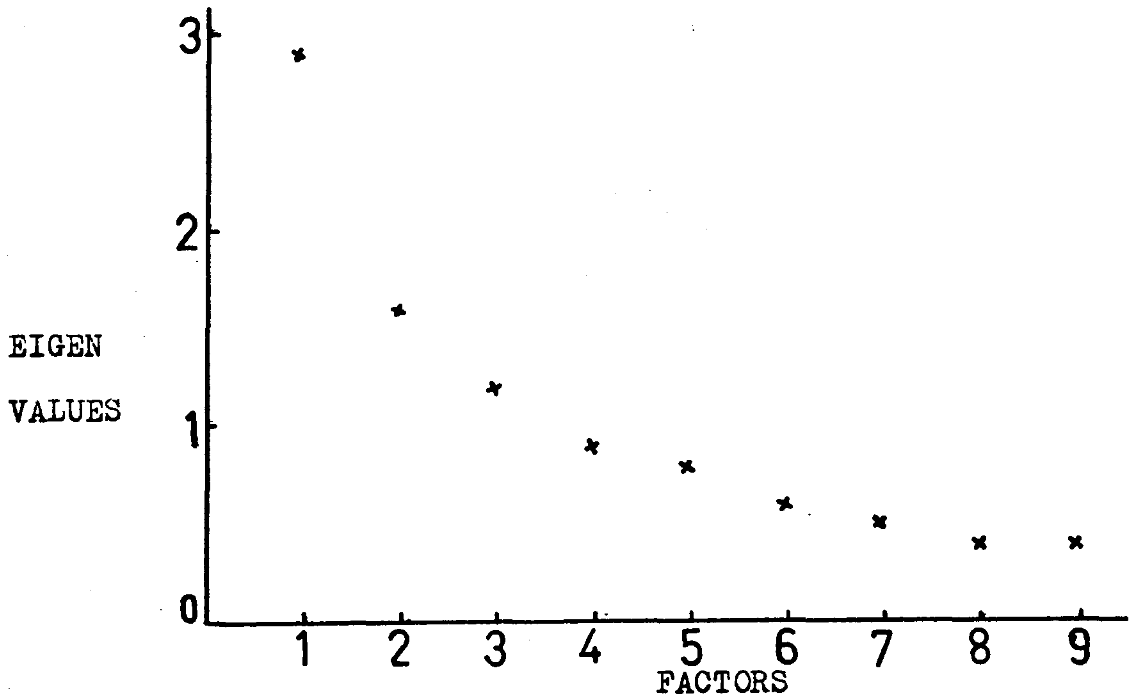


Fig. 3.5 Principal components and corresponding eigenvalues extracted from the intercorrelation matrix of nine primary factors.

In the grouping method of factor analysis, the percentage of variance associated with each factor is a function of the selected groups of variables, at least to some extent. In order to find out whether the presence of two dominant factors (i.e. factors 4 and 9) is the result of the factoring technique, principal component analysis was performed on the correlation matrix estimated from the rotated factor loadings and the primary factor intercorrelation matrix reported by Messick (1960, pp. 282-283). (It was assumed that the loadings which Messick reported are those for reference structure. This assumption was supported by the observation that the percentage of total variance accounted for by the principal component factors was equal to 53.10, which approximates very closely the 53.46% Messick reported for the nine orthogonal factors.) The eigenvalues for the 9 principal component factors were 9.99, 4.06, 1.86, 1.59, 1.24, 1.14, 0.92, 0.77 and 0.72, as shown in Fig. 3.6. Comparison of the slopes of the curves shown in Fig. 3.4 and Fig. 3.6 indicates that the presence of the two dominant factors are not totally due to the factoring technique adopted.

In spite of the above discussion, Messick's approach to the issue and his interpretation of the data are open to criticism on the following points:

a. Messick admitted that one of the shortcomings of Klett's study was that the subjects were instructed to rate "their judgement of the desirability" of the item content rather than to respond to it in a socially desirable manner (Klett, 1957b, p. 419). Thus, the scores which Klett obtained represent the judged personal desirability of the items and their social desirability. This issue is particularly important in view of the nature of the

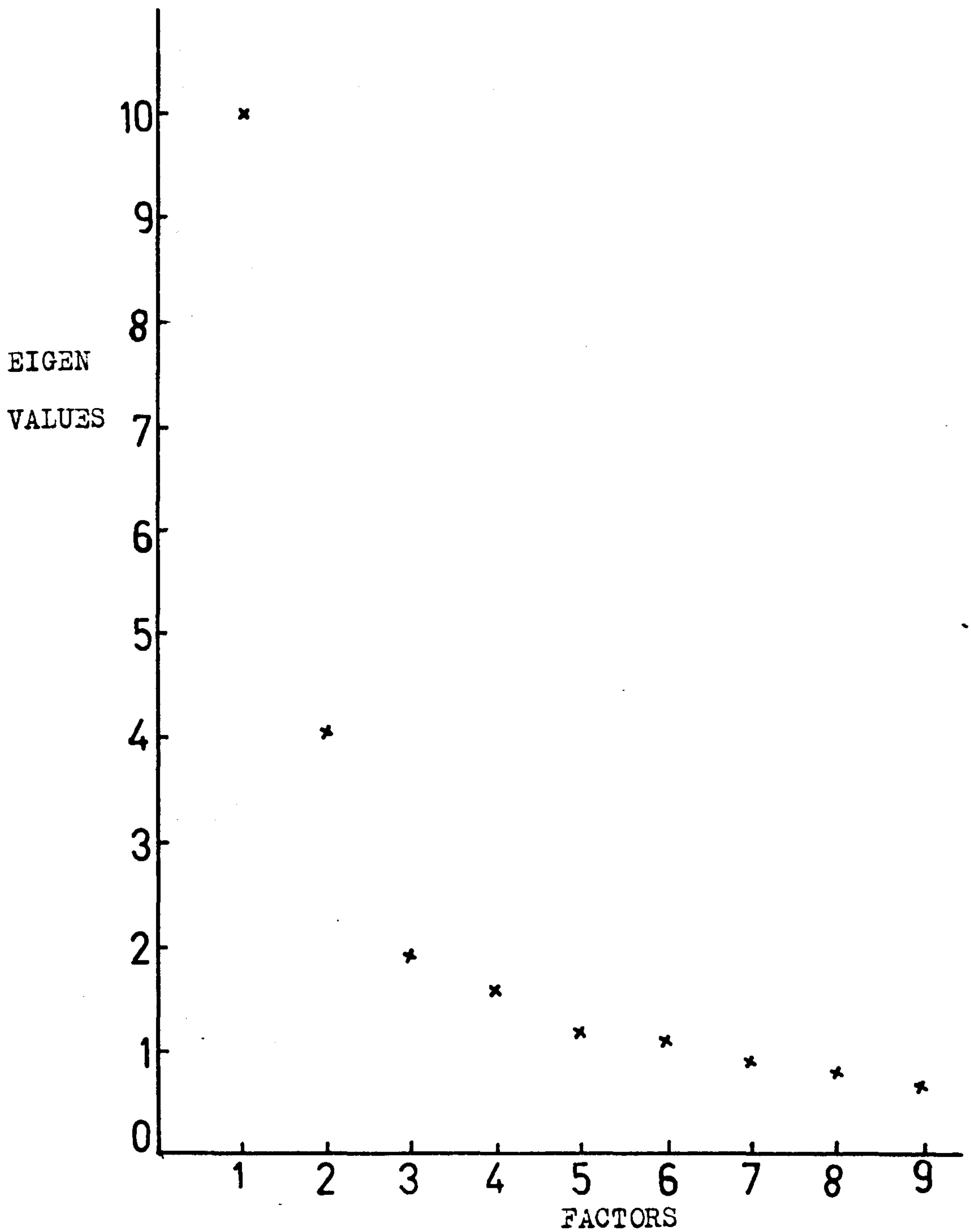


Fig. 3.6 Principal component factors and the associated eigenvalues obtained for $\hat{R}$

sample employed. The characteristics a patient may judge as desirable enough to treat as a model need not coincide with what he considers desirable to society in general. If the sample had been made up of socially adjusted subjects, these differences in interpreting the instructions may not have been that crucial.

b. Messick suggested that nine factors are required to account for the dimensionality of the data. But it is obvious from Fig. 3.4 and Fig. 3.6 that only two factors should be retained. In spite of the inappropriate instructions administered by Klett, it is reasonable to interpret these results as indicating that the concept of social desirability is not unidimensional.

## The SD Scale as a Measure of Psychological Pathology

Crowne and Marlowe (1960) criticized the SD scale and the concept of statistical deviancy upon which it is based. The authors argued the need for a social desirability scale whose content is less related to pathological symptoms to be used in the non psychiatric population.

Crowne and Marlowe pointed out since all the SD scale items are derived from the MMPI, they are loaded with pathological symptoms. This fact makes it hard to interpret high scores on the SD scale. A high score can be due to the effect of the social desirability factor or to the absence of pathological symptoms. If we accept the argument that the SD scale differs from the L scale in being a measure of the unconscious tendency to put oneself in a favourable light, and that the endorsement of the scale items implies the presence of pathology, it follows we are assuming all subjects to suffer from pathological symptoms, but there are some individuals who unconsciously deny the symptoms and obtain high scores on the scale. In this context, Wiggins (1958) observed that in view of the high correlations between the SD scale and the MMPI, one is persuaded to equate pathology with the absence of the tendency of social desirability.

To remedy the situation, Crowne and Marlowe (1960) constructed another social desirability scale (M-C SDS). The basic criterion for chosing the scale items was that "the population from which items were drawn is defined by behaviors which are culturally sanctioned and approved but which are culturally sanctioned and approved but which are improbable of occurance" (Crowne & Marlow, 1960, p. 350). But this is the same criterion according to which the L scale was constructed (Meehl & Hathaway, 1946). Therefore, the M-C SDS is a measure of dissimulation rather than the unconscious tendency to put oneself in a favourable perspective. The M-C SDS can, therefore, be considered as a substitute only to the L scale to be used with non psychiatric subjects. A second criticism against the M-C SDS is the ambiguity of the meaning of a high score because of the criterion according to which the scale is constructed. Is a high score due to "faking" or to conscientiousness? Probably, scores exceeding a certain critical value must be attributed to "faking". But this approach entangles the M-C SDS with the concept of statistical deviancy for which the SD scale was criticized. In view of these two disadvantages associated with the M-C SDS, the SD scale is a more appropriate measure of the concept of social desirability.

In defence of the SD scale, it can be argued that the usefulness of a psychological test is determined by its ability to accomplish what it is intended to do - as indicated by the indices of construct and concurrent validity - rather than by the face validity of its items. Given a group of individuals all of whom can be assumed to be non psychiatric patients, the concept of social desirability states that there are persons who are more willing than others to endorse a behavioral characteristic as a personal attribute. Hence, one is not interested in a scale which enumerates the individual's behavioral characteristic, as Crowne and Marlowe implied, but rather in a scale which allocates individuals to different points along a continuum according to their tendency to endorse certain personal attributes. One can further argue that a scale is a useful measure of social desirability only if its item content is not an obvious property of the population to be tested, because only then we can attribute the endorsement of unfavourable qualities to negative social desirability rather than to realistic description of the self. In this case there is no reason to wonder if a high SD score is due to the social desirability trait or absence of pathology because the latter variable has been assumed to be non-characteristic of the population being tested.

The SD Scale as a Measure of Acquiescence

Cronbach (1946) defined the term "acquiescence" as the tendency to give a "True" response to an item when the individual is not sure how to interpret the item content. Couch and Keniston (1960) defined the term as the tendency to respond "True" to an item irrespective of its content. Regardless of which way the term is defined, it has the logical counterpart of "dissention" - mentioned by Cronbach (1946) - where an individual endorses the item as "False".

In the present study Cronbach's definition is adopted because it permits the drawing of a parallel between acquiesence and the phenomenon of guessing in a multiple choice exam. A person is likely to make a guess in a multiple choice exam due to ignorance regarding the correct answer and not because of an uncontrolable urge to go on guessing. In a similar manner, acquiescence (or dissention) is likely to occur when the wording of the personality item is ambiguous, or when the subject is not sure of the frequency of the phenomenon being rated. The definition by Couch and Keniston, on the other hand, shows the subject responding to a personality inventory while under the "power" of the acquiescence set as if he were in a trance. Although individuals do differ with respect to the frequency of agreeing or disagreeing in general, this frequency is a function of the particular degree of ambiguity that has to be present before a particular subject starts "guessing". The level of ambiguity is also influenced by personal interest, experience, "noise", etc. This view should be treated as a model because of the lack of experimental evidence.

The inbalance in the keying of the SD scale gave rise to the suggestion that the scale is confounded with the acquiescence set - Fricke (1956); Wiggins (1959); Messick (1959). Since of the 39 items, 30 are keyed "False", the SD scale could be a measure of dissention rather than social desirability. Edwards (1957b) observed that if this is true, then there should be a positive correlation between the SD scale and other scales such as the Hs, D and Hy scales in which most items are keyed "False" and on which a high score is considered socially undesirable. Similarly, there should be a zero correlation between the SD scale and other scales such as the Pd scale where the item keying is balanced. That is, if the acquiescence hypothesis is true, then the correlations between the SD scale and other scales are a function of the keying of these other scales rather than the social desirability of the item content. The data in Table 3.2 show that the relations derived from the acquiescence hypothesis are not substantiated.

Further evidence against the acquiescence hypothesis is available from two experiments reported by Edwards (1957b).

Table 3.2

Correlations Between the SD Scale and Other Scales Which Have Different Proportions of Items Keyed "False"

| SCALE | PEARSON'S PRODUCT MOMENT CORRELATION | TOTAL NUMBER OF ITEMS | APPROXIMATE PERCENTAGE OF ITEMS KEYED "FALSE" | SOCIAL DESIRABILITY OF A HIGH SCORE |
|---|---|---|---|---|
| $Hs_1$ | -0.62* | 33 | 67 | negative |
| $D_1$ | -0.72* | 60 | 67 | negative |
| $Hy_1$ | -0.09 | 60 | 78 | negative |
| $Pd_1$ | -0.73* | 60 | 52 | negative |
| $Mf(m)_2$ | -0.16 | 60 | 53 | positive |

* $p < 0.01$

1 Crowne and Marlowe (1960). A sample of 37 male and female college students.

2 Edwards (1964). A sample of 150 college males.

In one experiment, a balanced SD (BSD) scale was constructed from 44 MMPI items, of which 22 items are keyed "True". According to the acquiescence hypothesis, the Sc scale - which has 78% of its items keyed "True" - must have a significantly lower correlation with the BSD scale than with the original SD scale. But for a sample of 155 counseling center males, the Sc scale correlated -0.86 with the BSD scale and -0.80 with the SD scale. Further the correlation between the BSD and SD scales was 0.85.

In a second experiment an alternative test was made of 39 items all keyed "True". This is referred to as the SDT scale. According to the acquiescence hypothesis, the Sc scale must correlate positively with the SDT scale and negatively with the SD scale. For the same sample used in the previous experiment, the TSD scale correlated 0.70 with the SD scale and -0.64 with the Sc scale.

Edwards (1961) investigated the effects of social desirability and acquiescence on the relationship between the SD scale and 43 MMPI scales. Pearson's r was computed for the SD scale correlations with the 43 scales, and both the proportion of items keyed "False" and the proportion of items keyed for social desirability in the 43 scales in order to test for acquiescence social desirability, respectively. The social desirability factor accounted for 0.91 of the variance in the SD scale correlations with the 43 scales, while acquiescence accounted for 0.46 of the variance.

Couch and Keniston (1961) reported that the SD scale is confounded with acquiescence because it correlated -0.34 ($p<0.05$) with the OAS, which is a scale the authors constructed to measure acquiescence. But as Edwards and Walker (1961) observed, it is doubtful whether the OAS is a measure of acquiescence because its correlations with five of Thurstone's Temperament scales were only 0.01, 0.19, 0.14, 0.10 and 0.16 (Couch and Keniston, 1960) while the percentage of items keyed "True" in these five scales are 1.00, 0.90, 0.70, 0.80 and 0.95, respectively.

<u>The SD Scale as a Measure of Dissimulation</u>

Megargee (1966) suggested that high scores on the SD scale could be the result of dissimulation. The study included three groups. Group 1 consisted of adjusted college students who were not motivated to dissimulate. Group 2 was adjusted and motivated to dissimulate. It consisted of 21 Peace Corps trainees. Group 3 consisted of 65 offenders who were both maladjusted and motivated to dissimulate. The means for the three groups on the SD scale were 30.83, 35.00 and 29.37, respectively. The group 2 mean was significantly higher than that for each of the other groups at the 0.001 level. There was no significant difference between the means for groups 1 and 3.

The significant difference between groups 2 and 3 supports the contention stated previously regarding the difference between social desirability and dissimulation. The trait of social desirability is acquired during an extended period of social learning and, unlike dissimulation, is not the product of an instantaneous and contracted social setting.

Since the mean for group 2 is significantly higher than that for group 1, Megargee attributed the difference to dissimulation. But further consideration of the characteristics of subjects in groups 1 and 2 suggests that Megaree's conclusion is not warranted by the data. The author did not present any evidence that the Peace Corps applicants are representative of the population from which the college students group was selected. Only if such evidence is available it is possible to claim that the mean of group 2 would have been similar to that for group 1 if it were not for the need to dissimulate. Otherwise it is possible that group 2 subjects have a higher mean because they are representative only of that portion of college students who are extreme on the positive pole of the social desirability dimension; and that they applied to the Peace Corps in virtue of their extreme internalization of social values which encourage dissipating one's knowledge and ideology to foreign cultures.

## Factor Analytic Study of the SD and Other MMPI Derived Scales

Edwards, Diers & Walker (1962) reported the results of a factor analytic study in which 61 personality inventories, 58 of which were derived from the MMPI, were administered to 151 male college students. Principal component analysis was performed on the correlation matrix of the 61 scales. Ten factors which accounted for 75% of the total variance were rotated orthogonally to satisfy the varimax criterion. From then on, Edwards et. al. used the fact that certain scales loaded higher on certain factors than on others to argue the presence of three response sets - i.e. social desirability, acquiescence and dissimulation - and to show the independence of the SD scale from the latter two response sets.

It is accepted in the present study that the first factor represents the social desirability dimension as defined by Edwards. The loading of the SD scale on the first factor was 0.97. The correlation between the percentage of keyed socially desirable items in the 60 scales - as reported by Heineman (1953) and Dahlstrom & Welsh (1960) - and the loadings on each of the three rotated factors were 0.90, -0.38 and -0.27, respectively. Furthermore, the correlations of the 60 scales with the SD scale correlated with the loadings on the three factors to the extent of 0.98, -0.55 and -0.15, respectively.

The reasons which Edwards et. al. gave for labeling the second and third factors "acquiescence" and "dissimulation", respectively; and for considering the SD scale independent of these behavioral aspects are tenuous because of the following reasons:

a. Fig. 3.7 shows the relationship between the first three of the ten rotated factors and the proportion of total variance accounted for by each of them. It is obvious from the slope of the curve that only the first factor should be retained. This trend would have been more clear if the unrotated factors had been plotted against their eigenvalues.

b. No attempt was made to control for the effect of item overlap between the scales on the magnitude of the intercorrelations.

c. Labelling the second factor "acquiescence" is based mainly on the magnitude of the correlation between the

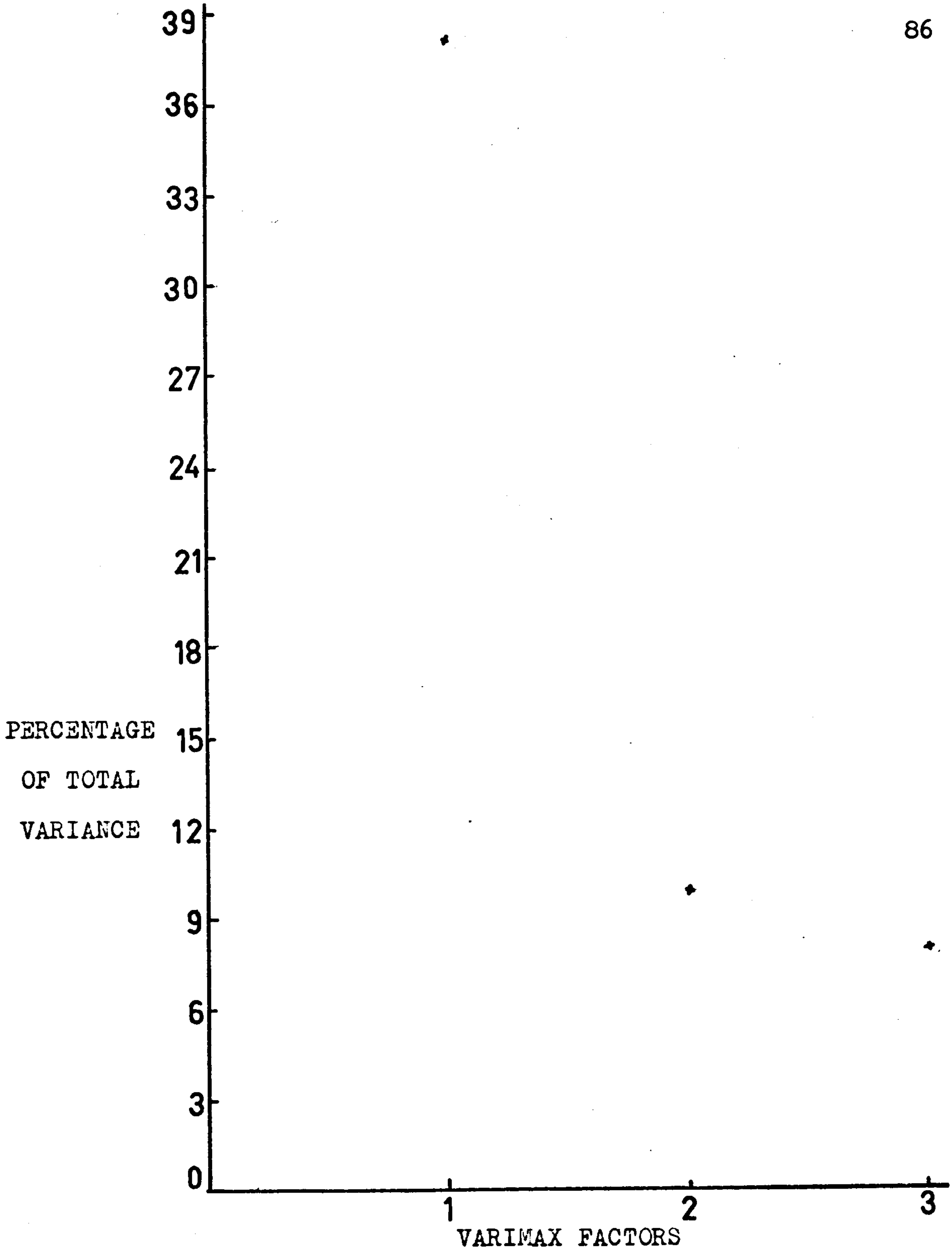


Fig. 3.7 Percentage of total variance accounted for by each of the first three of the ten rotated factors reported by Edwards et. al., 1962

proportion of items in the 60 scales keyed "True" and the loadings of these scales on the three factors. The correlations for the first, second and third factor were -0.62, 0.82 and -0.19, respectively. Although a Pearson's r of 0.82 is higher than that of -0.62, the two correlations are equally significant but opposite in sign. Therefore, if the second factor is labeled "acquiescence", it is reasonable to label the first factor "dissention".

d. To obtain the reported loadings for the three factors, Edwards et. al. normalized all 10 principal component factors prior to their rotation, but did not denormalize the loadings afterwards. The fact that the reported loadings were normalized was observed when their sum of squares were found to be equal to the percentages of common variance which Edwards et. al. associated with these factors. Therefore, the reported loadings for the 3 factors are normalized and are higher in magnitude than the corresponding denormalized loadings which would have been more appropriate for the purpose of factor comparison.

It is of interest to note the comment by Edwards et. al. (1962, p. 221) to the effect that "we may also argue, however, because of the nature of items in the SD scale, that low scores represent a strong tendency to give socially undesirable responses, and that this is also a general trait ... if we intercorrelate a large number of personality scales with varying proportions of items keyed for socially desirable responses and factor analyze the resulting correlation matrix, we would obtain a bipolar social desirability factor." This point of view goes beyond the previous contention (Edwards, 1957b, p. 54) that "since my interest is in social desirability, or faking good, I shall be concerned only with those studies of fakability in which subjects are expected to give favourable or socially desirable self-descriptions." When the social desirability dimension was first conceived, it was equated with, and only with, faking good. The probability that the dimension is bipolar seems to have occurred to Edwards only as an after thought in an attempt to match the social desirability concept with the observed data.

It is the aim in the present study to show that the bipolar factor Edwards et. al. (1962) extracted corresponds to the repression-sensitization dimension proposed by Byrne (1961) and not to the concept of social desirability originally defined by Edwards (1957b).

# CHAPTER IV

## TAYLOR'S MANIFEST ANXIETY SCALE

The current chapter will first present the theoretical background associated with the MAS, the construction of the scale, and its reliability. The relation between the scale and drive level as defined in Hull's (1943) framework has been investigated in a number of areas, the main of which are eyelid conditioning, serial learning, and academic achievement. But the research done in these areas will not be reviewed because the purpose of the present study is not to test the validity of the MAS as an index of drive, but rather to investigate its relation to the SD and R-S scales. To attain this purpose, the following discussion will refer to factorial and correlational studies which employed indices of social desirability, repression and sensitization. Scores on the MAS will also be examined in terms of other indices of anxiety such as clinical ratings and physiological indices of autonomic arousal to test whether MAS scores are a function of observed anxiety or the tendency to give socially desirable - or undesirable - responses as hypothesized in the dimension of repression-sensitization.

### Theoretical Background of the MAS

Taylor (1951) gave a detailed presentation of the theory underlying the MAS. The scale items are considered to describe the behavioral syndromes of psychiatric patients classified as anxiety neurotics. The behavioral symptoms of manifest anxiety are assumed to be related to, or paralleled by, internal emotional responses controlled mainly by the autonomic nervous system. These internal responses are assumed to determine the level of drive which, in turn, modifies performance in the manner conceived by Hull. Taylor assumed the drive level to be determined by the level of general anxiety as measured by the MAS as well as by the experimental setting and the negative affect resulting from the noxious UCS. These three variables are supposed to combine in "some ... manner" as to enhance the drive level. The manner in which these variables combine was not stated.

Scale Construction

Taylor (1953) discussed the procedure adopted in the construction of the MAS. Five clinicians were instructed to select from a set of approximately 200 MMPI items those which satisfy Cameron's (1947) definition of chronic anxiety. There were 65 true-false items on which at least four judges reached agreement. To these 65 anxiety items there was added a set of 135 buffer items rated by all judges as non indicative of anxiety. When the resulting scale was administered to 352 college students, the score range was 1-36, with a median of approximately 14.

In subsequent analysis, only those 50 items which had the highest correlation with the total anxiety score were retained - the magnitude of this correlation was not given. The buffer items were altered to include most of the items from the L, K and F scales of the MMPI as well as 41 items from Wesley's rigidity scale. The buffer items totaled 175 in all. No rational was given for the selection of these specific buffer items. In the present study reference will be made to the final version of the MAS unless otherwise stated. The terms "MAS" and "TMAS" will be used to refer to the 50 anxiety items and to the anxiety items plus the buffer items, respectively.

Taylor (1953) reported the distribution of TMAS scores for different samples. These data will be referred to later on when reviewing other studies on the MAS. For a group of 1971 male and female students, the mean was 14.56, the median was approximately 13 and the range was 1-46. The twentieth percentile was about 7, the fiftieth about 13 and the eightieth was approximately 21. Although females had a slightly higher mean, the difference between the two sex groups was not significant. The test-retest coefficient varied between 0.89 over a 3-week period for a group of 59 students, and 0.82 over a 5-month period for a sample of 113 students. For a sample of 103 neurotic and psychotic patients, the score range was 1-49 and the median was approximately 34. It would have been more appropriate if these two psychiatric groups were tested separately because they are unlikely to exhibit manifest anxiety to the same extent. However, the data presented suggest that the distributions for the normal and psychiatric samples are sufficiently different. Furthermore the MAS has a relatively high test-retest reliability coefficient.

### The Effect of Change in the Buffer Items on the Reliability of the Scale

Taylor (1953) administered the group MMPI profile to 282 freshmen males 18 weeks after they were given the TMAS. The correlation between the two sets of keyed anxiety items was 0.68. A chi-square test of homogeniety showed that the score distribution obtained from the MMPI was significantly different from that for the TMAS which was similar to the previously reported distributions for college students. Taylor (1953) attributed the low correlation between the two sets of keyed items to the alteration of the buffer items. Such an argument throws doubt on the reliability of the scale, let alone its validity. But studies by Lebo and Nablin (1958), and Feldman and Siegel (1958) indicate that changes in the buffer items do not have a significant effect on the MAS score. In view of the latter evidence, it was possible to combine the 50 keyed MAS items with the other scales used in Experiments 1 and 2 in the manner shown in Appendix A. The difference in the distributions of the two sets of MAS scores reported by Taylor could be due to the increase in the number of buffer items which could have induced fatigue when the whole MMPI profile was administered.

### The Factor of Social Desirability in the MAS

The effect of the social desirability factor on the MAS scores has been reported in factorial studies which included the MA and SD scales in the analysis, as well as in those studies which examined the correlation between the desirability ratings of the MAS items and the probability of their endorsement. The factorial studies further indicate that the MA, SD and R-S scales load on the same factors. This suggests the presence of a common personality dimension underlying the three scales.

Liberty, Vitola & Pierson (1965) administered 54 personality scales to 150 college students. Principal components was performed on the correlation matrix. Nine factors whose roots exceeded unity were rotated according to the varimax criterion. These nine factors accounted for 74% of the total variance. The loadings of 12 scales which are of interest are presented in Tabe 4.1.

It is apparent that the MA and SD scales load mainly on the first factor. The loadings of the ES and N scales are also similar in pattern to those of the SD and MA scales. These four scales do seem to measure the same trait. The loadings of the Pt and MA scales on all nine factors are congruent with the commonly reported high correlation between them - Deese, Lazarus & Keenan (1953), Ericksen (1954). The high loadings of the K and SD scales on the first factor reflect the close similarity between them as mentioned by Edwards (1957b). The Im scale has a high loading on the second factor, but not on the first one as would have been expected

Table 4.1*

Orthogonally Rotated Factor Loadings

| VARIABLE | I | II | III | IV | V | VI | VII | VIII | IX |
|---|---|---|---|---|---|---|---|---|---|
| MAS | -.79 | -.27 | .24 | -.09 | -.01 | -.02 | .16 | -.09 | .15 |
| Ego Strength (ES) | .66 | -.04 | -.01 | -.01 | .06 | .12 | -.14 | -.08 | .07 |
| MMPI Validity Scale (F) | -.48 | -.13 | .14 | -.05 | -.08 | .05 | .27 | .03 | .60 |
| Hypochondriosis (HS) | -.59 | -.06 | .18 | -.15 | -.25 | -.31 | .32 | -.03 | .20 |
| Conversion Hysteria (Hy) | -.17 | .27 | .04 | -.27 | -.21 | -.66 | .05 | .36 | .24 |
| K Scale | .57 | .50 | -.25 | .00 | -.06 | -.15 | -.24 | .34 | .02 |
| L Scale | .10 | .21 | -.74 | -.19 | -.06 | .15 | .00 | .10 | .02 |
| Neuroticism (N) | -.76 | -.07 | .18 | -.16 | .01 | -.30 | .24 | .00 | .18 |
| Pt Scale | -.76 | -.29 | .20 | -.09 | .07 | -.10 | .11 | .01 | .20 |
| SD Scale | .82 | .25 | -.03 | .05 | .02 | -.02 | -.23 | .04 | -.15 |
| Marlow-Crowne SD Scale (M-CSD) | .11 | .30 | -.56 | -.16 | -.01 | -.13 | .12 | .13 | -.31 |
| Impulsivity (Im) | -.28 | -.54 | .42 | -.01 | .08 | -.16 | .33 | -.14 | .29 |

* A modification of the table given by Liberty et. al., 1965, p. 328.

if one is to consider impulsivity to be a component of neuroticism which is identified by Factor I. It is of interest to note that the M-C SD scale loads on Factor III as does the L scale. This substantiates the similarity between the two scales mentioned in Chapter 2. Although the data show a strong relation between the MA and SD scales, one should observe that Liberty et. al. did not control for item overlap among the scales. Item overlap could have induced spuriously high intercorrelations among certain scales and the observed symetry in the corresponding factor loadings.

Golin, Herron, Lakota & Reineck (1967) carried out a factorial study to investigate the relation of Eysenck's Extraversion-Introversion dimension to the R-S and MA scales. A total of 16 scales were administered to 226 college students. The squared multiple correlations were the initial communality estimates which were then iterated by Rao's method to a convergence criterion of 0.005. Factors whose roots exceeded unity were rotated to the normalized varimax criterion. Following rotation, Golin et. al. discarded those factors considered to be of minimal importance. The criterion adopted in this step was not mentioned. The correlations and factor loadings for the 16 variables are given in tables 4.2 and 4.3, respectively.

In contrast to Liberty et. al. (1965), Golin et. al. sought to test for the effect of item-overlap by carrying out two additional factor analysis in which the MA and R-S scales were included only one at a time. The data obtained in either case was similar to that shown in Table 4.3. Golin et. al. concluded that item-overlap between the two scales had no significant effect on the rotated factor loadings. But this

Table 4.2**

Means, Standard Deviations, Communality Estimates, and Intercorrelations

| VARIABLE | R-S | MA | E | N | ARS | F- | F+ | TAS | SAS |
|---|---|---|---|---|---|---|---|---|---|
| R-S | .92 | | | | | | | | |
| MA | .87* | .87 | | | | | | | |
| E | -.39* | -.36* | .51 | | | | | | |
| N | .75* | .71* | -.37* | .77 | | | | | |
| ARS | .56* | .49* | -.11 | .52* | .72 | | | | |
| F- | -.08 | -.09 | .09 | -.12 | .02 | .22 | | | |
| F+ | .28* | .22 | -.15 | .21 | .28* | .03 | .34 | | |
| TAS | .57* | .63* | -.21 | .61* | .45* | -.02 | .24* | .69 | |
| SAS | .31* | .24* | -.05 | .24* | .58* | .18 | .44* | .28* | .71 |
| MHS | .59* | .51* | -.11 | .57* | .53* | -.22 | .25* | .36* | .24* |
| WRS | .09 | .07 | -.11 | .07 | .08 | .11 | .15 | .06 | .28* |
| Es | -.73* | -.68* | .27* | -.56* | -.42* | .01 | -.28* | -.56* | -.36* |
| K | -.69* | -.62* | .21 | -.55* | -.51* | .09 | -.23 | -.40* | -.32* |
| Pr | .70* | .58* | -.28* | .55* | .48* | -.14 | .36* | .47* | .34* |
| St | -.46* | -.42* | .29* | -.41* | -.23 | -.13 | -.21 | -.39* | -.26* |
| L | -.47* | -.39* | .07 | -.38* | -.29* | .06 | -.04 | -.23 | -.06 |
| M | 59.4 | 17.5 | 26.4 | 22.3 | 5.7 | 4.0 | 1.5 | 5.4 | 24.9 |
| SD | 18.5 | 8.7 | 8.5 | 11.7 | 2.7 | 1.2 | 1.0 | 3.6 | 10.0 |

(Table continued on next page)

Table 4.2 continued

| VARIABLE | MHS | WRS | Es | K | Pr | St | L |
|---|---|---|---|---|---|---|---|
| R-S | | | | | | | |
| MA | | | | | | | |
| E | | | | | | | |
| N | | | | | | | |
| ARS | | | | | | | |
| F- | | | | | | | |
| F+ | | | | | | | |
| TAS | | | | | | | |
| SAS | | | | | | | |
| MHS | .74 | | | | | | |
| WRS | .09 | .21 | | | | | |
| Es | -.37* | -.16 | .75 | | | | |
| K | -.57* | -.14 | .44* | .69 | | | |
| Pr | .65* | .19 | -.58* | -.57* | .77 | | |
| St | -.24* | -.22 | .50* | .32* | -.45* | .52 | |
| L | -.43* | -.07 | .37* | .40* | -.38* | .26* | .50 |
| M | 15.6 | 4.5 | 41.7 | 11.8 | 9.3 | 18.8 | 3.2 |
| SD | 7.2 | 2.0 | 5.8 | 3.5 | 4.5 | 4.1 | 1.8 |

Note - The values of $h^2$ have been inserted in the major diagonal; N = 226.

* $p < .001$.

** From Golin et al., 1967, p. 566.

Table 4.3*

Factor Loadings of Each Variable on the Obtained Factors

| VARI-ABLE | FACTOR | | | | | | | | COM-MUN-ALITY |
|---|---|---|---|---|---|---|---|---|---|
| | I | II | III | IV | V | VI | VII | VIII | |
| R-S | -.59 | .48 | .27 | -.38 | -.06 | .15 | -.26 | .18 | .915 |
| MA | -.48 | .61 | .18 | -.34 | .02 | .09 | -.18 | .27 | .867 |
| E | .04 | -.16 | -.01 | .67 | .15 | -.08 | .04 | -.01 | .510 |
| N | -.44 | .58 | .22 | -.37 | -.02 | .19 | .04 | -.10 | .766 |
| ARS | -.38 | .30 | .69 | -.04 | .03 | .05 | .03 | -.07 | .721 |
| F- | .05 | -.02 | .08 | .06 | -.13 | -.43 | -.00 | -.01 | .215 |
| F+ | .03 | .12 | .42 | -.09 | -.32 | .10 | -.11 | .10 | .339 |
| TAS | -.16 | .77 | .21 | -.07 | -.11 | .08 | -.01 | .01 | .690 |
| SAS | -.07 | .13 | .75 | .01 | -.29 | -.20 | -.05 | .03 | .713 |
| MHS | -.55 | .21 | .34 | -.02 | -.10 | .52 | .02 | -.03 | .738 |
| WRS | -.06 | -.01 | .14 | -.06 | -.42 | -.10 | .01 | .01 | .213 |
| Es | .35 | -.54 | -.21 | .19 | .21 | .04 | .50 | .00 | .751 |
| K | .65 | -.24 | -.28 | .15 | .16 | -.13 | -.06 | -.25 | .692 |
| Pr | -.41 | .31 | .31 | -.15 | -.39 | .42 | -.24 | .05 | .773 |
| St | .25 | -.36 | -.05 | .24 | .48 | .09 | .13 | .09 | .515 |
| L | .67 | -.15 | .03 | -.02 | .09 | -.05 | .09 | .09 | .498 |
| Variance Common | 25.0% | 23.5% | 18.0% | 10.1% | 9.0% | 8.1% | 4.2% | 2.1% | |
| Total | 15.5% | 14.5% | 11.1% | 6.3% | 5.6% | 5.0% | 2.6% | 1.3% | |

* From Golin et. al., 1967, p. 567

conclusion is unjustified: The exclusion of the MAS, for example, from the analysis does not completely eliminate the effect of item-overlap because both the MA and R-S scales consist of items which are common to the L and K scales. A method which is more appropriate to the control of item-overlap effect is outlined in Chapter 7.

In view of the differential loadings of the R-S, MA and N scales on the first two factors shown in Table 4.3, the authors associated the traits of defensiveness and emotionality with factors one and two, respectively. Golin et. al. (1967, p. 568) suggested that while the MA and R-S scales seem to be independent of the extraversion-introversion dimension, they are "equivalent and largely determined by two orthogonal traits defensiveness and emotionality." In support of this view, Golin et. al. cited a study by Cohen, M. who reported that while both defensiveness and emotionality as measured by the GSR are a function of the R-S dimension, both variables are uncorrelated. But the argument that MAS scores are determined by two orthogonal traits defensiveness and emotionality is questionable because as shown in Table 4.1 (Liberty et. al., 1965), the MA and N scales have high loadings <u>only</u> on the first factor which is associated with the SD scale. Whereas, if the argument of Golin et. al. is valid, one would have expected the MA and N scales to load on the first factor which is associated with repression as well as on some other factor which could then be identified with emotionality.

To determine whether the dependence of the MA and R-S scales on the two orthogonal traits which Golin et. al. reported was due mainly to the factoring procedure adopted, principal components was performed on the correlation matrix given in Table 4.2. The loadings on the 16 unrotated factors, the associated eigenvalues and the variance cumulated across factors are given in Table 4.4. The plot of the eigenvalues against the corresponding factors is given in Fig. 4.1.

From the data in Table 4.4 and Fig. 4.1 it is obvious that the number of factors required to define the domain is not eight as Golin et. al. suggested, but less than that. The exact number of factors to be retained, however, is somewhat ambiguous. As shown in Table 4.4, only four factors have eigenvalues exceeding unity. Yet, the difference between the eigenvalues for factors four and five is so small, that the retention of one implies the same thing for the other. But when the first five factors are rotated according to the varimax criterion, the internal consistency of the fifth factor is only 0.08. It was therefore decided that no more than three factors should be retained. The loadings for the first three orthogonally rotated factors and their corresponding indices of internal consistency are given in Table 4.5.

The data in Table 4.5 shows that, as reported by Liberty et. al., the MA, Es and N scales have similar loadings across factors - a fact which emphasizes the similarity between these three scales. But contrary to the findings of Liberty

Table 4.4

Internal Consistencies, Eigenvalues and Loadings for 16

Unrotated Principal Component Factors Obtained

From the Correlation Matrix

Reported by Golin et al., 1967

(N = 226)

| | | | | | | |
|---|---|---|---|---|---|---|
| | .9052 | .3969 | .2019 | .0226 | -.0134 | -.4241 |
| | -.4681 | -.8708 | -.9248 | -1.1962 | -1.4224 | -2.0013 |
| | -2.9082 | -3.4542 | -3.8100 | -10.3658 | | |
| | 6.6043 | 1.5925 | 1.2335 | 1.0216 | .9876 | .7155 |
| | .6950 | .5505 | .5356 | .4714 | .4285 | .3477 |
| | .2684 | .2359 | .2187 | .0933 | | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | .9120 | -.1459 | -.0841 | .0395 | -.0555 | .0293 |
| 2 | .8476 | -.1859 | -.1551 | .0471 | -.1465 | .0806 |
| 3 | -.3855 | .0991 | .5926 | .4240 | -.0663 | -.2613 |
| 4 | .8099 | -.1946 | -.0896 | -.0126 | -.1245 | .1531 |
| 5 | .6855 | .1984 | .4011 | .0413 | -.2178 | .2984 |
| 6 | -.0822 | .5951 | -.2184 | .5784 | -.2004 | .0331 |
| 7 | .4020 | .4700 | .1475 | -.4712 | -.0624 | -.4665 |
| 8 | .6919 | .0011 | -.1453 | .0338 | -.3517 | .0200 |
| 9 | .4718 | .6748 | .2797 | -.0881 | -.1082 | .1447 |
| 10 | .7005 | -.2007 | .4111 | -.0511 | .1830 | -.0248 |
| 11 | .2005 | .4918 | -.1449 | -.0280 | .6984 | .2798 |
| 12 | -.7702 | -.0611 | .2216 | -.0871 | .0844 | .1575 |
| 13 | -.7492 | .1018 | -.2036 | -.0951 | -.1459 | -.1197 |
| 14 | .7981 | -.0118 | .0808 | -.1258 | .1773 | -.1777 |
| 15 | -.5663 | -.2079 | .4522 | -.1625 | -.1223 | .3072 |
| 16 | -.5168 | .2821 | -.1480 | -.4566 | -.3466 | .2081 |

(Table continued on next page)

Table 4.4 continued

| | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|
| 1 | -.0702 | .0969 | -.0160 | -.1823 | .0475 | -.0880 | .0417 |
| 2 | .0472 | .1815 | .0283 | -.1706 | -.0372 | -.1069 | .1050 |
| 3 | .4262 | .0355 | .0897 | -.1308 | -.0751 | -.1251 | .0076 |
| 4 | .0290 | -.0077 | .1489 | .2052 | -.0224 | -.2919 | -.2217 |
| 5 | -.0615 | -.1562 | -.1265 | .1425 | .0653 | -.0302 | .3312 |
| 6 | -.3267 | .0658 | .2923 | -.0342 | .1261 | .0305 | -.0239 |
| 7 | -.1884 | .2666 | .1065 | .1042 | -.0888 | -.0933 | .0785 |
| 8 | .3831 | .1209 | .1567 | .2779 | -.1203 | .2987 | -.0149 |
| 9 | .0029 | -.1069 | -.3125 | -.0164 | -.0291 | .0319 | -.2656 |
| 10 | -.0466 | -.1924 | .3045 | .0566 | .1763 | -.0792 | -.0690 |
| 11 | .2780 | .1778 | .1091 | .0460 | .0095 | -.0482 | .0671 |
| 12 | -.2111 | -.1509 | .2646 | .1944 | -.2478 | .0524 | .0265 |
| 13 | .1944 | -.0571 | -.0553 | .2651 | .4268 | -.1249 | .0406 |
| 14 | .0142 | -.1737 | .1316 | -.1546 | .2373 | .2917 | -.0231 |
| 15 | -.0818 | .4713 | .0488 | -.0466 | .2099 | .1017 | -.0809 |
| 16 | .2096 | -.1846 | .2683 | -.3170 | -.0169 | -.0673 | .0217 |

| | 14 | 15 | 16 |
|---|---|---|---|
| 1 | .0221 | .1129 | .2481 |
| 2 | -.1312 | .2516 | -.1531 |
| 3 | .0785 | .0475 | .0097 |
| 4 | .2374 | -.0360 | -.0380 |
| 5 | .0855 | -.0690 | -.0156 |
| 6 | -.0048 | -.0201 | -.0093 |
| 7 | .0191 | -.0165 | -.0038 |
| 8 | -.0760 | -.0200 | .0417 |
| 9 | -.0807 | .1230 | .0027 |
| 10 | -.2841 | -.0737 | .0083 |
| 11 | .0134 | .0037 | .0103 |
| 12 | .0396 | .2672 | .0379 |
| 13 | -.0257 | .1651 | .0233 |
| 14 | .2266 | .1016 | -.0489 |
| 15 | .0356 | -.0138 | -.0045 |
| 16 | .0004 | -.0596 | .0106 |

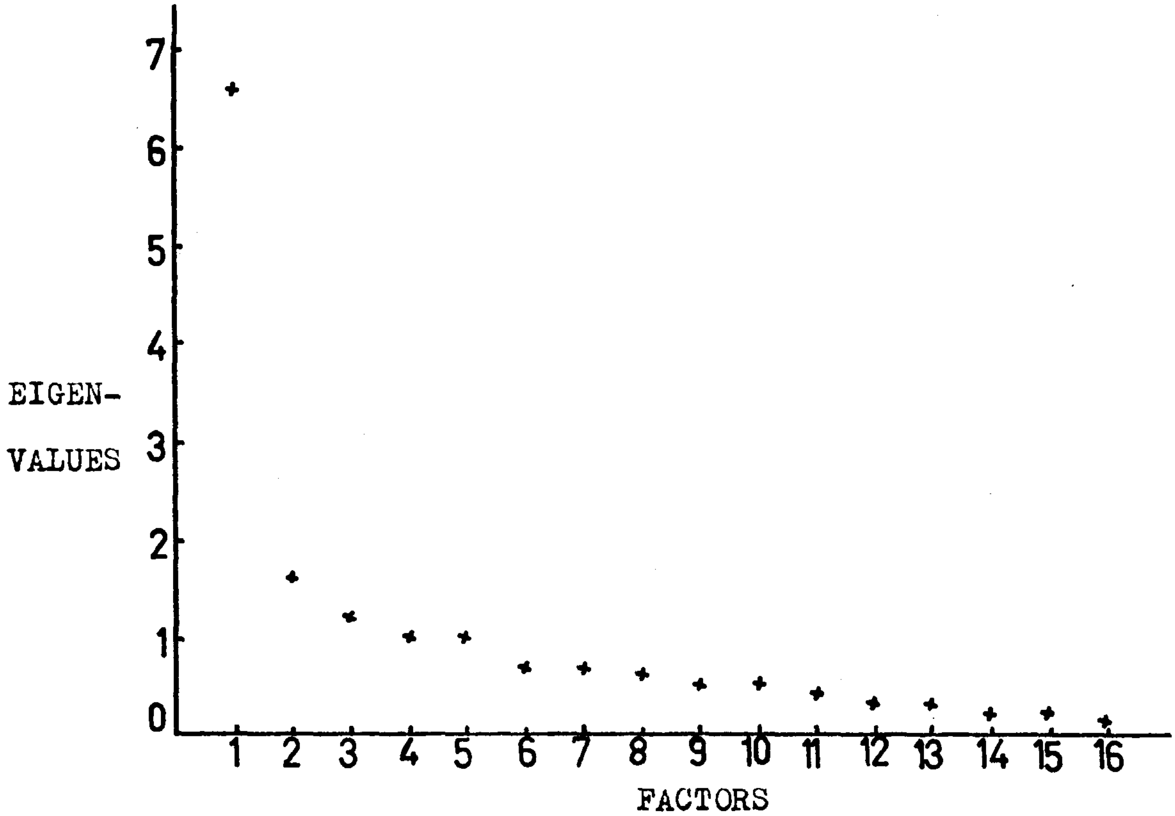


Fig. 4.1 Eigenvalues for 16 principal componant factors extracted from correlation matrix reported by Golgin et. al. (1967).

et. al., these three variables load heavily on factors 1 and 3, and not on a single factor only. Furthermore, the MA and R-S scales are not as independent of the extraversion dimension as Golin et. al. hinted.

If, however, only one factor is retained in view of the relatively rapid levelling off of the eigenvalues after the first factor as shown in Fig. 4.1, the data given by Liberty et. al. become similar to that obtained after reanalysis of the data reported by Golin et. al. From Table 4.4 it is

Table 4.5

Internal Consistencies and Loadings for 16 Scales

(Golin et. al., 1967) Obtained Through

Varimax Rotation of 3 Factors

(N = 226)

| | 1 | 2 | 3 |
|---|---|---|---|
| 1 | .7432 | .1029 | -.5452 |
| 2 | .6659 | .0408 | -.5761 |
| 3 | -.0434 | .0406 | .7114 |
| 4 | .6706 | .0279 | -.5013 |
| 5 | .7069 | .4126 | .0099 |
| 6 | -.3436 | .5286 | -.1056 |
| 7 | .2715 | .5731 | -.0456 |
| 8 | .4915 | .1782 | -.4760 |
| 9 | .3380 | .7999 | .0464 |
| 10 | .8357 | .0353 | -.0162 |
| 11 | -.0468 | .5134 | -.1930 |
| 12 | -.5001 | -.2504 | .5773 |
| 13 | -.7431 | -.1254 | .2124 |
| 14 | .6959 | .2145 | -.3366 |
| 15 | -.1762 | -.3152 | .6618 |
| 16 | -.5757 | .1157 | .1544 |

apparent that the MA, R-S, K, N and Es scales have high loadings on the first factor. Furthermore, the small magnitude of the E scale loading on the first factor renders the R-S and MA scales somewhat independent of the extraversion trait.

From the above discussion, it is apparent that the relation of the R-S and MA scales to one another and to other scales depend on the factoring model, communality estimates and the number of factors retained. In view of this situation, the interdependence between the MS, R-S and SD scales require further investigation.

An intensive investigation of the effect of social desirability on MAS scores is reported by Heinemen (1953). A sample of 108 students was administered an inventory which included the 50 MAS items plus another set of 50 MMPI items which correlated 0.41 or more with the total MAS score in a previous study. These 100 statements were rated for social desirability on a 5-point scale on which a score of 1 and 5 indicated judgements of extreme favourability and unfavourability, respectively. The subjects were instructed to assume a "yes" response to all items, whether positively or negatively stated. The 24 anxiety items which were stated negatively received a mean desirability rating ranging between 1.38 and 2.44, while the mean desirability rating for the 76 positively stated anxiety items varied between 2.72 and 4.65. In accordance with Edwards' (1957b) hypothesis, the denial of anxiety symptoms was viewed as more socially desirable than the admission of such symptoms. However, when individuals constituting the upper and lower 20% of the MAS score range were compared with one another regarding the social desirability of the MAS items, the high MAS group rated the admission of anxiety as more desirable than did the low MAS group ($p < 0.001$). Thus, while the sample as a whole considered it more socially desirable to deny anxiety symptoms, certain individuals within the sample considered it more desirable to endorse such symptoms.

This evidence gives further support to the statement made in Chapter 3 where it was suggested that the high positive correlation consistantly reported between the social desirability scale value of an item and the probability of its endorsement could be due to the technique used to obtain these scale values. Specifically, the scaling technique which Edwards (1957b) used was criticized because the social desirability ratings of an item were averaged across individuals and consequently obscured the presence of those individuals who might have endorsed socially undesirable items.

Further evidence associating MAS scores with social desirability was observed when Heinemen administered to a sample of 32 students the MAS twice: once under conventional instructions, and another time two weeks later under the instruction to appear in the most favourable light possible. The mean scores for the first and second sessions were 19.13 and 15.03, respectively. The difference was significant at the 0.001 level.

Suinn's (1968) data are congruent with the previous discussion. Eighty-nine students who had previously responded to the MAS, rated the items on a 9-point scale for social desirability. Extreme favourability was indicated by a score of 1. For 11 of the 50 items, the biserial correlation between the desirability score of an item and the probability of its endorsement was significant at the 0.05 level.

Adams and Kirby (1963) approached the issue in a somewhat different manner when they examined the relation between the set and content components of the MA and SD scales. Set and content scores were computed by means of the formula given by Messick and Fredriksen (1958). The latter formula was derived from another one which Helmstadler (1957) outlined.

The MA content correlated -0.2 with the MA set, -0.86 with the SD content and 0.66 with the SD set. The MA set correlated 0.00 and -0.05 with SD content and SD set, respectively. The SD content correlated -0.68 with the SD set. The authors attributed the high negative correlation between SD and MA content scores to the effect of overlaping items; and they concluded that while the MAS is free from "response set", the SD scale is not. But it is questionable whether the MAS is free from any response set because of the correlation of 0.66 ($p<0.01$) between MA content and SD set. It is more likely that the same set response - whether acquiescense or dissention - is positively related to both scales.

In this respect, reference should be made to the factor analytic study by Liberty et. al. (1965). Set and content scores were computed by the Helmstadter technique for the SD, MA and Mf scales, which were then factor analized with another 54 scales by means of principal components. The SD and MA content variables loaded 0.79 and -0.78, respectively, on the first factor. The SD and MA set variables both loaded 0.79 on the fifth factor which was described as a "set factor." Apparently, the two scales reflect the same behavioral pattern whether it is set or otherwise. But since the Mf set loaded only 0.05 on the fifth factor, Liberty et. al. (1965, p. 329) suggested that "The immediate conclusion would seem to be that the Helmstadter set procedure does not consistently indicate a uniform stylistic tendency and that there is need for caution in making acquiescence interpretations based upon this procedure." So far, the data indicate the presence of close similarity between the SD and MA scales. But as to the extent to which response set influences either of them the issue is unsettled.

The above discussion shows that the MA, SD and R-S scales share a common personality dimension, which in the present study is hypothesized to be that of repression-sensitization. The extent of actual interdependence between these three scales as indicated in the studies reviewed is partially obscured by the presence of overlaping items, an issue which will receive further attention in Chapter 7.

<u>The MAS and Self-Concept</u>

In the previous section it was observed that the MAS is negatively correlated to indices of ego-strength. The interdependence between these two variables will be given further consideration in the present section by comparing MAS scores with scores on self-concept, self-ideal, and the discrepancy between these two sets of scores. The importance of this comparison is due to the fact that if the MAS is actually a measure of sensitization as was hypothesized, then there should be a negative correlation between the MAS and self-concept scores. The rational for this is that the sensitizer has a relatively greater tendency to endorse negative self attributes.

Cowen, Heilizer, Axelrod & Alexander (1957) administered the MAS and the L scale to 102 male and female freshmen students. The sample was divided into high, middle and low anxiety groups according to their MAS scores: high anxiety (HA) was characterized by scores of 27 or more, middle anxiety (MA) by scores of 12 to 14, and low anxiety (LA) by scores of 6 or less. The number of subjects in each group ranged between 28 and 42. The sample also responded to indices of self-concept, self-acceptance, self-ideal, and the discrepancy between self-concept and self-ideal.

Across the three anxiety groups, high MAS scores were associated with lower scores for self-concept, self-acceptance, and higher self-discrepancy scores. A series of pairs of

T-tests showed all differences to be significant at the 0.001 level. The three groups did not differ with respect to self-ideal ratings. The sample was then regrouped according to their L scores into HL (scores of 6 or above) and LL (scores of 3 or below). The two groups consisted of 25 and 42 subjects, respectively. The LL group had a higher self-discrepancy mean ($p<0.02$). Therefore, high MAS scores are associated with self-depreciation as noted from measures of self-concept, self-acceptance, and ideal-self discrepancy. Similarly, low MAS scorers tend to place themselves in an unrealistically favourable light as can be observed from their relatively high scores on the L scale.

Weitzner, Stallone & Smith (1967) administered the MAS and a self-ideal discrepancy scale to 96 male students. The sample was divided into three anxiety groups: low (scores 1-7), middle (scores 12-17) and high (scores 21-36). The self-ideal discrepancy mean score was significantly higher ($p<0.01$) for the high MAS group when it is compared with the low MAS group. In contrast to the findings of Cowen et. al. (1957), there was no significant difference between the middle MAS group and either of the low or high MAS groups regarding self-ideal discrepancy. This could be due to the fact that although both studies sampled scores at both extreme ends of the MAS continuum, the scores of the middle anxiety group as defined by Weitzner et. al. were not very different from those for the other two groups. Negative correlations between the MAS and both self-concept and acceptance of others were also reported by Bass and Fiedler (1961).

Howard and Kubis (1964) found the correlation between the MAS and the Schaffer's Ego-Identity scale to be -0.48 and -0.46 for freshmen and sophomore females, respectively. Both correlations are significant at the 0.01 level.

Murphy (1963) reported that the MAS was correlated positively with self-ideal discrepancy and negatively with self-concept. The MAS and self-ideal were once more reported to be uncorrelated.

So far the evidence is consistent in indicating high MAS scores to be associated with the tendency to attribute negative characteristics to oneself - a trait which is equivalent to sensitization as defined in the personality dimension of repression-sensitization. The fact that the MAS correlates with self-ideal discrepancy but not with the perceived ideal further suggests that high MAS scorers differ from those with low scores not in terms of the standard they set for themselves, but rather with respect to the degree they believe they have attained this ideal standard.

## Concordance Between MAS Scores and Clinical Ratings of Anxiety

The purpose of this section is to investiage the relation between the MAS and the rating of anxiety symptoms by clinicians as well as by the individual himself. The distinction between the clinician's and the individual's anxiety ratings is important because if the MAS scores correlate only with the individual's report of experienced anxiety but not with clinical rating of behavioral anxiety symptoms, there is further reason to associate high MAS scores with the trait of sensitization. In other words, high MAS scores could be indicative of the willingness to admit anxiety symptoms even when such symptoms are not apparent to the experienced clinician.

A study which is of particular importance in this area is one carried out by Buss, Wiener, Durkee & Baer (1955) in which ratings by psychologists were compared with MAS scores. The study is important because of the experimental controls adopted, and the distinction made between the rating of verbal reports and that of observed behavior.

The subjects were 64 male and female neuropsychiatric patients. The sample was screened to eliminate those who were out of contact, undergoing electroshock or insulin therapy, of low intelligence, or suffering from organic brain damage. Each subject was interviewed by the same psychologist while three other attending psychologists asked the subject questions at the end of the session. Following the interview, each judge performed his rating independently, while the subject was administered the MAS by another staff member in another room.

The rating scale consisted of three categories of anxiety symptoms relating to observed behavior and six to reported behavior. Each patient was rated on the category as a whole rather than on each of the concomitant symptoms independantly because the occurance of these individual symptoms varied extensively across patients. Each category was rated on a 5-point scale with a score of 5 representing maximal manifest anxiety. The interjudge reliability coefficients and the product moment correlation between each category and the MAS is given in Table 4.6, which is an adaptation of that presented by Buss et. al. (1955, p. 127).

The rating of the first category - "Distractability" - was based on inattentiveness during the interview and a task of serial subtraction. The symptoms of agitation, tremors and tics are componants of both categories 2 and 8, except that in the latter category the symptoms were reworded in terms of subjective feelings of tension - e.g. the term "tremor" is replaced by "feel shaky". The ninth category labeled "over-all ratings of anxiety" is an intuitive and general evaluation of anxiety. While rating this category, the judges sought to keep their evaluation independent from the configuration of the previous categories.

From the data shown in Table 4.6, it is evident that the interjudge reliability coefficients are relatively high except for category 3. It might be that physiological concomitants such as heart beat, respiration, etc. of medium intensity are more difficult to discern than tremors and tics which are components of category 2 or serial subtraction which is a component of category 1.

The main issue to be observed here is that the MAS

Table 4.6*

Interjudge Reliability Coefficients and Correlations of the MA Scale and Over-all Rating with 9 Anxiety Categories for a Sample of 64 Neuropsychiatric Patients

| Category | Interjudge Reliability Coefficient | | Correlation With Over-all Ratings | Correlation With MA Scale |
|---|---|---|---|---|
| | Mean | Range | | |
| Observed | | | | |
| 1. Distractibility | .93 | .92-.94 | .47 | .16 |
| 2. Restlessness | .74 | .68-.80 | .66 | .37 |
| 3. Physiological concomitants | .56 | .41-.65 | .56 | .22 |
| Reported | | | | |
| 4. Subjective feelings of tenseness | .66 | .59-.77 | .65 | .52 |
| 5. Worry | .76 | .71-.79 | .50 | .50 |
| 6. Somatic complaints | .85 | .81-.88 | .52 | .40 |
| 7. Physiological concomitants | .81 | .76-.86 | .72 | .68 |
| 8. Muscular tension | .73 | .67-.77 | .68 | .54 |
| 9. Over-all rating of anxiety | .83 | .66-.92 | --- | .60 |

$p < .05$, $r = 0.25$ $p < .001$, $r = 0.41$

$p < .01$, $r = 0.32$

* From Buss et. al., 1955, p. 127

constantly correlated much less with the observed than with the reported anxiety symptoms. This suggests that variables 4 to 8 have in common with the MAS a source of variance which is not shared by variables 1 to 3. Since variables 4 to 8 and the MAS are all self-report measures, whereas variables 1 to 3 are not self-report - but objective - measures, the most obvious source of variance that would be shared by the MAS and variables 4 to 8 but not variables 1 to 3 would be a systematic distortion of self-report. It is hypothesized that this distortion is due to the contamination of the self-report measures by the repression-sensitization dimension. It now becomes apparent that the findings of studies seeking to validate the MAS in terms of clinical ratings depend to a great extent on the method of validation adopted. If one follows the procedure accepted in most validation studies and compare MAS scores with ratings of reported physiological concomitants, the obtained correlation could be due in a large part to the operation of the repression-sensitization dimension. The degree to which this happens is a function of the relative weight given to the self-report measures when computing the clinical ratings.

Hoyt and Magoon (1954) compared the MAS scores with clinical ratings for 289 college students. Eight counselors classified the students with whom they were familiar into "high", "medium" and "low" anxiety groups according to anxiety symptoms as defined by specific characteristics which included both verbal reports and manifest symptoms. The MAS scores were also trichotomized into three groups: high (scores of 21 or more), medium (scores of 12 to 20), and low (scores of 11 or less). Analysis of variance performed on the ratings associated with the three groups showed that all counselors performed the ratings according to a similar frame of reference. The chi-square for the ratings and the MAS scores was equal to 50.64 ($p < 0.001$, $df = 4$). The authors concluded that the MAS is a valid index of clinically diagnosed anxiety. This interpretation of the data is questionable because, for one thing, the counselors rated the clients according to behavioral characteristics such as mannerisms, nail biting, knuckel-cracking, etc. as well as verbal reports regarding the inability to relax, lack of confidence, etc. These two aspects of anxiety were not distinguished from one another before correlating the MAS scores with the ratings; and as Buss et. al. (1955) has demonstrated, the reported and observed characteristics of anxiety need not correlate equally well with the MAS. Since it is logical to assume that individuals who report negative characteristics during an interview will also endorse these characteristics when administered a questionnaire, the reported correlation between the ratings and the MAS scores is to some extent spurious. Furthermore, the counselors rated clients with whom they were acquainted, and the authors did not mention whether the counselors were familiar with the clients' MAS scores prior to the rating procedure. It is likely that these defects in the experimental design could have contributed to the significant chi-square reported for the two variables. In fact, if the two variables are assumed to be continuous and the statistic $\emptyset'$ is computed to estimate the product moment correlation between them, $\emptyset'$ is equal to 0.29. Although this value is significant at the 0.001 level for a sample of 289 individuals, there is still the fact that the MAS accounts for only 9% of the common variance. Hence, the extent to which the MAS corresponds to behavioral anxiety symptoms - other than the fact that anxiety is reported - is not satisfactorily established.

Lauterbach (1958) reported that for a sample of 44 male psychiatric patients, the composite scores of three psychologists correlated 0.44 ($p<0.1$) with the MAS. It was not mentioned, however, whether the anxiety ratings were limited to observed behavioral symptoms or whether they also included reports of experienced anxiety.

Kendall (1954) compared the MAS scores of 93 T.B. patients with their anxiety ratings compiled by ward nurses. The rating scale consisted of nine subtraits of anxiety given by Cameron (1947, p. 249) and scored on a 7-point scale. The MAS scores were obtained from the MMPI profiles which were administered two to six months prior to the rating procedure. Each patient was rated independently by two ward nurses who had observed him for at least one month prior to the experiment.

The interjudge reliability coefficients (corrected by the Spearman-Brown formula) ranged between 0.80 and 0.99 with a mean of 0.91. When the upper and lower 27% of scores on the MAS were selected, the difference between the mean ratings for the two groups was not significant at the 0.05 level ($t = 1.407$). When only the upper and lower 13% of the anxiety scores were selected, the difference between the ratings for the two groups was significant at the 0.01 level. In view of these data and the results of five other studies reported in the literature, Kendall concluded that the MAS is useful only as a coarse measure of anxiety. Other data reported by Rubin and Townsend (1958) lead to the same conclusion.

The above discussion indicate that the MAS correlates with the tendency to report the experience of anxiety rather than with the behavioral symptoms of anxiety as rated by a clinician. This observation together with the fact that the MAS correlates positively with the Pt scale of the MMPI and negatively with measures of self-concept and social desirability, shows that a high MAS scorer tends to exagerate his negative qualities. It is in this respect that a high MAS scorer can be viewed as a sensitizer. A statement relevant to this issue was made by Brackbill and Little (1954, p. 435) who noted that among college students high MAS scores are associated with an MMPI profile which shows the individual to be "introspective, quite sensitive to environmental press, and willing to admit to being easily disturbed." The authors continued to add that "low scores, conversely, utilize both denial and repression fairly frequently and rarely introspect." Since the sensitizer is defined as the one who seeks tension reduction by approaching the stressful stimulus, and the repressor is defined as that who utilizes repression to combat anxiety, the statement by Brackbill and Little suggests that high and low MAS scores are indicative of sensitization and repression, respectively. But it should be noted that since the distribution of MAS scores is positively skewed (Taylor, 1953), it follows that the MAS differentiates better between individuals who obtain high scores than among those with low scores who are lumped together at the lower end of the scale. Thus, while the argument by Brackbill and Little associates high and low MAS scores with sensitization and repression, respectively, the positive skewedness of the distribution of scores suggests that the MAS is more representative of the sensitization end of the repression-sensitization dimension than it is of the repression end of it.

## The Physiological Correlates of the MAS

The present section seeks to examine the relation of the MAS to some of the generally accepted physiological indices of arousal and emotional lability such as skin conductance, palmer sweating, plasma 17-OH-CS, forearm blood flow and non-specific GSR responses. This comparison is important because only if the correlation between the MAS and the physiological variables is negative or non-significant is there sufficient reason to consider whether or not high MAS scores are associated with the trait of sensitization. In other words, if for a given individual with a high MAS score the physiological indices of arousal do not reflect the presence of anxiety, then it is more likely that the MAS is an index of sensitization or the willingness to report the presence of anxiety even when the latter is not substantiated by a third objective index.

The question regarding the nature of the arousal state indicated by the physiological variables is circumvented here by limiting the review to studies which employed stressors such as threat of electric shock or ego-threatening tasks which are commonly accepted to induce anxiety.

Silverman (1957) investigated the intercorrelations among the MAS, the K scale of the MMPI, Heineman's (1953) forced-choice version of the MAS (HFC) and skin conductance (SC). SC measures were recorded during rest, while solving simple addition problems under threat of shock in case of error, and while performing the same task under no threat. All SC readings were transformed into logarithmic units. The HFC was used in the experiment in the hope to control for the effect of social desirability on the MAS. The original sample consisted of 85 male college students. The SC readings in the rest condition were available for only 66 subjects, who were randomly assigned to shock-threat condition (N = 36) and no shock-threat condition (N = 30). During the problem solving session, SC readings were taken immediately preceeding the presentation of each problem. This aspect of the experimental design is important in order to prevent SC responses due to anxiety from being confused with those due to factors such as shift in attention and postural movement which need not be related to the incidence of anxiety. Such a precaution was neglected by Runquist and Spence (1959), and Runquist and Ross (1959) in their study of the inter-relationship between anxiety, autonomic arousal and conditionability.

None of the MAS correlations with the SC readings in the three conditions was significant - they ranged between 0.07 and -0.17. The HFC correlation with SC change was 0.24 ($p < .05$) for the rest condition, 0.12 for the no-shock condition, and -0.50 ($p < .01$) for the shock condition. The HFC correlated 0.50 ($p < .001$, $N = 69$) with the MAS and -0.07 with the K scale. The MAS correlated -0.55 ($p < .001$, $N = 85$) with the K scale. Silverman considered the lack of a correlation between the HFC and the K scale as showing the independence of the former measure from the effects of repression and social desirability.

Silverman (1957, p. 95) attributed the absence of a correlation between the MAS and SC to the "spurious nature of some of the MAS scores" in that "some low MAS scores were associated with defensiveness and some high MAS scores were simply reflecting a too candid or critical attitude." Hence, once more it is apparent that a high MAS score is representative of sensitization in that the individual tends to over emphasize personal shortcomings.

Ralphenson (1957) reported on the relation between the MAS and SC measures recorded during an initial stage of rest and later on while solving a problem disguised as an intelligence test. The subjects were 24 college students ranging in age between 18 and 25. The MAS scores were trichotomized into high (15-22), middle (14-8) and low (1-7) anxiety groups. Each group consisted of 8 subjects. The mean absolute conductance during the rest condition for the high, middle and low anxiety groups were 17.7, 22.4 and 22.0 micromhos, respectively. During the problem-solving period, the mean variation in conductance expressed as a percentage of the rest period level for the high middle and low anxiety groups were 109.6, 98.8 and 101.8 micromhos, respectively. No transformations were performed on the SC readings. The difference between the three anxiety groups in terms of skin conductance were not significant during either the rest or the experimental session.

Fiorcia and Muehl (1962) reported a highly significant difference in the mean plasma 17-OH-CS between extreme groups on the MAS. A sample of 50 college students were dichotomised according to their MAS scores in low (1-6) and high (23-34) anxiety groups. The difference in plasma 17-OH-CS level between the two groups was significant at the 0.005 level. Since the laboratory setting and the veripuncture procedure could have acted as stressors, the authors concluded that it was undetermined whether the MAS is a measure of chronic or state anxiety.

Winter, Ferreira & Ransom (1963) compared the MAS and the Multiple Affect Adjective Check List (MAACL) scores for 13 male and 6 female college students with their palmer sweat index (PSI) under six experimental conditions: two conditions of low anxiety, two of examination anxiety, and two of experimentally induced high anxiety. While the PSI differentiated between the three conditions of high, exam-induced and low anxiety conditions at the 0.001 level, there was no significant correlation between the PSI and the MAS. If the MAS is a measure of chronic anxiety or the tendency to be anxious as Fiorcia Muehl (1962) suggested, one would expect PSI readings to vary in proportion to the MAS scores to produce a significant correlation between the two variables. The absence of a correlation between the MAS and the PSI in this case can not be attributed to the law of response specificity (Lacey, Bateman & Van Lehn (1953) because the PSI did differentiate between conditions. It is worth noting that the MAACL which did not correlate with the PSI, showed a correlation of 0.44 ($p < .05$) with the MAS. One possible interpretation of the data is that the MAS does not measure anxiety as reflected by physiological reactivity, but rather the tendency to overestimate, or underestimate, one's state of arousal.

Katkin and McCubbin (1969) tested the hypothesis that a moderately intense stimulus would elicit defense reflexes (DRs) for anxious subjects and orienting responses (ORs) for non anxious subjects. DRs, unlike ORs, are elicited by stimuli which are at least moderate in intensity, and they do not habituate rapidly to repeated stimulation. The stimulus was a tone presented several times after an initial 10-minute period of rest. The anxiety measures were scores on the MAS and the number of nonspecific (NS) GSR responses recorded during the last two minutes preceeding the presentation of the tone. The MAS scores ranged between 4 and 35, with a median of 14. This range of MAS scores is approximately equal to the total range reported by Taylor (1953). Individuals with a score of 7 or more on the L scale of the MMPI were excluded from the study. The results confirmed the hypothesis as far as the physiological measures were concerned. Stabile subjects (0-8 NS responses) habituated to the stimulus at a greater rate than labile subjects (11-34 NS responses). But the MAS failed to differentiate between the two groups, and it had a non-significant correlation of -0.17 with the NS responses.

The conclusion drawn from the above mentioned studies is that the correlation between the MAS and the autonomic indices of arousal is predominantly non existant. It is, therefore, suggested that the MAS does not reflect the presence of anxiety or the tendency to be anxious, but rather the willingness to verbalize the experience of stress - a tendency which is characteristic of the trait of sensitization.

# CHAPTER V

## SKIN RESISTANCE AND SKIN POTENTIAL

In the present chapter only a brief description will be given regarding the techniques and problems associated with the recording of skin resistance (SR) and skin potential (SP) activity. These issues are presented in detail by Venables and Martin (1967) and Edelberg (1967). The main issues of interest will be the effectiveness of the GSR to reflect changes in the state of arousal, and the quantitative relation between the various SR and SP indices. The emphasis on these two issues is considered important because their discussion will provide an outline for the analysis of the data in Experiment 2. The present chapter will also provide a brief discussion of the appropriate GSR unit for analysis, and the theories which have been suggested so far to account for the SR and SP activity.

In the present study, the term "GSR" includes both SR and SP phenomena. The terms "skin resistance response" (SRR) and "skin potential response" (SPR) will refer to instantaneous changes in the SR and SP indices. Such changes which occur in the absence of a specific stimulus are referred to as "nonspecific" responses. The terms "instantaneous skin resistance level" (ISRL) and "instantaneous skin potential level" (ISPL) will refer to the base line level at that instant when the corresponding response occured. The terms "skin resistance level" (SRL) and "skin potential level" (SPL) will refer to the corresponding basal levels recorded during any time interval prior to the ISRL and ISPL, respectively. The term "skin conductance" (SC) will be substituted for "SR" in the above terms whenever it is appropriate.

## Physical Characteristics of the SR and SP Components

A note should be made regarding the shape of the SR and SP components which are shown in Fig. 5.1.

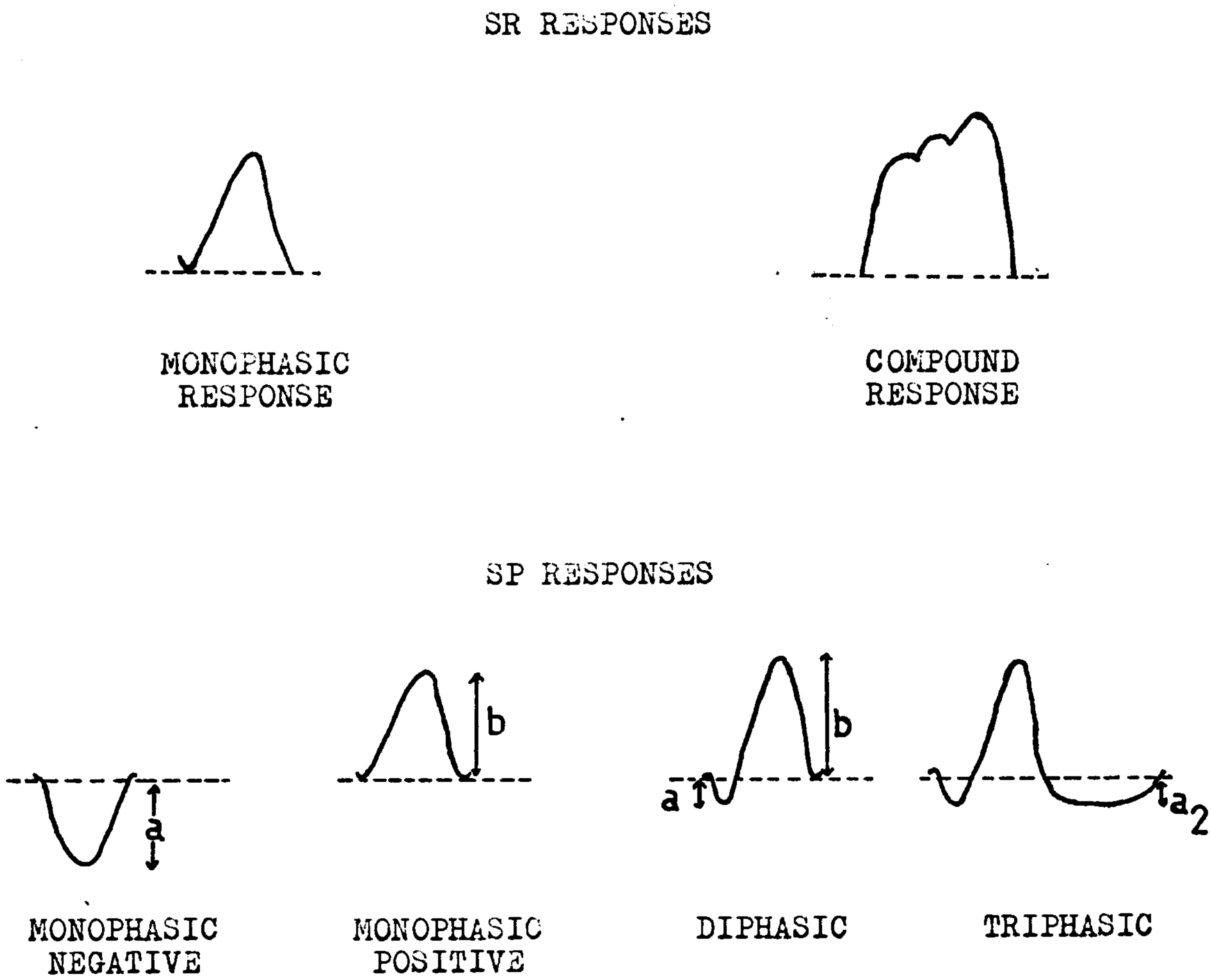


Fig. 5.1 Skin resistance and skin potential responses and their components.

The SRR is always monophasic, and there is general consensus that its amplitude is equal to the distance between the ISRL and the crest of the wave form. These two characteristics of the SRR render it the most frequently used index of emotional arousal. Sometimes, the SRR is a compound one as shown in Fig. 5.1. Such a response pattern is likely to occur if the latency between successive stimuli is less than the recovery period. The scoring of a compound SRR is described in Edelberg (1967). However, in Experiment 2 the occurance of a compound response was rare; and whenever it occurred, the response amplitude was scored as the distance between the ISRL and the highest crest in the response.

The SPR, in contrast, can be monophasic positive (b component), monophasic negative (a component), or diphasic where an initial negative component is followed by a positive one. While the monophasic SP components are scored in the same manner as the SRR, there is no consensus as to how to score the diphasic SP component (Burstein, Fenz, Bergeron & Epstein, 1965). The SPR can also be triphasic where the b component of the diphasic response is followed by a negative wave form ($a_2$ component) which, unlike the a component, has longer incidence and decay latencies and has a relatively small amplitude. The situation is further complicated by the fact that a given person can exhibit two or more of the SPR patterns during the same testing session (Burstein et. al., 1965). It is of interest to note that a shift from a diphasic or triphasic SPR to a monophasic one can occur as a result of variations in the magnitude of each of the components (measured in mv.) and the latency between them (Holmguest and Edelberg, 1964).

The Recording of GSR Activity

Only a brief discussion will be given to the techniques and problems associated with the recording of SR and SP activity because the evaluation of the different recording methods which have been suggested by various sources is beyond the scope of the present study. A detailed discussion of this topic is presented by Venables and Martin (1967) and Edelberg (1967).

Since GSR activity is partially dependent on the activity of the sweat glands (Wilcott, 1962, 1964), a suitable recording site is that which provides the highest density of sweat glands. For the SR recording the palmar areas of the hand satisfy this criterion (Venables and Martin, 1967). The choice of the specific palmar areas for the placement of the electrodes has to take into account the absence of cuts at the recording sites and the differential susceptibility of different areas to movement artifact. The same considerations are relevant for the recording of the SP except that in this case the reference area - or inactive site - is usually selected at the dorsal part of the forearm because it shows the highest potential difference with respect to the palmar area. In the case of both SR and SP recording, electrode pressure must be minimized;

and the exact location of the electrodes must be standardized for all individuals because the resistance and potential levels vary across the surface of the palm (Venables and Martin, 1967).

In the case of both SR and SP recording the choice of electrode paste has to take into account the differential permeability of the skin to various electrolytes as well as the nature of the electrode medium (Edelberg, Greiner & Burch, 1960). Thus, SRR and SPR are increased by large ions such as $Ca^{++}$, $Zn^{++}$ and $Al^{+++}$, and they are attenuated by small ions such as $K^{+}$. In a similar manner the multivalent $Ca^{++}$ and $Al^{+++}$ ions reduce both SRL and SPL. In view of these factors, Edelberg (1967) recommended the use of Ag-AgCl electrodes and NaCl paste with a NaCl concentration similar to that in human sweat which is between 0.015 and 0.06 M.

When recording SR it is possible to chose between a constant voltage and a constant current system. The main advantage of the constant voltage system is that the recorded units in impedance are directly proportional to conductance (Venables and Martin, 1967; Montagu, 1964). Conductance is preferable to resistance as a unit of analysis because it is directly proportional to sweating and, therefore, it constitutes a biologically meaningful parameter (Lacey, 1947). The disadvantage of the constant voltage system is that the current density is independent of the electrode size. This means that with a decrease in skin resistance the current density may exceed the safe limit of $8\mu a/cm^2$, and thus cause skin damage and serious electrode polarization (Venables and Martin, 1967). The constant current system is free of these serious disadvantages, and since resistance units can be easily transformed into conductance units, it is apparent that the constant current system is the preferable of the two methods.

The Unit of Analysis for the GSR

A review of the literature showed the desirability to perform certain transformations on the raw SR scores (which are in ohms) prior to the analysis stage. The reasons for this were based on certain theoretical and statistical arguments which will be discussed in the present section. The literature also showed that whatever statistical transformations proposed were limited to the case of the SRR and SRL, and there is no reference as to whether any transformation is required for the SPR and SPL raw data. The absence of any such recommendations regarding the SP is not surprising in view of the disagreement as to the physiological and psychological phenomena which give rise to the changes in the SPL and the occurrance of the various components of the SPR (Wilcott, 1967). Hence, the following discussion will be limited to the treatment of SR raw scores and the various transformations suggested in the literature in terms of which they satisfy certain statistical and theoretical requirements, the extent to which these requirements are satisfied by a given transformation across different stimuli and samoles; as well as in terms of their ability to differentiate between psychiatric and normal samples.

The main theoretical rationale for the need to perform a transformation on the SR units (ohms) is that in the analysis stage the adopted units must be linearly and positively related to acceptable indices of psychological and autonomic arousal. In view of the fact that skin conductance (SC) is linearly and positively related to the amount of arousal sweat on the skin, Darrow (1937, 1964) suggested that SC units (micro mhos) are more appropriate. Darrow argued that because of the relation between sweating and conductance on one hand, and between conductance and resistance on the other, resistance units are unsatisfactory because a small change at a relatively low basal level may indicate a larger change in the arousal level than a large change at a relatively high basal level. The main point to notice here is that Darrow's argument implies that the SRL must be taken into account when computing the SRR. However, Darrow further added that psychophysical research show that the relation between psychological and physiological changes is a logarithmic one rather than a strictly linear one. Accordingly, Darrow suggested that SR scores should be transformed into log conductance - and not log of conductance change. The author further noted that changes in log conductance are proportional to changes in percentage resistance.

At this point it is worth noting that if sweating is to be used as the criterion for the evaluation of SR units, a distinction must be made between sweating induced by psychological stress and that induced by temperature changes. As yet, there is no consensus regarding the relation, and the extent of overlap, between these two variables across different areas of the body (Wilcott, 1967).

Haggard (1945) specified four criteria for an appropriate SR unit for analysis. The unit for the SRR must be chosen so as to satisfy the following criteria:

1. Reduce computational error.
2. Facilitate the comparison of individuals under the same treatment as well as differentiate between hypothetically different samples.
3. Express the SRR independently of the ISRL.
4. Make it possible to implement statistical techniques which assume the scores to be normally distributed and have equal scale units.

To satisfy these four criteria, Haggard suggested a logarithmic transformation based on the regression of the SRR upon the SRL.

The extent to which Haggard's transformation has been found to satisfy the four criteria in other studies will be discussed later on in the present section. The main concern here is to examine the implications of the four criteria. The first criterion does not pose any difficulty because of the present level of computer technology. The fourth criterion can also be satisfied by choosing SC units or a logarithmic transformation. However, in a given study it may be difficult to satisfy the second and third criteria simultaneously because of possible conflict between them. Haggard stated that the SRR must be defined independently of the basal level, because only in this way it is permissable to compare the responses of individuals with different basal levels. But it is established that certain clinical samples differ from one another and from normals in terms of the basal level alone (S. Eysenck, 1956). Since Haggard has specified the unit of analysis must also permit the comparison of different samples, it follows that the simultaneous satisfaction of the second and third criteria can be problematic. In the present study it is suggested that the choice of a unit of analysis ultimately depends on whether the hypothesis specifies the comparison of individuals constituting a homogeneous group, or the comparison of groups which are expected to differ from one another.

Lacey and Siegal (1949) compared eight units of SRR in terms of the extent to which they satisfied the criteria specified by Haggard (1945). The eight units were change in resistance, change in conductance, per cent change in resistance, per cent change in conductance, change in log resistance, change in log conductance, log change in conductance, and Haggard's unit. The subjects were 92 male college students. The stimulus was an electric shock. The basal level was defined in terms of the ISCL. The data indicated that the criteria of independence from the ISCL was satisfied by change in conductance and log change in conductance.

S. Eysenck (1956) suggested that the absence of consensus regarding differences between normals, neurotics and psychotics in terms of SRR and SPR is due to the uncertainty as to the nature of the psychological and physiological processes underlying the various GSR indices, and to the diversity of scoring systems in use.

To clarify the issue, Eysenck sought to compare four scoring systems in terms of their independence from the log of the ISCL, and in terms of their ability to differentiate between normals, neurotics and psychotics. The three groups included males and females and were matched for the sex factor only. The four scoring systems were change in conductance, percent change in conductance, change in resistance and percent change in resistance. The SR was recorded during an initial 15-minute relaxed condition and then following three stimuli which were inhaling, the reporting of a "threat score" to the subject, and the occurrence of sudden noise.

The data showed that none of the four scoring systems was consistantly uncorrelated with the log of ICL for the three groups across the three stimuli or during rest. Furthermore, the kind of scoring system found to be uncorrelated with the log of ICL was partially a function of the length of the time interval which preceded the recording of the two variables even during the rest period. For example, during the 15-minute rest, only the percent change in conductance did not correlate significantly ($p > 0.05$) with the ICL for all groups. But during the first 6-minutes of the rest period, only the change in resistance and the percent change in resistance for the psychotic group had no significant correlation with the ICL.

It is further interesting to note that the three groups were not differentiated by change scores following any stimulus, but rather by the log of basal conductance computed during the rest period or just before the presentation of each stimulus. S. Eysenck (1956, p. 266) concluded that "this effect is so striking that we are probably justified in concluding that the three groups are not differentiated with respect to psychogalvanic responses to stimuli, but only with respect to their basal conductance."

The results of the above mentioned experiment must be interpreted with caution because of certain flaws in the experimental design. First, the three stimuli were not described in detail and, therefore, the intensity of their psychological components is unknown. Second, in the normal sample, the males were more heterogeneous in terms of intelligence and emotional stability than the females. Third, Eysenck assumed the age factor to be irrelevant in spite of the fact that there was a significant ($p<0.05$) correlation between the log of basal resistance and the age variable. The third criticism is particularly important in view of the fact that the three groups had an age range of 15 to 57 years, and the evidence that there is a significant decrease in basal conductance between a given 20-year span and the consecutive one (MacKinnon, 1954).

Montagu and Coles (1966) stated that there are marked inter-individual and intraindividual differences in terms of basal conductance. They suggested that when two or more groups are to be compared in terms of arousal as indicated by SCR, then it should be ascertained whether the transformation applied to the raw data does not eliminate the SCL effect. They preferred the unit of SC to that of SR because it was shown to be linearly related to the number of active sweat glands. Montagu and Coles were also of the view that the relation between physiological and psychological processes is logarithmic rather than linear. Hence, it was suggested that when the effect of the SCL is to be retained, the appropriate unit of analysis is that of "log change in conductance". The alternative transformation which is "change in log conductance" was recommended for that case where it is desirable to nullify the SCL effect.

The studies reviewed in the present section can be summarized in the following points:

1. SC units have the advantage in that they are linearly related to the number of active sweat glands, and they are normally distributed.
2. SCL should not be partialled out if the purpose of the analysis is to investigate differences between heterogeneous groups.
3. If a decision is made to partial out the SCL, the appropriate transformation to be used is likely to be a function of the sample and the

stimuli employed. A unit which insures the statistical independence of the SCR from the basal level is that of "change in log conductance".

4. Normal, neurotic and psychotic samples are likely to be differentiated from one another in terms of the log of SCL and the log of ISCL.

<u>The Physiological Determinants of the GSR</u>

There is considerable uncertainty regarding the peripheral mechanisms underlying GSR activity. The purpose of the following discussion is to outline the theories which sought to explain SR and SP activity, examine some of the reasons for the state of confusion and to present recent views about the issue.

There are four theories which attempted to explain the peripheral mechanisms underlying SR activity. The muscular theory (Sidis and Nelson, 1910) attributed SR to electrical activity induced by muscle contraction at the recording site. The vascular theory (McDowall, 1933) attributed SR to changes in the tone of the blood vessels of the skin. But Lader and Montagu (1962) demonstrated that when SR and PV were recorded simultaneously from the same finger, the application of atropine to deactivate the sweat glands eliminated SR but not PV responses. Similarly, the administration of bretylium to deactivate the nerves regulating vasoconstriction eliminated PV but not SR responses. The sweat-gland theory (Darrow, 1927) attributed SR to the activity of the sweat glands. But the ability of this theory to account for all the characteristics of SR was questioned by Wilcott (1962). The fourth theory was proposed by Wilcott (1962), and it attributed the SR phenomenon to the activity of sweat glands as well as the resistance of the epidermis in the absence of sweating. A similar view was presented by Martin and Venables (1966). Wilcott (1967) stated that the absence of the SRR and the presence of relatively high SRL exhibited by individuals with congenital absence of sweat glands do not validate the sweat-gland theory because such individuals have an abnormal epidermis. Thus, whether the difference between two individuals in terms of the magnitude of the sweating response is associated with a similar difference in the SRR depends on the correspondence of the epidermal resistance for the two individuals. It should be noted that now it is accepted that whatever relation exists between sweating and the SRR it is due to changes in the permeability of the sweat-gland cells which take place before the sweat appears at the surface of the skin (Wilcott, 1962).

The theories presented so far to account for the SP phenomenon are similar to those discussed above. However, there is more uncertainty regarding the determinants of the SP than those of the SR; and this is probably due to the relatively larger variety of the SP components. Thus, the occurrence of the SPR has been attributed to sources such as the activity of sweat glands, vasoconstriction, the release of acetylcholine by the sympathetic fibers at the recording site and to certain properties of the epidermis. A review of the literature by Wilcott (1967) indicated there is no consensus regarding the determinants of either the positive or negative component of the SPR. The lack of consensus was attributed to the fact that the study of the relative contribution of any of the above mentioned mechanisms is very difficult to carry out without interference by the other hypothesized determinants. For example, the intercutaneous injection of acetylcholine was shown to produce negative components at low concentrations, and positive and diphasic components at high concentrations. But Wilcott noted that the intercutaneous injection of acetylcholine increases sweating, which in turn affects the properties of the epidermis.

In view of the above mentioned state of affairs, only the quantitative interrelationship between SPR, SPL, SRR and SRL will be of concern in the present chapter. The following section will discuss the interrelationship among the GSR indices during rest and following an increase in the arousal level.

<u>The GSR and Changes in the Level of Arousal</u>

In the following discussion the various GSR indices will be compared with one another in terms of their ability to reflect changes in the level of arousal.

Changes in the arousal level influencing the GSR activity are mediated through the ascending reticular activation system (Wang, 1958; Venables and Wing, 1962), and they are released through the sympathetic nervous system (Silverman, Cohen &

Shmavonian, 1959). A state of arousal can be induced by physical as well as psychological stimuli (Silverman et. al., 1959). The physical stimuli are not limited to electric shock, loud noise, pain, etc., but they also include variables such as localized temperature changes and mechanical force applied to the chest (Yokota et. al., 1958). The GSR can also be elicited by subliminal stimulation: Redlich (1945) reported the occurrence of SRR following exposure to stimuli below the awareness threshold.

The differential effects of physical and psychological stimulation can not be detected from the characteristics of the recorded GSR. Therefore, when only psychological factors are of interest it is essential to control for that aspect of arousal which is merely due to the mechanical process of stimulus presentation. But even when a given stimulus is considered to be primarily a psychological one, there is not an accepted criterion for distinguishing the "quality" of the psychological experience associated with a specific GSR response (McCurdy, 1950). The decision as to whether a given stimulus is comic or anxiety-inducing depends on the experimenter's personal judgement, which can ultimately be verified by group consensus or through the verbal reports elicited from the subject.

McCurdy (1950) reviewed the literature in terms of the relation between the SRR and subjective evaluation of psychological stimuli varying in intensity. Of the 17 studies carried out between 1911 and 1948, the lowest correlation reported was 0.53, and in 10 studies the two variables had a correlation of 0.70 or more.

Greiner and Burch (1955) reported that gradual sedation with drugs affecting the central nervous system (CNS) was associated with a decrease in the amplitude of the SRR to specific stimuli, a decrease in the frequency of non-specific responses, and an increase in the SRL. However, when the arousal level was gradually increased by the injection of a stimulant both the SRR and the frequency of non-specific responses increased simultaneously up to a certain point, after which the continuous increase in the frequency of the non-specific response was accompanied by a gradual decrease in the SRR. These observations indicate that when one is investigating extreme changes in the arousal level in a within-group design, or when comparing groups who are expected to exhibit relatively large differences in the arousal level, the frequency of non-specific responses is preferable to the SRR as an index of autonomic arousal. In the following discussion it will become apparent that the choice of the appropriate index of autonomic arousal is also influenced by the nature of the stimulus employed to induce changes in the arousal level.

Silverman et al. (1959) reported that psychological stimuli such as "charged" words as well as physical stimuli such as pain and the administration of stimulants are associated with a significant decrease in SRL. The authors further considered the SRL and frequency of non-specific responses to be equally appropriate indices of the level of general arousal. However, the relation between the two variables did not necessarily hold when changes in the arousal level were due to specific stimuli. To quote Silverman et al. (1959, p. 68), "indeed, aside from the fact that transient increases in arousal (i.e. in response to specific stimuli) may be seen as evidenced by increases in the number of non-specific fluctuations while the basal resistance in general does not change, there is an extremely good correlation between number of non-specifics and level of basal resistance." This quotation implies that chronic anxiety can be diagnosed equally well by the relatively low SRL and high frequency of non-specific responses if the recording is performed during the state of rest. But in the case where the experimental design is limited to the application of a specific or a continuous stimulus, the basal level is inferior to the frequency of non-specifics as an index of arousal.

Silverman et al. (1959) mentioned interesting data regarding the adaptation of the GSR following repeated stimulation. When a group of 5 subjects were presented with 37 neutral and "charged" words on two successive occasions, in the second session the subjects responded to more words with a higher frequency of non-specific SR responses. On the basis of the data, the authors questioned the occurrence of GSR adaptation following repeated stimulation as reported by McCurdy (1950) and others. Silverman et al. made a distinction between the physical and psychological components of the GSR response, and suggested that repeated stimulation can reduce the "startle" effect which is an aspect of the physical component alone. This trend in thought implies that whether repeated stimulation will also nullify the effect of the psychological component will depend on the individual's personality characteristics and one's ability to desensitize.

Leiderman and Shapiro (1964) investigated changes in SPL under the following conditions: during wakefulness and sleep under conditions of sensory deprivation, during rest, while learning a monotonous task, during a post-task rest period, and in response to an electric shock. The potential difference between the active site - the thenar eminence of the left palm - and the inactive site - the dorsal part of the forearm - was expressed without sign. The data showed the SPL was highest following the electric shock and lowest during sleep. The SPL during the task was similar to that during the post-task resting period. The SPL during the task was higher than that during sleep ($p < .002$), but lower than that during wakefulness ($p < .01$). The SPL following the shock was higher than that during the task ($p < .02$) and sleep ($p < .002$), but not statistical significant from that recorded during the state of wakefulness. It follows that wakefulness during sensory deprivation and exposure to electric shock are equally stressful, and noxious stimuli in general lead to increase in the SPL. It should be noted that Leiderman and Shapiro sampled the SPL readings at regular time intervals, irrespective of whether the latter coincided with ISPL or SPR as previously defined.

Burstein et al. (1965) compared changes in SR and SP responses recorded at different levels of arousal. The sample consisted of 10 male and 10 female college students. The stimuli were 12 "critical" words interposed by 30 buffer words. The 12 critical words consisted of 4 neutral words, 4 moderately charged words, and 4 highly charged words. The buffer and neutral words did not differ in terms of emotional content, and the distinction between the two sets is made here for the sake of reference in the following discussion.

Computations were made of the mean "magnitude" for the SCR in micro mhos and for each of the three SP components (i.e. a, b and $a_2$) in millivolts. The authors used the term "magnitude" to indicate that zero responses were included in the analysis. A fifth measure consisted of the sum of the three SP components. The sixth and seventh measures were the deviation scores computed for the SRR and the total SPR, respectively. The means and standard deviations used in this process were computed from the corresponding response magnitudes for 9 of the 30 buffer items. No mention was made as to how these 9 words were selected.

The analysis indicated a significant positive relation between the SRR magnitude and the level of emotional content of the stimulus words. The F-ratio was 13.61 ($p<.001$) for the absolute conductance scores and 31.31 for the deviation scores. The difference between the magnitudes of the two F-ratios suggests that between-treatment differences are accentuated when individuals are equated for the level and variability of their normal reactivity.

Regarding the magnitudes of the SP indices across stimuli, the total SPR had the steepest gradient. This was followed by gradients for the b, $a_2$ and a components in a descending order of slope steepness. An increased frequency of the $a_2$ component, rather than the b component as reported by Wilcott, Darrow & Stegela (1957) and Forbes and Bolle (1936), was associated with higher levels of emotional arousal.

Intersubject analysis showed there was a significant correlation ($p<.05$) between the total SPR and the magnitude of each of the a and b components at the three stimulus levels. The total SPR correlated significantly ($p<.01$) with the magnitude of the $a_2$ component only in the high arousal condition. The correlation between SC and the total SPR was significant ($p<.02$) only in the high arousal condition, too. It is worth noting that the correlation between the $a_2$ component and SC was 0.63 ($p<.01$) for the low arousal condition, 0.70 ($p<.001$) for the medium arousal condition, and 0.79 ($p<.001$) for the high arousal condition. Thus, an increase in arousal level is associated with an increase in both the magnitudes of the $a_2$ component and its frequency.

The intrasubject correlations among the various SR and SP indices are given in Table 5.1. Trials in which both the

Table 5.1[*]

Intrasubject Correlations Between Simultaneously Recorded SR and SP Measures For 20 Subjects on All Wave Forms[a]

| Measures Correlated[b] | Range | Mean r | Total No. of Positive and Negative rs | | No. of Positive and Negative rs Significant at 0.05 Level | |
|---|---|---|---|---|---|---|
| | | | + | - | + | - |
| 1, 2 | -0.78 to +0.51 | -0.21 | 4 | 14 | 0 | 2 |
| 1, 3 | -0.54 to +0.84 | 0.34 | 14 | 4 | 5 | 1 |
| 1, 4 | -0.46 to +0.87 | 0.36 | 15 | 4 | 6 | 1 |
| 1, 5 | -0.47 to +0.87 | 0.28 | 11 | 8 | 6 | 1 |
| 2, 3 | -0.26 to +0.67 | 0.20 | 11 | 6 | 2 | 0 |
| 2, 4 | -0.06 to +0.99 | 0.74 | 18 | 1 | 16 | 0 |
| 2, 5 | -0.15 to +0.84 | 0.50 | 18 | 1 | 10 | 0 |
| 3, 4 | -0.12 to +0.97 | 0.65 | 17 | 1 | 10 | 0 |
| 3, 5 | -0.23 to +0.89 | 0.41 | 14 | 4 | 8 | 0 |
| 4, 5 | -0.05 to +0.93 | 0.66 | 20 | 0 | 15 | 0 |

[a] The number of trials upon which each correlation was based ranged from 4 to 20 per subject. The total number of correlations per pair of measures is not always 20 because some subjects did not exhibit certain wave forms.

[b] 1 = a wave form; 2 = b wave form; 3 = $a_2$ wave form; 4 = total SP; 5 = galvanic skin response.

[*] Burstein et al., 1965, p. 21.

SR and SP had a zero response were not included in Table 1 The intrasubject correlations showed a good deal of variability. The data given in Table 1 were not corrected for the basal effect. In contrast to the trend in the intersubject correlations discussed above, the intrasubject data showed the SC to be more related to the total SPR than to the $a_2$ component. The data in Table 1 shows that most of the correlations between the b component and the total SPR are positive and significant at the 0.05 level. The same is true for the SC and the total SPR correlations. Thus in both between-subject and within-subject analysis, the total SPR was consistantly and significantly related to SC and the b component.

The quantitative relations among the various GSR indices discussed above can be summarized in the following points:

1. There is a fairly good correlation between the magnitude of the SRR and the subjective evaluation of the stimulus intensity which is of a psychological nature. This gives rise to the question as to whether the relation between the two variables is a linear or a logarithmic one.
2. The state of arousal is generally associated with an increase in the SCR and the frequency of non-specific SR responses; and it is accompanied by a decrease in SRL.
3. Free-floating anxiety is associated with a decrease in the SRL and an increase in the frequency of non-

specific SR responses if no external stimulation is being applied. If the GSR is to be recorded in the presence of a stimulus, the frequency of non-specific SR responses is a more appropriate index.

4. The phenomenon of "GSR adaptation" is a function of the perceived intensity of the physical and psychological components of the stimulus, and the personality structure of the individual.
5. Across stimuli of varying intensity, the gradient with the most steep slope is that of the total SPR, and it is followed by that of the b, $a_2$ and a components, in the order of decreasing magnitude.
6. It is not yet certain whether a state of high arousal gives rise to an increase in the frequency of the $a_2$ or the b component of the SPR.
7. The correlations between SC and the various SP indices increase with the rise in the level of arousal. These correlations are also differentially modulated by within- and between-subject designs.

# CHAPTER VI

# PHOTOPLETHYSMOGRAPHY

The present chapter will first outline the relation of plethysmography to the GSR and the main aspects of the technique. Following that there will be a detailed discussion of the physiological bases underlying photoplethysmography and the autonomic mechanisms regulating cutaneous vascular activity. Such a detailed discussion is considered relevant for accurate interpretation of pulse volume (PV) changes in repressors and sensitizers in terms of autonomic reactivity and susceptibility to stress.

## Plethysmography and the GSR

Until the late 1920s, cardiovascular activity was associated with changes in the electrical properties of the skin. In 1888, Fere attributed the decrease in SR to the increase in peripheral blood flow as a result of vasoconstriction. Radecki in 1911 suggested that changes in both blood pressure and vascular tone result in variations in $CO_2$ concentration in the blood, and this in turn causes changes in SR. But Darrow (1929) finally established that blood flow and SR are not directly related to one another. When the two variables were recorded simultaneously from two adjacent fingers, changes in blood volume (BV) in one finger were not related to variations in SR recorded from the adjacent finger. Lader and Montague (1962) stated a similar view. Administration of atropine to the finger abolished the GSR without affecting the PV, and the application of bretylium eliminated vasomotor activity without interfering with the GSR.

Silverman et al. (1959) reported that the spontaneous fluctuations in PV and SR occur independently of one another. Furthermore, there is evidence that SR is a more sensitive index of autonomic reactivity. Furedy and Gagnon (1968) compared the differential sensitivity of PV, BV and SC. The experimental condition consisted of responses to a tone or light previously paired with an electric shock. The control condition consisted of responses to the tone or light not previously associated with electric shock. The sensitivity index for each variable was the percent of change in the response magnitude in the experimental condition. The data showed that SC had a higher sensitivity index (p 0.001) than either PV or BV. The correlation between the sensitivity indices for PV and BV was 0.356 (p 0.01). None of the correlations between the SC sensitivity index and that for either PV or BV was significant at the 0.05 level.

Photoelectric Plethysmography

The methods of plethysmography can be classified into three major categories, which are pneumatic, impedance and photoelectric plethysmography. The first two techniques, however, involve a number of theoretical and technical problems (Brown, 1967). The following discussion will be limited, therefore, to the method of photoelectric plethysmography which was adopted in Experiment 2, and which is beset by fewer controversial issues than either of the other two methods.

The two principal techniques of photoplethysmography relate to the measurement of transmitted light and reflected light. In the transmitted mode, the light source and the photocell are placed on opposite sides of the limb. In the reflected mode, both the light source and the photocell are placed next to each other and the photocell detects the light reflected by the different tissue layers.

The choice between the transmitted and the reflected modes requires the weighing of the advantages and disadvantages of each of them. In the transmitted mode the light is modulated by the superficially situated capillary plexuses as well as the deeper layers of venous plexuses and arterioles which contain the larger portion of blood volume in the limb. In the reflected mode the light is modulated only by the cutaneous tissue (Brown, 1967). As a result of the difference in the volume of blood modulating the incident light in each method, the transmitted mode yields larger PV deflections than the reflected mode provided that other factors are constant (Weinman, 1967). On the other hand, in the reflected mode recording can be made from any part of the body. This advantage of the reflected mode must not be exagerated because, as will be apparent later on, the vascular activity in the hands and feet - unlike that in other parts of the body - is regulated primarily by the sympathetic system. As a result of this fact it is easier to interpret the causes of PV changes in the fingers and toes where the transmitted mode can be applied than those recorded from other parts of the body where the reflected mode is the only possible technique. However, Brown (1967) suggested that it can be difficult to use the transmitted mode if the subject has a pigmented skin. The nature of the difficulty was not stated.

Weinman (1967) pointed out that the difference between the transmitted and reflected modes is relative because of the refracting property of unhemolyzed blood. In the transmitted mode there is considerable attenuation due to refration and little to absorbtion (Loewinger, Gordon, Weinreb & Gross, 1964). Similarly, in the reflected mode there is considerable attenuation due to the scattering of the incident light (Weinman, 1967).

## Physiological & Physical Factors Underlying Photoplethysmography

Photoplethysmography is based on the differences between the extinction coefficients for blood and other various body tissue. The extinction coefficient is an index of the transparency of the recording site, and it is a function of the wavelength of radiant energy applied as well as the processes of refraction and absorbtion (Loewinger et al., 1964). Since in Experiment 2 only the transmitted mode is applied, the discussion of the extinction coefficient will be limited to this area.

The relation between the extinction coefficient, incident light and transmitted light is given by the following formula:

$$e = \frac{- \log_{10} (L/L_o)}{X} \qquad (1)$$

The term "$L_o$" represents the incident light, "L" the transmitted light, "X" the thickness of the tissue in cm., and "e" the extinction coefficient. Both L and $L_o$ can be assumed to be in millilambert units.

The term e is a function of the nature of tissue at the recording site and the type of radiant energy used. For a given spectral region and tissue thickness, transmitted light is maximal for fat and minimal for whole blood. According to Weinman (1967), when the incident light is 8050 A and the tissue is 1.3 mm. thick, the percentage of transmitted light is 0.7% for whole blood and 62% for tissue. Weinman did not specify the constituents of the latter tissue layer. On the other hand, transmitted light is maximal at the infrared region of the spectrum (7000 - 9000 A), and it is approximately zero at the ultra violet region. However, when recording from a single site, the terms $L_o$, e and X in equation 1 are constant and changes in L can be assumed to be linear to changes in blood concentration in the limb.

Another factor which can seriously influence the magnitude of the extinction coefficient is the level of oxygen in the blood. A study by Kramer, Elam, Saxton & Elam (1951) suggested that the problem can be solved by the use of infrared radiation, because in this spectral region, the extinction coefficient of blood is independent of the oxygen content. In Experiment

2, however, the effect of changes in oxygen concentration in the blood is not controlled for because the experiment employs a within-subject design and changes in the magnitude of e during the stress condition can be treated as an aspect of autonomic reactivity.

<u>Autonomic Control of the Cutaneous Vasculature</u>

There are regional differences regarding the autonomic innervation of cutaneous blood vessels (Best & Taylor, 1961). Whether the vasculature is regulated by the sympathetic system, parasympathetic system, or both, and the complexity of this process vary from one recording site to another. It is, therefore, preferable to choose a recording site which coincides with the purpose and design of the experiment and at the same time permits a clear interpretation of the processes underlying the observed changes in the magnitude of the BVP.

The cutaneous vasculature in the trunk, face and legs are innervated by the parasympathetic system (Brown, 1967). In the forearm, the vasculature in the skin and muscles are regulated by a complex interaction between the sympathetic and parasympathetic systems (Lader, 1967). In the hand and foot the cutaneous vasculature is innervated by the sympathetic system and, therefore, the mechanism regulating blood flow in these areas is a constrictor (Brown, 1967). This implies that vasodilation in the hand and foot is equivalent to the absence of the vasoconstrictor tone. It is thus apparent that recording sites on the hand and foot have an advantage over other sites in that the sympathetic system is the sole regulator of the vasculature, and the mechanisms contributing to changes in the PV are relatively easy to identify.

From the above discussion it follows that the activation of the autonomic system results in vasoconstriction in the hand and foot. Considering the case where the transmitted mode is used and the recording site is the finger, as for example in Experiment 2, vasoconstriction results in a relative reduction of the total blood volume in the limb. This phenomenon appears on the plethysmogram as a decrease in both the proportion of transmitted light and the magnitude of the PV. On the other hand, an increase in the magnitude of the PV is indicative of an increased blood flow, and a decrease in the reactivity of the sympathetic system rather than an increase in the reactivity of the parasympathetic system.

<u>Components of the Plethysmographic Trace</u>

The plethysmographic trace represents simultaneous changes in two parameters which are the BV and the PV. BV changes account for most of the modulation in the transmitted light (Weinman, 1967), and it is regulated by the relatively large and slow-changing blood reservoirs in the venous plexuses and arterioles. The PV is induced by changes in the pulse pressure and it represents changes in the blood content of the capillary plexuses. BV changes are slow over time, and they are characterized by a "wavy" baseline. Superimposed on this baseline is the PV which occurs at the approximate rate of one per sec. The super-imposition of the PV on the BV and their relative rates of change are illustrated in Fig. 6.1.

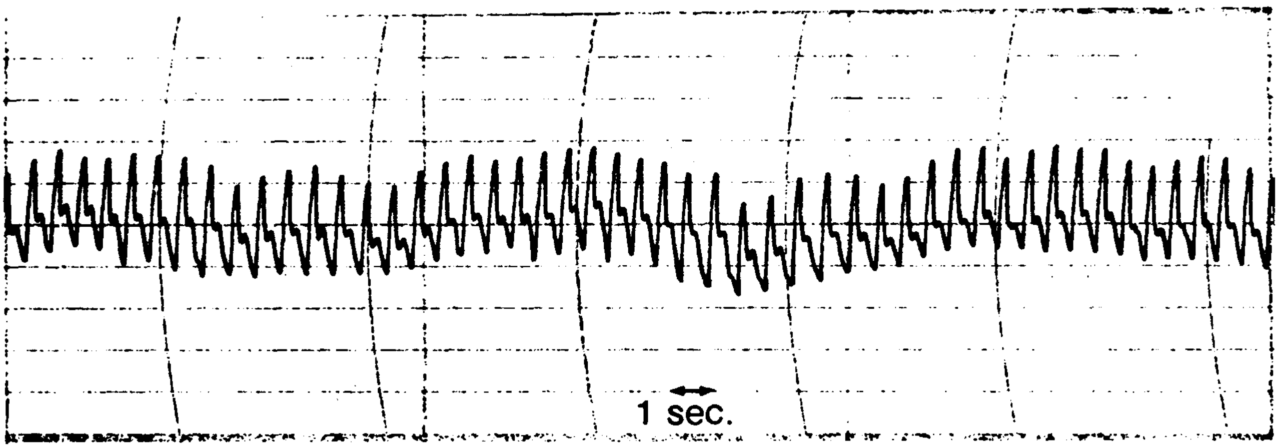


Fig. 6.1 The superimposition of the PV on the BV and their relative rates of change over time.

The recorded changes in the BV and PV are only relative. The magnitude of absolute change in either component varies with the pressure induced by the transducer, the elevation of the recording site with respect to the heart, etc. (Brown, 1967). Absolute measures are hard to obtain also because, at least over a short time period, the volume of blood outflow from the recording site does not necessarily equal the volume of blood inflow to the same area (Lader, 1967). However, when the recording site is at the level of the heart there is a very close correlation between the magnitude of the PV and the rate of blood flow through the limb (Burton, 1939; Melrose et al., 1954). In this case the magnitude of the PV is a close approximation to the level of autonomic reactivity.

There are specific recording procedures associated with the BV and PV. When a DC preamplifier is used, both BV and PV changes can be recorded simultaneously. The recording of PV alone requires an AC preamplifier with a time constant of 1-1.65 sec. (Weinman, 1967). The recording of BV alone makes it necessary to set up a complex electrical circuit described by Weinman (1967).

The PV Trace

In this section a detailed description will be given for the PV trace because it is this component which is of major interest in Experiment 2. A sample of the PV trace is shown in Fig. 6.2.

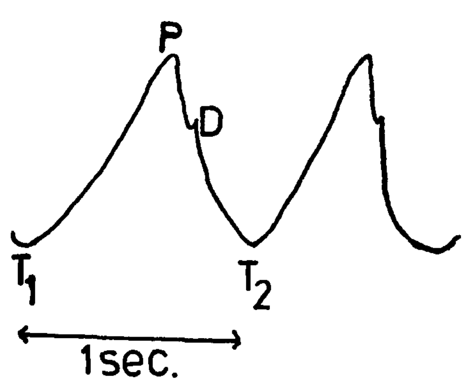


Fig. 6.2 Components of a PV trace.

At the trough T1 blood flow to the limb is equal to the outflow. The ascending trace following point T1 represents the systolic phase during which the left venticle of the heart contracts. Point P is the systolic peak when the volume of blood in the limb is maximal. During the time interval between T1 and P, the rate of inflow equals that of outflow and the observed increase in blood volume during this period is due to the increase in both the inflow and outflow rates. The magnitude of the trace between T1 and P represents the PV which indicates the level of autonomic reactivity.

The descending trace following point P represents the diastolic phase during which the blood outflow from the limb is not accompanied by an inflow. At point T2, the rates of inflow and outflow are equal once more. The time interval between T1 and T2 is approximately 1 sec. and represents the duration of one cardiac cycle. The length of this time interval depends upon the general level of arousal characteristic of the individual and the nature of the stimulus being presented.

The appearance of the dicrotic notch at point D during the diastolic phase is due to the backflow of the blood when the aortic valve closes (Lader, 1967). The processes regulating the appearance and shape of the dicrotic notch did not receive much attention in the psychophysiological literature (Brown, 1967). In general, its appearance is affected by such factors as the health of the individual, the elevation of the recording site in relation to the heart, the recording frequency, periodic changes in BV and the recording site (Weinman, 1967).

The exact effect of these factors will not be described here because the present study does not take into account changes in the shape, or the frequency, of the dicrotic notch.

<u>Extraneous Factors</u>

There are a number of factors which should be controlled during the recording session to minimize error.

The recording site should be maintained at a fixed position (Brown, Giddon, & Dean, 1965) otherwise the plethysmogram may show movement artifacts which are hard to distinguish from responses due to autonomic reactivity.

The elevation of the limb with respect to the heart should be the same throughout the recording session as well as for all subjects if inter-individual comparisons are to be made. Lowering the recording site below the heart level induces distension in the blood vessels and an increase in the magnitude of the PV. Raising the recording site has the opposite effect. But in neither case is there any change in the inflow and outflow rates of blood. Thus, changes in the elevation of the limb result in changes in the PV trace which do not correspond to variations in the volume of blood at the recording site.

Lader (1967) suggested that gradual vasoconstriction may occur as a result of restlessness if the recording session is extended beyond one hour. Hence, for prolonged recording sessions certain statistical methods must be used to estimate the error due to the time factor. In Experiment 2, the effect of time factor is tested for even though the duration of the control and experimental conditions did not exceed 30 minutes.

During the recording process, care should be taken to avoid incurring sudden sounds when manipulating the recording equipment. Such stimuli are equivalent to orienting responses which, according to Burch (1961), always result in vasoconstriction.

While recording, the photocell must be shaded from intense light from the surroundings. Otherwise, a slight change in the orientation of the limb in relation to the extraneous light source may result in PV changes which are large enough to obscure those due to sympathetic activity. This error can be minimized by dimming the lights as much as possible, and by placing the photocell against the fleshy part of the limb. Brown (1967) suggested covering the limb with an opaque material. But this arrangement can increase the temperature of the limb and consequently lead to vasodilation.

Coughing results in pronounced vasoconstriction followed by gradual vasodilation (Lader, 1967). The shape of the PV resulting from coughing is shown in Fig. 6.3. Such responses were eliminated when analysing the data for experiment 2, and the mean of the valid responses during the preceeding and following 10 seconds was substituted for the missing data.

There is an advantage in placing the recording site as close to the heart level as possible. As was noted previously, the PV is only a relative measure of the blood flow to the limb (Lader, 1967) because of variations in the rates of

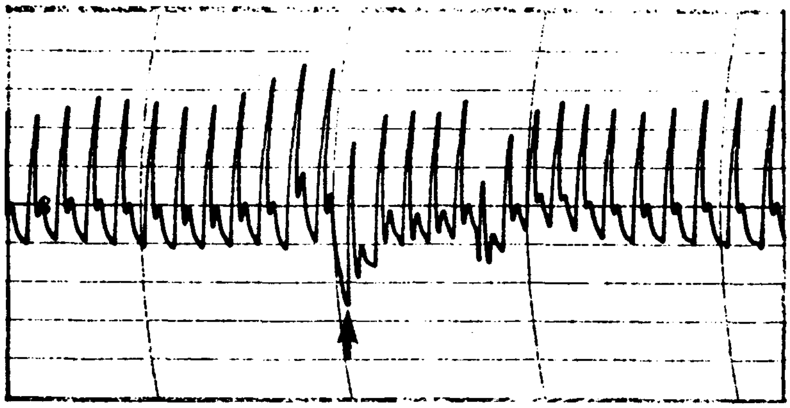

Fig. 6.3 Effect of coughing on a PV trace.

inflow and outflow. The discrepancy between these rates is due mainly to variations in venous pressure, and these changes in blood pressure do not have a significant effect on the blood flow when the digit is at the level of the heart (Burton, 1939).

Particular care should be taken when interpreting the data of studies which investigated the relation between PV and anxiety induced by stimuli such as cold or hot water. The PV can be affected by temperature changes - which induce vasoconstriction or vasodilation - and by stimuli of psychological significance, but only in the latter case does PV changes correspond variations in the GSR. Thermal stimuli result in vasoconstriction and a decrease in SR only if they are of a high intensity (Brown, 1967). In the present study it is assumed that only painful cutaneous stimuli such as a pinch and extreme temperature changes have a psychological significance.

The pressure of the photoelectric transducer on the finger tip must be just enough to hold the transducer in place. Excessive pressure on the finger tip results in a decrease in the rate of blood flow during vasoconstriction (Burch, 1961). This factor is relevant when there is a comparison of data for different individuals even in a within-subject design.

## The PV as an Index of Psychological Adjustment

The purpose of the present section is to discuss the usefulness of the PV as an index of emotional reactivity to a stressor. In particular, reference will be made to studies which investigated PV activity in normals, hysterics and neurotics because it is hypothesized that the latter two groups are the clinical counterparts of repressors and sensitizers, respectively.

Ackner (1956) compared normals, anxiety patients and non-anxiety patients regarding changes in the PV and SR during normal state of wakefulness and during an induced state of rest.

The anxiety group consisted of 10 female and 3 male patients with an average age of 35.7 years. The classification of these patients was based on verbal reports and observed symptoms of anxiety and restlessness. The non-anxiety psychiatric group consisted of 8 females and 2 males with an average age of 31.7 years. This group consisted mainly of hysterical and phobic patients who appeared relaxed during the day. The control group comprised medical students and staff members, and it consisted of 7 males and 3 females with an average age of 31.5 years. No subject with a history of "cold fingers" was included in the study.

Most subjects were examined at least twice during the state of wakefulness to record PV, SR and other variables. In the third session, which constituted the rest condition, autonomic activity was recorded after sleep was induced by the administration of Seconal orally. This procedure was adopted in order to control for variations in the level of physical and emotional activity prior to the rest condition. Both patient groups were considered "test sophisticated". The PV was recorded by means of the volume-displacement technique. In the third session the room temperature was maintained at 22 C because at this temperature or above it vasodilation does not occur automatically as a result of sleep. EEG activity was monitored to identify the onset of sleep.

Ackner reported that there was no significant differences in SR activity among the three groups during any of the sessions. No mention was made as to whether the comparison was performed on the magnitude or the frequency of SR responses. The psychiatric and control groups may not differ from one another in terms of the magnitude of SR deflections because of the absence of a specific stressor stimulus. But one expects the anxiety group to have a greater frequency of non-specific SR responses during the state of wakefulness.

There were significant differences in the PV recordings among the three groups during both the normal and rest conditions. The data for the three groups are given in Table 6.1. The mean increase in PV was obtained by subtracting the magnitude of the PV at the beginning of the session from the maximum PV recorded during the same session.

Table 6.1*

Pulse-Volume Changes

| | Mean of initial PV | Mean of increase in PV | Range of increase in PV |
|---|---|---|---|
| <u>State of Wakefulness</u> | | | |
| Controls | 9.4 $mm^3$ | 1.0 $mm^3$ | |
| Non-anxiety patients | 5.8 $mm^3$ | 1.6 $mm^3$ | |
| Anxiety patients | 3.4 $mm^3$ | 1.0 $mm^3$ | |
| <u>State of Sleep</u> | | | |
| Controls | 10.1 $mm^3$ | 0.55 $mm^3$ | 0-2.5 $mm^3$ |
| Non-anxiety patients | 6.3 $mm^3$ | 2.3 $mm^3$ | 0-5.0 $mm^3$ |
| Anxiety patients | 4.9 $mm^3$ | 12.3 $mm^3$ | 6-23.0 $mm^3$ |

* From Ackner, B, 1956, p. 27

During the state of wakefulness, there was no significant difference in the mean PV changes among the three groups. But regarding the initial PV, the difference between the three groups was significant at the 0.001 level ($F = 17.35$, df = 2.65).

A sequence of t-tests showed that the anxiety group differed from the control group at the 0.001 level and from the non-anxiety group at the 0.025 level.

During the state of sleep, the F ratio for differences in mean initial PV was stated as statistically significant. The exact level of significance was not reported. Differences between the three groups regarding the mean PV increase were significant at the 0.001 level ($F = 45.3$, $df = 2.37$). A sequence of t-tests showed that the anxiety group differed from the control and the non-anxiety groups at the 0.001 level. The difference between the control and non-anxiety groups was significant at the 0.01 level.

The data in Table 6.1 shows that during both states of wakefulness and sleep, vasoconstriction was minimal in the control group and maximal in the anxiety group. During the state of wakefulness, however, the control and anxiety groups do not differ regarding the mean increase in vasodilation during the session. The anxiety group exhibited a greater variability in the increase in PV during sleep than the control group. Ackner reported that during sleep, a small initial PV in the non-anxiety and control groups was associated with a small or no increase during the session. But in the anxiety group sometimes a "moderate" initial PV was associated with a large increase. In this case there is a positive relationship between the magnitude of the PV during wakefulness at the beginning of the third session and the magnitude of change in the PV during sleep - or the state of induced relaxation.

Generalizing from this data to what might happen in response to a stressor, it is hypothesized in Experiment 2 that subjects who verbalize feelings of anxiety and show a relatively higher level of vasoconstriction under the control condition will exhibit further vasoconstrictive activity under the stressor condition. The opposite of this relation is hypothesized to be true of repressors. In support of this view, Patton (1961) reported that subjects classified as "sympathetic" under a non-stress condition exhibited more SNS activity under different types of stress conditions than those classified as "parasympathetic". Van Der Merwe & Theron (1947) also reported a positive correlation between the magnitude of vasoconstriction during rest and that occurring in response to a stressor such as a mental arithmetic test or a cold water bath.

Regarding the dynamics underlying the above mentioned differences, Ackner stated that an excess in circulating adrenalin could not be the cause since the three groups did not differ in terms of pulse rate during the state of wakefulness. An excess of noradrenalin as the cause was also ruled out because the three groups had similar rates during wakefulness. Ackner (1956, p. 34) concluded that "increased sympathetic activity along the vasomotor pathways would appear, at the moment, to be the most likely explanation."

Henschel, Brozek & Keys (1951) compared normals and schozophrenics regarding the magnitude and latency of both vasodilation and increase in temperature in the finger due to the immersion of the feet in a 45 C$^{o}$ - water bath, after vasoconstriction was artificially induced by placing the subject in a 17-20 C$^{o}$ room.

The initial skin temperature due to the 17-20 C$^{o}$ room and the magnitude of skin-temperature increase following the warm bath were the same for the two groups. But the latency between the application of the warm bath and the onset of increase in skin temparature was 40% as much for the schizophrenic group as for the controls. The photoplethysmographic data consisted of the expression of the crest time as a percentage of the cycle duration. For this variable there was no significant difference between the groups. The lack of difference can be due to the previously mentioned inadequacy of using mild temperature changes to investigate the relation between emotional stability and vascular activity. The lack of a difference between the two groups can also be due to the possibility that the percentage of crest time to cycle length is an inappropriate criterion to differentiate between normals and schizophrenics. The magnitude of the PV may be a more appropriate criterion for this purpose.

Henschel et al. attributed the persistance of vasoconstriction and the delay in skin-temperature increase in the schizophrenic sample to an abnormally high temperature threshold in the hypothalamus, and not to an organic malfunction in the cutaneous blood vessels. This conclusion and that of Ackner (1956) are similar in that the vasoconstrictive activity was attributed to the direct activation of the SNS by the CNS rather than to the increase of adrenaline in the blood.

Van Der Merwe and Theron (1947) computed the intercorrelation between the Bell emotional stability scores and a number of subindices of vascular activity during rest and in response to a stressor in the form of a mental arithmetic test and a 16 $C^{o}$ water bath applied to the left hand while the recording was performed on "one of the fingers of the right hand." The sample consisted of 25 male and 5 female college students with an age range of 19-23 years. The volume-displacement technique was adopted in the experiment.

The centroid method of common factor analysis was applied to the correlation matrix - the communality estimates were not given. Three factors were extracted and these were rotated by means of the graphical method (Thurstone, 1935).

The loadings on the factor associated with "emotional tension" showed that the subindices of vascular activity vary in their effectiveness to measure the vasoconstrictive activity associated with stress. These variables, in a descending order of effectiveness, are pulse volume during rest, total reflex finger volume deviation during problem-solving, change in PV during problem-solving and the rate of finger-volume change during problem-solving. The loadings for these variables on the "emotional tension" factor varied between 0.724 and 0.908. These data support the view that the magnitude of the PV during rest and that during stress are positively related.

It is worth noting that the cold-water test scores obtained by the different subindices of vasoconstriction loaded heavily on an independent factor other than that for "emotional tension" mentioned above. Furthermore, the Bell scores were identified by a third independent factor. It follows that vasoconstriction due to a cold water bath is not equivalent to that induced by a mental arithmetic test. Also, the Bell scores for emotional stability do not seem related to the level of vasoconstriction during rest, a 16 C$^{o}$ water bath, or a mental arithmetic test. The ineffectiveness of using a cold water bath when investigating the relation between vasoconstriction and emotionality has already been mentioned. The examination of the validity of the Bell inventory is beyond the scope of the present study. But it can be stated that if arousal during a mental arithmetic test is related to psychological stress, then the PV is an appropriate index of vasoconstriction induced by an emotionally stressful stimulus.

Van Der Merwe (1948) compared the vasoconstrictive activity of normals, anxiety patients and hysterics under rest and stress conditions. The control group consisted of 40 male and 10 female college students. The age range for 49 of the subjects was 17-25. One male was 45 years old. The data for this group was previously collected by Theron (1948). The neurotic sample consisted of 5 male and 3 female patients. The hysterics consisted of 11 males and 2 females. Both hospitalized groups had an age range of 19-40 years.

The indices of vascular activity were pulse volume during rest (P), pulse volume immediately preceding an 18 C$^{o}$ cold water test (Pw), the pulse volume before a mental-arithmetic test (Pt), the rate of finger volume change during the cold water test (Rw) and during the mental-arithmetic test (R). Two other general indices were computed. The emotional tension index (T) was computed by summing the scores for variables Pw, Pb and Pt. A negative T score indicated vasoconstrictive or sympathetic predominance, and a positive score represented sympathetic inhibition. The emotional lability score (L) was computed by summing the scores for the P, Pw, Pt, Rw and R variables. A high L score was indicative of emotional lability. The choice of the components of the T and L scores was based on the results of a factor analytic study by Theron (1948).

The means for the neurotic and control groups associated with the eight variable and the related T-tests are given in Table 6.2. The data for the hysterics and controls, and for neurotics and hysterics are given in tables 6.3 and 6.4, respectively.

The mean scores for emotional tension (T) given in tables 6.2, 6.3 and 6.4 show that, in comparison with normals, hysterics exhibited a lower level of sympathetic activity vasoconstriction. The opposite was true for the neurotic sample. The magnitude of the BVP during rest (P) and that during problem-solving (Pt) were effective in differentiating between controls and the other two psychoneurotic groups. The variables P and Pt are of importance because they are expected to correspond to the levels of the PV during the control and experimental conditions, respectively, in Experiment 2. The lability score (L) as defined above seems to be ineffective

Table 6.2*

Mean Scores and Associated T Values for the Control and Neurotic Samples Across the 8 Variables

| | VARIABLE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | P | Pw | Pb | Pt | Rw | R | T | L |
| Controls | .00732 | .00686 | .00706 | .00668 | .1740 | .1362 | -.02 | 0.2 |
| Neurotics | .00425 | .00425 | .00363 | .00350 | .1280 | .1220 | -5.375 | 4.0 |
| t | 1.749 | 1.676 | 2.526 | 2.316 | 3.208 | 1.305 | 1.680 | 1.262 |
| p | n.s. | n.s. | .02 | .05 | .01 | n.s. | n.s. | n.s. |

* From Van Der Merwe, A. B., 1948, p. 350

Table 6.3*

Mean Scores and Associated T Values for the Control and Hysteric Samples Across the 8 Variables

| | VARIABLE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | P | Pw | Pb | Pt | Rw | R | T | L |
| Controls | .00732 | .00686 | .00706 | .00668 | .1740 | .1362 | -.020 | 0.200 |
| Hysterics | .01331 | .01338 | .01162 | .01077 | .4750 | .2810 | 12.385 | 5.923 |
| t | 3.887 | 4.608 | 3.772 | 3.141 | 5.172 | 7.806 | 4.228 | 2.112 |
| p | .001 | .001 | .001 | .01 | .001 | .001 | .001 | .05 |

* From Van Der Merwe, A. B., 1948, p. 351.

Table 6.4*

Mean Scores and Associated T Values for the Hysteric and Neurotic Samples Across the 8 Variables

| | P | Pw | Pb | Pt | Rw | R | T | L |
|---|---|---|---|---|---|---|---|---|
| Hysterics | .01331 | .01338 | .01162 | .01077 | .4750 | .2810 | 12.385 | 5.923 |
| Neurotics | .00425 | .00425 | .00363 | .00350 | .1280 | .1220 | -5.375 | 4.00 |
| t | 10.371 | 10.186 | 10.406 | 7.880 | 4.806 | 6.363 | 8.502 | .898 |
| p | .001 | .001 | .001 | .001 | .001 | .001 | .001 | n.s. |

Column group heading: VARIABLE

* From Van Der Merwe, A. B., 1948, p. 351

in differentiating between the three groups. In Experiment 2 an attempt will be made to find out whether the frequency of non-specific GSR responses is a more appropriate index of emotional lability. The data also suggests that it is not necessary to resort to the relatively more difficult task of recording and summing scores for the different variables to compute the emotional tension (T) score, because the magnitude of the P and Pt scores for neurotics and hysterics - in comparison with those for normals - are sufficient to differentiate between the three groups. Since the 8 variables mentioned above were useful in differentiating between normals and hysterics on one hand and between hysterics and neurotics on the other, the lack of a significant difference between neurotics and normals can not be attributed to faults in the procedure for recording and computing different scores. As Van Der Merwe suggested, the absence of a significant difference is more likely due to the fact that the distribution of scores for normals were skewed in the direction of vasoconstriction.

The discussion in the present chapter suggests that the transmitted mode of photoplethysmography is preferable to the reflected mode in terms of the ease of application and the magnitude of recorded BVP trace. The finger tip appears the most suitable recording site because in this area the vascular activity is primarily sympathetic and, accordingly, the processes underlying the observed data are easier to identify. A review of the literature has shown that the magnitude of the PV is an accurate index of the general level of autonomic arousal as well as the level of reactivity to extreme changes in temperature or to emotionally stressful stimuli. If it is accepted that hysteria and neurosis are the clinical counterparts of repression and sensitization, it seems likely that repressors and sensitizers differ from one another not so much in terms of susceptibility to stress, but rather in terms of the sign of change in the PV in response to a stressor. It seems that repressors and sensitizers are equally susceptible to stress. But in response to a noxious stimulus, repressors are likely to exhibit greater inhibition of the sympathetic nervous system than neutrals on the R-S dimension. The opposite pattern is suggested to be true of sensitizers.

# CHAPTER VII

# EXPERIMENT I

This experiment was designed to test the hypothesis that the R-S, F-I, SD and MA scales measure the same underlying personality dimension rather than different and independent traits. The underlying personality dimension was hypothesized to be that of repression-sensitization. The rational for the hypothesis was presented in detail in previous chapters allocated to the tests.

## METHOD

### Sample

The sample consisted of 33 males and 36 females solicited from an introductory psychology course. The mean age for each of the two sex groups was 20 years. The age range for the total sample was between 17 and 37 years. Detailed data and individual scores on each of the four scales are presented in Appendix B.

### Personality Scales

The R-S, F-I, SD and MA scales were combined into a single questionnaire. An attempt was made to preserve the sequence of items within each scale as outlined by the respective authors. Items that were common to two or more scales were retained. In view of the length of the scales when combined and the need to maintain the interest of the subjects throughout the testing session, filler items were excluded.

In order to simplify the analysis procedure, the scoring keys of the SD and F-I scales presented by Edwards (1957b) and

Ullman (1962), respectively, were reversed. Such a step was possible because none of the common items was scored differently by the original keys along the hypothesized common dimension - e.g. in the R-S and F-I scales, none of the common items is scored in the direction of sensitization in one scale and in that of inhibition in the other. Consequently, all significant intercorrelations should be positive. The means for the SD and F-I scales observed in this study should be subtracted from the total number of items in the respective scales - which are 39 and 43 items - before a comparison can be made with the results of other studies.

Procedure

In order to secure maximal co-operation from the subjects, participation in the experiment was optional; and no identification was required unless personal scores were requested by the subject. The subjects were tested in groups of ten to fifteen. The instructions were as stated on the first page of the questionnaire given in Appendix A. These same instructions were stated verbally, too. Most subjects completed the questionnaire within thirty minutes.

## RESULTS

The intercorrelations among the four scales are given in Table 7.1. The means for the R-S, F-I, SD and MA scales were 58.42, 16.71, 12.71 and 20.58, respectively. The corresponding standard deviations were 13.53, 6.80, 5.18 and 6.60, respectively.

Table 7.1

Intercorrelations Between the SD, MA, R-S and F-I Scales

(N = 69)

| | SD | MA | R-S | F-I |
|---|---|---|---|---|
| SD | -- | | | |
| MA | 0.85 | -- | | |
| R-S | 0.78 | 0.79 | -- | |
| F-I | 0.82 | 0.79 | 0.85 | -- |

The high correlations shown in Table 7.1 could lead to the immediate conclusion that the hypothesis has been substantiated. But the four combined scales included 55 items which were common to two or more scales. Therefore, a large proportion of the observed intercorrelations between the four scales could be spurious. Prior to the discussion of the methods used to investigate this possibility, consideration should be given to the effect of sex differences, and response discrepancy among the overlaping items. The latter variable is important because it reflects on the reliability of the observed data.

## Sex Differences

The intercorrelations among the four scales were computed for male and female subjects to test for the effect of sex differences. The data in Table 7.2 and Table 7.3 indicate that the correlation matrices for the two sex groups are similar; though, some of the elements in Table 7.3 are slightly larger in magnitude.

Table 7.2

Intercorrelations Between Four Scales for the Female Sample

(N = 36)

| | SD | MA | R-S | F-I |
|---|---|---|---|---|
| SD | -- | | | |
| MA | 0.84 | -- | | |
| R-S | 0.73 | 0.72 | -- | |
| F-I | 0.82 | 0.75 | 0.79 | -- |

Table 7.3

Intercorrelations Among Four Scales for the Male Sample

(N = 33)

| | SD | MA | R-S | F-I |
|---|---|---|---|---|
| SD | -- | | | |
| MA | 0.85 | -- | | |
| R-S | 0.83 | 0.86 | -- | |
| F-I | 0.82 | 0.82 | 0.89 | -- |

The Hotelling $T^2$ statistic (Morrison, 1967) was computed to test for differences between the two sex groups on the four scales. The covariance matrices for the two groups were pooled together on the basis of their similarity and the relatively large sample size. The data involved in obtaining the value of $T^2$ and the corresponding F ratio are summarized in Table 7.4.

Table 7.4

Components of $T^2$ Computed to Test for Differences Between the Two Sex Groups on the SD, MA, R-S and F-I Scales

| | Males | | Females | |
|---|---|---|---|---|
| Sample Size | 33 | | 36 | |
| Mean Vector | 12.0303, 19.9091, 58.0909, 16.2121 | | 13.3333, 21.1944, 58.7222, 17.1667 | |
| Pooled Covariance Matrix | 27.2384 | 29.4143 | 56.3320 | 29.2954 |
| | 29.4143 | 44.4831 | 72.9286 | 36.1413 |
| | 56.3320 | 72.9286 | 188.5067 | 80.6423 |
| | 29.2954 | 36.1413 | 80.6423 | 47.4405 |
| $T^2$ | 2.1910 | | | |
| F | 0.5232 (df = 4, 64; $p > 0.05$) | | | |

The value of the F statistic was below that of 2.53 required at the 0.05 level for rejection of the null hypothesis of no difference between the population means. The two sex groups were considered to come from populations with a common mean vector. The absence of a significant difference between the two sex groups should be expected because the scales were constructed with the intention to eliminate the effect of sex differencies.

Response Discrepancy Among Overlaping Items

In order to find out the extent to which the overlaping items were endorsed differentially across the scales to which they were common, the four scales were divided into 14 common and 4 unique subscales. For each subject, the discrepancy (Disc) score was computed by considering the first response to an item as the 'correct' one, and each time the same item was answered differently in each of the subsequent scales the subject was given a score of one point. For example, if an item common to the MA, R-S and F-I scales was endorsed as 'T', 'F' and 'F', respectively, then the Disc score for this particular item was two. The total Disc score for a subject was the sum of the Disc scores for all of the 55 overlaping items. The method for computing Disc scores, as well as the decision to present scales with fewer items first, were based on the assumption that the first response to an item was the accurate one, and a diviation from this response in the subsequent scales was due to extraneous factors such as fatigue, loss of interest, delayed cognition, etc. The term 'delayed cognition' refers to the situation where a subject endorses an item as applicable to himself the first time he comes across it while working fast through the questionnaire, but shortly afterwards he recognizes the social undesirability of its content and reverses his previous response the second time he comes across the same item at a later stage in the questionnaire.

The number of items common to 4, 3 and 2 scales are 3, 16 and 36, respectively. If 'k' denotes the number of scales to which a set of common items belong, and '$n_k$' the number of items in this set, then the maximum Disc score obtainable by any one subject is equal to 77, as shown in equation 7.1.

$$Disc_{max} = \sum_{k=2}^{4} (k-1)\, n_k \qquad (7.1)$$

Assuming that multiple responses are binomially distributed with $p = \frac{1}{2}$ and are independent of one another, then the expected Disc score obtainable by chance on the 55 common items is equal to 38.5. The data in Appendix B show that the maximum observed Disc score was 25 which is below the expected score at the 0.002 level of significance. It could be argued that the assumption of independence of responses to overlaping items conflicts with the concept of delayed cognition as previously defined. Although the problem is recognized, it is not relevant in the present context because if delayed cognition was an effective variable, the maximum observed Disc score would have been in excess of the expected score of 38.5. Only if the latter condition was true, would the assumption of independence of responses on the overlaping items would have to be reconsidered. However, given the observed data, all first responses were considered as typical and the overlaping items were deleted in Experiment 2.

Item-Overlap and Spurious Correlations

Five techniques were tried to test for the presence of spurious correlations due to item-overlap. The techniques, presented in the order in which they are treated, were: a. exclusion of common items; b. random distribution of the common items among the four scales; c. random distribution of the weighted common items among the four scales; d. the increase of sample heterogeniety; e. the use of principal component analysis.

a. Exclusion of Common Items

The scores of the total sample on the four scales were divided into 10 common and 4 unique subscales to find out to what extent the intercorrelations between the unique subscales are affected by the exclusion of common items. The correlation matrix for the 14 subscales and the 4 complete scales is given in Table 7.5, and their means and standard deviations are shown in Table 7.6.

The highest correlations were between the unique subscales and the corresponding complete ones. It is worth noting that the SD and MA scales correlated slightly higher with the F-I scale than with the R-S scale. The latter trend, which was persistant throughout the analysis, could be due to that the F-I scale is a more valid measure of the repression-sensitization dimension. Whether this is the case will become apparent when the R-S and F-I scores are compared with the data for the

Table 7.5

Correlation Matrix for the SD, MA, F-I and R-S Scales, and Their Common and Unique Subscales*

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| ALL | 1 | 1.00 | | | | | | |
| DMR | 2 | .56 | 1.00 | | | | | |
| MRI | 3 | .59 | .47 | 1.00 | | | | |
| DRI | 4 | .15 | .23 | .04 | 1.00 | | | |
| DMI | 5 | .05 | .19 | .12 | -.05 | 1.00 | | |
| MSRS | 6 | .44 | .41 | .42 | .19 | .07 | 1.00 | |
| DSRS | 7 | .20 | .29 | .30 | .14 | .17 | .12 | 1.00 |
| RSIF | 8 | .55 | .54 | .48 | .26 | .13 | .45 | .43 |
| DSMS | 9 | .38 | .33 | .37 | -.03 | .07 | .23 | .13 |
| MSIF | 10 | .19 | .21 | .04 | .14 | .03 | .19 | .08 |
| DSU | 11 | .40 | .40 | .21 | .08 | .15 | .20 | .20 |
| MSU | 12 | .19 | .31 | .09 | .10 | .15 | .38 | .12 |
| RSU | 13 | .35 | .31 | .41 | .17 | .21 | .34 | .52 |
| IFU | 14 | .56 | .56 | .41 | .24 | .34 | .40 | .29 |
| SD | 15 | .70 | .86 | .55 | .26 | .28 | .43 | .49 |
| MS | 16 | .69 | .80 | .63 | .19 | .24 | .73 | .29 |
| RS | 17 | .60 | .62 | .60 | .27 | .21 | .57 | .56 |
| FI | 18 | .72 | .65 | .62 | .31 | .30 | .51 | .41 |

| | | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|
| ALL | 1 | | | | | | | |
| DMR | 2 | | | | | | | |
| MRI | 3 | | | | | | | |
| DRI | 4 | | | | | | | |
| DMI | 5 | | | | | | | |
| MSRS | 6 | | | | | | | |
| DSRS | 7 | | | | | | | |
| RSIF | 8 | 1.00 | | | | | | |
| DSMS | 9 | .39 | 1.00 | | | | | |
| MSIF | 10 | .17 | .19 | 1.00 | | | | |
| DSU | 11 | .38 | .22 | .16 | 1.00 | | | |
| MSU | 12 | .39 | .21 | .17 | .26 | 1.00 | | |
| RSU | 13 | .72 | .41 | .05 | .32 | .37 | 1.00 | |
| IFU | 14 | .65 | .32 | .22 | .52 | .28 | .44 | 1.00 |
| SD | 15 | .68 | .55 | .26 | .67 | .35 | .54 | .70 |
| MS | 16 | .68 | .55 | .29 | .42 | .60 | .52 | .63 |
| RS | 17 | .87 | .46 | .15 | .41 | .42 | .90 | .63 |
| FI | 18 | .88 | .42 | .26 | .50 | .35 | .63 | .89 |

(Table continued on next page)

Table 7.5 continued

| | | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|
| ALL | 1 | | | | |
| DMR | 2 | | | | |
| MRI | 3 | | | | |
| DRI | 4 | | | | |
| DMI | 5 | | | | |
| MSRS | 6 | | | | |
| DSRS | 7 | | | | |
| RSIF | 8 | | | | |
| DSMS | 9 | | | | |
| MSIF | 10 | | | | |
| DSU | 11 | | | | |
| MSU | 12 | | | | |
| RSU | 13 | | | | |
| IFU | 14 | | | | |
| SD | 15 | 1.00 | | | |
| MS | 16 | .85 | 1.00 | | |
| RS | 17 | .78 | .79 | 1.00 | |
| FI | 18 | .82 | .79 | .85 | 1.00 |

* Variables:

ALL: Items common to SD, MA, R-S and F-I scales
DMR: Items common to SD, MA and R-S scales
MRI: Items common to MA, R-S and F-I scales
DRI: Items common to SD, R-S and F-I scales
DMI: Items common to SD, MS and F-I scales
MSRS: Items common to MA and R-S scales
DSRS: Items common to SD and R-S scales
RSIF: Items common to R-S and F-I scales
DSMS: Items common to SD and MA scales
MSIF: Items common to MA and F-I scales
DSU: Items unique to SD scale
MSU: Items unique to MA scale
RSU: Items unique to R-S scale
IFU: Items unique to F-I scale

Table 7.6

Means and Standard Deviations for the SD, MA, R-S and F-I Scales, and Their Common and Unique Subscales

| Variable | | Mean | Standard Deviation |
|---|---|---|---|
| ALL | 1 | 1.43 | .92 |
| DMR | 2 | 4.19 | 2.39 |
| MRI | 3 | 1.71 | .98 |
| DRI | 4 | .61 | .49 |
| DMI | 5 | .45 | .50 |
| MSRS | 6 | 6.62 | 1.99 |
| DSRS | 7 | 1.74 | 1.06 |
| RSIF | 8 | 4.58 | 2.86 |
| DSMS | 9 | 1.62 | 1.18 |
| MSIF | 10 | .09 | .28 |
| DSU | 11 | 2.67 | 1.58 |
| MSU | 12 | 4.46 | 1.85 |
| RSU | 13 | 37.54 | 7.29 |
| IFU | 14 | 7.84 | 2.96 |
| SD | 15 | 12.71 | 5.18 |
| MS | 16 | 20.58 | 6.60 |
| RS | 17 | 58.42 | 13.53 |
| FI | 18 | 16.71 | 6.80 |

physiological variables observed in Experiment 2.

The main issue raised by the data in Table 7.5 was the magnitude of the intercorrelations among the unique subscales which was considerably less than that for the complete scales. Such an observation suggests that each of the complete scales is multidimensional, in which case the exclusion of the common items would obliterate the basic of the common variance for the 4 complete scales. The multidimensionality of the complete scales could imply that the unique subscales measure independent traits, and this would negate the hypothesis that the specific variances of the complete scales are negligible. The multidimensionality of the original scales was tested for by computing their indices of internal consistancy.

Cronbach formula 2 (Cronbach, 1951) was used to compute $\alpha$, the index of internal consistancy. The magnitude of $\alpha$ is given by the following equation,

$$\alpha = \frac{n}{n-1} \left( 1 - \frac{\sum V_i}{V_t} \right) \qquad (7.2)$$

where 'n' is the number of test items, '$V_i$' the item variance and '$V_t$' the test variance. The concept of internal consistancy as used in this context refers to the extent to which an individual's score on the scale is representative of his estimated score on the population of items associated with the personality dimension which the scale is supposed to measure. It follows that the magnitude of $\alpha$ is an increasing function of the number of scale items measuring the personality characteristic in concern. To obtain a measure of internal consistancy which is independent of scale-length, the statistic $\bar{r}$ (Cronbach, 1951) was computed. The values of $\alpha$ and $\bar{r}$ associated with the 4 complete scales and the 14 subscales are given in Table 7.7.

Table 7.7

The Magnitudes of Both $\alpha$ and $\bar{r}$, Number of Items, Means and Standard Deviations for the 14 Subscales and 4 Complete Scales

| Variable | $\alpha$ | $\bar{r}$ | Number of Items | Mean | Standard Deviation |
|---|---|---|---|---|---|
| ALL | 0.27 | 0.11 | 3 | 1.43 | 0.92 |
| SD / MS / RS | 0.63 | 0.14 | 11 | 4.19 | 2.39 |
| MS / RS / FI | 0.38 | 0.17 | 3 | 1.71 | 0.98 |
| SD / RS / FI | -- | -- | 1 | 0.61 | 0.49 |
| SD / MS / FI | -- | -- | 1 | 0.45 | 0.50 |
| MS / RS | 0.36 | 0.04 | 12 | 6.62 | 1.99 |
| SD / RS | 0.19 | 0.06 | 4 | 1.74 | 1.06 |
| RS / FI | 0.74 | 0.18 | 13 | 4.58 | 2.86 |
| SD / MS | 0.22 | 0.04 | 6 | 1.62 | 1.18 |
| MS / FI | -- | -- | 1 | 0.09 | 0.28 |
| DSU | 0.31 | 0.03 | 13 | 2.67 | 1.58 |
| MSU | 0.32 | 0.03 | 13 | 4.46 | 1.85 |
| RSU | 0.71 | 0.03 | 80 | 37.54 | 7.29 |
| FIU | 0.55 | 0.06 | 21 | 7.84 | 2.96 |
| DS | 0.74 | 0.07 | 39 | 12.71 | 5.18 |
| MS | 0.78 | 0.07 | 50 | 20.58 | 6.60 |
| RS | 0.86 | 0.05 | 127 | 58.42 | 13.53 |
| FI | 0.83 | 0.10 | 43 | 16.71 | 6.80 |

The above data indicates that the complete scales are internally consistant. It should be noted that while the R-S scale has about three times as many items as the F-I scale, the magnitude of its $\alpha$ is only slightly higher than that for the latter scale.

If both the intercorrelations between the unique subscales and the internal consistancies of the complete scales were low, then it would have been permissable to attribute the high intercorrelations between the complete scales to the presence of overlaping items, and to counteract the effect of these items by using the scores on the unique subscales only in the remainder of the analysis. However, since the complete scales are internally consistant, the method of excluding common items is inappropriate because the resulting unique subscales no longer adequately represent the domain of the characteristics associated with the personality dimensions they are supposed to measure.

b. Random Distribution of Common Items

It was possible that the exclusion of common items deleted certain marker items from the scales and, consequently, contributed to low interdependence among the unique parts. Such a possibility was partly justified by the fact that subscales 1, 2 and 8 correlated relatively high with the complete scales. The presence of marker items need not be ruled out off hand on grounds of the observed indices of internal consistancy for the complete scales. The fact that $\alpha$ is large in magnitude indicates that the scale items do represent a common domain of behavioral characteristics; but it does not necessarily follow that all items are equally effective for that purpose. To preserve the effect of marker items, should there be any, and simultaneously reduce interference with the content of the scales to some extent, the common items were distributed among the four unique subscales. The distribution was not random in the strict sense because an attempt was made to divide the items in each subscale equally among the scales to which they belonged. The assignment of the overlaping items is given in Appendix C. The correlation matrix for the four modefied scales is shown in Table 7.8, and the corresponding means and standard deviations in Table 7.9.

Table 7.8

Correlation Matrix for the SD, MAS, R-S and F-I Scales Modified Through the Random Distribution of Common Items

(N = 69)

| | SD | MAS | R-S | F-I |
|---|---|---|---|---|
| SD | -- | | | |
| MAS | 0.53 | -- | | |
| R-S | .52 | .53 | -- | |
| F-I | .62 | .70 | .64 | -- |

Table 7.9

Means and Standard Deviations for the SD, MAS, R-S, and F-I Scales Modified Through the Random Distribution of Common Items

(N = 69)

| SCALE | SD | MAS | R-S | F-I |
|---|---|---|---|---|
| Mean | 6.49 | 11.06 | 47.01 | 10.10 |
| SD | 3.03 | 3.94 | 9.77 | 4.81 |

The intercorrelations among the modified scales were higher than those for the unique subscales, but they were considerably below those for the complete scales. The persistent difference in magnitude between the two sets of correlations could be due to either the presence of 'real' spurious correlations which were eliminated by the random distribution of common items - and in this case the problem would have been resolved - or the possibility that the division of the marker (or common) items reduce the power of each scale to measure the underlying common personality dimension. It is logical to assume that items common to two or more scales are more important than those unique to a single scale in the detection of the underlying common variable. In order to preserve the power of the scales as much as possible, the alternative method of random distribution of weighted common items was adopted.

c. <u>Random Distribution of Weighted Common Items</u>

In the present technique the distribution of common items remained the same as that given in Appendix C, except that each common item was given a weight of 1, 2, 3 or 4 depending on whether it was peculiar to one, two, three or four scales, respectively. The observed correlation matrix is given in Table 7.10 and the corresponding means and standard deviations in Table 7.11.

Table 7.10

Correlation Matrix for the SD, MAS, R-S, and F-I Scales Modified Through the Random Distribution of Weighted Common Items

(N = 69)

| SCALE | SD | MAS | R-S | F-I |
|---|---|---|---|---|
| SD | -- | | | |
| MAS | .59 | -- | | |
| R-S | .54 | .52 | -- | |
| F-I | .65 | .71 | .60 | -- |

The overall change in the correlation matrix given in Table 7.10 from that in Table 7.8 is negligible. In this respect, Guilford (1954, p. 443) observed that the effectiveness of weights in changing intercorrelations is directly

Table 7.11

Means and Standard Deviations for the SD, MAS, R-S and F-I Scales Modified Through the Random Distribution of Weighed Common Items

(N = 69)

| SCALE | SD | MAS | R-S | F-I |
|---|---|---|---|---|
| Mean | 12.97 | 19.58 | 58.74 | 14.25 |
| SD | 6.40 | 7.37 | 13.42 | 7.38 |

related to the ratio of the range of weights to their mean, and indirectly proportional to the number of items in the tests and the homogeneity of the scales. Differential weighting is ineffective in altering intercorrelations between scales which exceed 20 items each and have relatively high internal consistancy. Considering the ratio of the range of weights adopted to their mean, the length of the scales obtained through random distribution of common items, and the homogeneity of the original scales, the ineffectiveness of weighting should have been expected.

d. The Increase of Sample Heterogeneity

The common variance of a battery of tests is a function of the individual test variances which are in turn sensitive to the length of the tests and sample heterogeneity. The low intercorrelations between the unique scales could be due to the homogeneity of the sample in Experiment 1 rather than to the absence of marker items, elimination of spurious correlations, or the distortion of the correspondence between the total test score and the estimated score for the domain of the characteristics of the relevant personality dimension. To a certain extent the increase in sample herogeneity could compensate for the reduction in test variance due to the exclusion of some items.

In order to increase sample heterogeneity, additional data was transposed from the MMPI sheets of fifty patients at Riverview Hospital. The scores for the R-S, F-I, SD and MA scales and other information relevant to this sample are given in Appendix D. The correlation matrix for the new heterogeneous sample (i.e. the combined student and psychiatric samples) is given in Table 7.12, and the corresponding means and standard deviations are shown in Table 7.13. Due to the possibility that the data for the psychiatric sample may alter intercorrelations among the subscales, all 14 subscales and 4 complete scales are presented.

The data shown indicates that the test scores of the 50 psychiatric patients did not significantly alter the correlations presented in Table 7.5. Sample homogeniety was, therefore, discarded as a factor contributing to the low intercorrelations among the unique subscales.

e. Principal Component Analysis[1]

The results obtained by the four techniques previously discussed indicate that low intercorrelations among the unique

[1] The technique was suggested by Dr. R. Koopman.

Table 7.12

Correlation Matrix for the SD, MA, R-S and F-I Scales and Their Common and Unique Subscales for the Combined Sample of 69 University Students and 50 Psychiatric Patients

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| ALL | 1 | 1.00 | | | | | | |
| DMR | 2 | .47 | 1.00 | | | | | |
| MRI | 3 | .63 | .37 | 1.00 | | | | |
| DRI | 4 | .22 | .22 | .09 | 1.00 | | | |
| DMI | 5 | .25 | .25 | .31 | -.04 | 1.00 | | |
| MSRS | 6 | .44 | .47 | .47 | .23 | .25 | 1.00 | |
| DSRS | 7 | .31 | .34 | .42 | .13 | .34 | .27 | 1.00 |
| RSIF | 8 | .55 | .55 | .49 | .36 | .27 | .57 | .51 |
| DSMS | 9 | .33 | .31 | .34 | -.05 | .29 | .37 | .24 |
| MSIF | 10 | .17 | .20 | .07 | .12 | .09 | .12 | .11 |
| DSU | 11 | .20 | .38 | .06 | .07 | .10 | .14 | .19 |
| MSU | 12 | .26 | .34 | .20 | .06 | .23 | .41 | .30 |
| RSU | 13 | .48 | .41 | .48 | .30 | .30 | .49 | .57 |
| IFU | 14 | .52 | .49 | .38 | .31 | .30 | .41 | .33 |
| SD | 15 | .64 | .83 | .51 | .26 | .43 | .52 | .59 |
| MS | 16 | .67 | .76 | .64 | .19 | .43 | .79 | .45 |
| RS | 17 | .63 | .62 | .61 | .36 | .35 | .67 | .62 |
| FI | 18 | .72 | .59 | .63 | .39 | .39 | .58 | .50 |

(Table continued on next page)

Table 7.12 continued

| | | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|
| ALL | 1 | | | | | | | |
| DMR | 2 | | | | | | | |
| MRI | 3 | | | | | | | |
| DRI | 4 | | | | | | | |
| DMI | 5 | | | | | | | |
| MSRS | 6 | | | | | | | |
| DSRS | 7 | | | | | | | |
| RSIF | 8 | 1.00 | | | | | | |
| DSMS | 9 | .34 | 1.00 | | | | | |
| MSIF | 10 | .20 | .04 | 1.00 | | | | |
| DSU | 11 | .27 | .10 | .25 | 1.00 | | | |
| MSU | 12 | .38 | .22 | .20 | .33 | 1.00 | | |
| RSU | 13 | .77 | .26 | .10 | .28 | .39 | 1.00 | |
| IFU | 14 | .68 | .24 | .16 | .32 | .28 | .54 | 1.00 |
| SD | 15 | .68 | .55 | .25 | .61 | .45 | .60 | .60 |
| MS | 16 | .70 | .58 | .25 | .33 | .64 | .60 | .56 |
| RS | 17 | .89 | .36 | .17 | .31 | .44 | .93 | .65 |
| FI | 18 | .90 | .36 | .24 | .31 | .37 | .73 | .88 |

| | | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|
| ALL | 1 | | | | |
| DMR | 2 | | | | |
| MRI | 3 | | | | |
| DRI | 4 | | | | |
| DMI | 5 | | | | |
| MSRS | 6 | | | | |
| DSRS | 7 | | | | |
| RSIF | 8 | | | | |
| DSMS | 9 | | | | |
| MSIF | 10 | | | | |
| DSU | 11 | | | | |
| MSU | 12 | | | | |
| RSU | 13 | | | | |
| IFU | 14 | | | | |
| SD | 15 | 1.00 | | | |
| MS | 16 | .85 | 1.00 | | |
| RS | 17 | .78 | .80 | 1.00 | |
| FI | 18 | .76 | .76 | .87 | 1.00 |

Table 7.13

Means and Standard Deviations for the SD, MA, R-S and F-I Scales and Their Common and Unique Subscales for the Combined Sample of 69 University Students and 50 Psychiatric Patients

| Variable | | Mean | Standard Deviation |
|---|---|---|---|
| ALL | 1 | 1.55 | .96 |
| DMR | 2 | 4.53 | 2.15 |
| MRI | 3 | 1.81 | 1.04 |
| DRI | 4 | .55 | .50 |
| DMI | 5 | .57 | .49 |
| MSRS | 6 | 6.91 | 2.16 |
| DSRS | 7 | 1.92 | 1.15 |
| RSIF | 8 | 4.66 | 2.92 |
| DSMS | 9 | 2.02 | 1.23 |
| MSIF | 10 | .12 | .32 |
| DSU | 11 | 3.26 | 1.69 |
| MSU | 12 | 4.88 | 1.92 |
| RSU | 13 | 37.78 | 8.33 |
| IFU | 14 | 7.74 | 3.00 |
| DS | 15 | 14.39 | 5.15 |
| MS | 16 | 22.38 | 6.92 |
| RS | 17 | 59.71 | 15.27 |
| IF | 18 | 17.00 | 7.08 |

subscales were likely due to the interferance with the content of the scales which consequently reduced their variances and obscured the presence of any common variance that might have existed. There was a need to adopt a method which would test for the presence of common variance while preventing the interference of spurious correlations, and without altering the variances of the original scales. The outline of the technique used is as follows:

a. Principal component analysis was performed on the correlation matrix for the 10 common and 4 unique subscales. Fourteen factors were extracted.

b. For each subscale, the normalized loadings on the 14 factors were multiplied by the corresponding standard deviations to obtain the total variance of each subscale accounted for by each factor.

c. To obtain the loadings of each complete scale on each of the 14 factors, the denormalized loadings of the subscales associated with the complete scales were added across the 14 subscales. This procedure resulted in a 4 by 14 matrix of denormalized factor loadings for the 4 complete scales on the 14 factors.

d. The loadings obtained in 'c' for each complete scale were divided by the square root of the sum of squares for that scale to renormalize the loadings and permit factor comparison.

Component factor analysis was adopted in preference to the common factor model because the main interest was to extract the factors accounting for the total variance observed rather than the common or unique variance, each of which depends on the estimated communalities.

The factor loadings and eigenvalues computed for the common and unique subscales are shown in Table 7.14.

Certain aspects of Table 7.14 should be considered prior to the discussion of the subsequent steps in the technique.

The decision regarding the number of factors to retain usually depends on the proportion of the total variance accounted for by each factor (i.e. its sum of squares) as well as by the extent of its internal consistancy. The internal consistancy of a factor, which reflects the amount of its error variance, is an important criterion for purposes of replication and prediction. To satisfy these two criteria, it is usual to retain only those factors whose eigenvalues exceed unity - in the present case these are the first four factors. But it is apparent that the magnitudes of the eigenvalues show a relatively sharp decrease after the first factor and level off from then onward. Although the second, third and fourth factors have eigenvalues exceeding unity, they are unlikely to be as important as the first factor. The scree test (Cattell, 1966) was performed to compare the importance of the extracted 14 factors. Each factor was plotted against its eigenvalue, as shown in Fig. 7.1.

The slope of the curve in Fig. 7.1 indicates not only that

Table 7.14

Eigenvalues and Loadings for Unrotated Principal Components Extracted for 14 Common and Unique Subscales

| | | 5.0068 | 1.2293 | 1.1651 | 1.0935 | .9744 | .8876 |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| ALL | 1 | .7332 | -.1966 | -.3698 | -.0170 | -.2020 | -.0421 |
| DMR | 2 | .7368 | -.1703 | -.0561 | -.0767 | -.2082 | -.0879 |
| MRI | 3 | .6515 | .1285 | -.5189 | .0893 | -.1018 | -.1087 |
| DRI | 4 | .2773 | -.3699 | .4217 | .5872 | -.2665 | -.0775 |
| DMI | 5 | .2726 | .4394 | .3685 | -.5190 | -.2245 | -.2011 |
| MSRS | 6 | .6064 | -.3058 | -.0767 | .0654 | .2348 | -.4124 |
| DSRS | 7 | .4860 | .4966 | .1995 | .3618 | -.0865 | .3186 |
| RSIF | 8 | .8450 | .0922 | .0485 | .1924 | .0990 | .0223 |
| DSMS | 9 | .5294 | .0220 | -.3541 | -.1870 | .3547 | .3545 |
| MSIF | 10 | .2863 | -.5367 | .2421 | -.2088 | .0373 | .5799 |
| DSU | 11 | .5622 | -.0440 | .1481 | -.3227 | -.2414 | .1038 |
| MSU | 12 | .4747 | -.1323 | .4074 | -.1623 | .5791 | -.2519 |
| RSU | 13 | .7128 | .3974 | .1232 | .2320 | .2894 | .0943 |
| IFU | 14 | .7881 | -.0239 | .1245 | -.1735 | -.2854 | -.0515 |

| | | .8012 | .6716 | .5408 | .4340 | .3935 | .3287 |
|---|---|---|---|---|---|---|---|
| | | 7 | 8 | 9 | 10 | 11 | 12 |
| ALL | 1 | -.0567 | -.0480 | -.0105 | -.2103 | .1691 | .3634 |
| DMR | 2 | .0306 | -.0486 | .5061 | .0293 | -.2239 | -.1680 |
| MRI | 3 | .2230 | -.1093 | .0132 | .0416 | .3266 | -.2380 |
| DRI | 4 | .0497 | .3846 | .0383 | .1247 | .1640 | .0119 |
| DMI | 5 | .4146 | .1851 | -.0236 | .0441 | .0985 | .0391 |
| MSRS | 6 | .2323 | -.1962 | -.2685 | .3091 | -.1917 | .0677 |
| DSRS | 7 | .0986 | -.3448 | .1609 | .1640 | -.0511 | .2051 |
| RSIF | 8 | -.0804 | .0407 | -.1101 | -.2844 | -.1426 | -.1397 |
| DSMS | 9 | .0148 | .4824 | .1029 | .2100 | -.0599 | .0999 |
| MSIF | 10 | .3533 | -.1914 | -.1099 | -.0609 | .0698 | -.0813 |
| DSU | 11 | -.5954 | -.1155 | -.1264 | .2765 | .1246 | -.0783 |
| MSU | 12 | -.1287 | -.1042 | .2556 | -.1035 | .2031 | .0682 |
| RSU | 13 | -.0607 | .0886 | -.2057 | -.0468 | .0415 | -.1174 |
| IFU | 14 | -.0556 | .1116 | -.1611 | -.1708 | -.2118 | .0526 |

(Table continued on next page)

Table 7.14 continued

| | | .2923 | .1810 |
|---|---|---|---|
| | | 13 | 14 |
| ALL | 1 | -.1825 | -.0180 |
| DMR | 2 | -.1529 | -.0775 |
| MRI | 3 | .1808 | .0050 |
| DRI | 4 | .0138 | .0172 |
| DMI | 5 | -.1088 | .0700 |
| MSRS | 6 | -.0396 | .0213 |
| DSRS | 7 | .0982 | .0418 |
| RSIF | 8 | -.0524 | .2899 |
| DSMS | 9 | .0637 | .0466 |
| MSIF | 10 | -.0302 | -.0185 |
| DSU | 11 | -.0435 | .0548 |
| MSU | 12 | .1293 | -.0048 |
| RSU | 13 | -.2082 | -.2398 |
| IFU | 14 | .3318 | -.1421 |

the first factor is more important than the subsequent three factors, but that actually it is the only one which should be retained.

For unrotated principal components, the index of internal consistancy is given by the following equation,

$$\alpha_k = \left( \frac{n}{n-1} \right) \left(1 - \frac{1}{d_k^2}\right) \qquad (7.3)$$

where 'k' is the factor number, '$d_k^2$' its eigenvalue, and 'n' the number of variables. The indices of internal consistancy for the first four factors were 0.86, 0.20, 0.15 and 0.09, respectively. Only the first factor had a relatively high internal consistancy, while the indices of the other three factors approximated zero. The trend of these data further

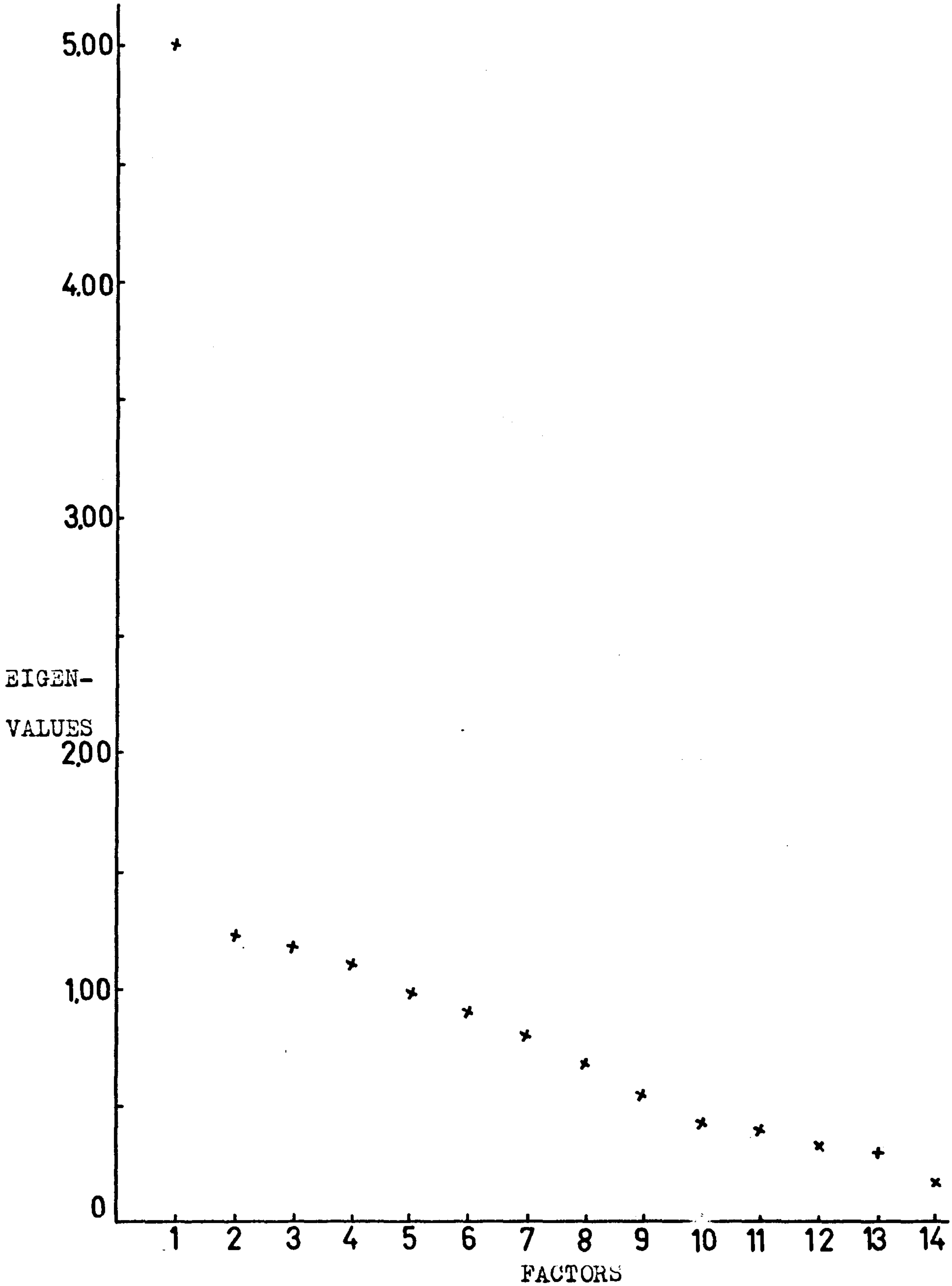


Fig. 7.1 Eigenvalues for 14 principal component factors.

support the decision that only the first factor should be retained.

In step (b) the elements in each row in Table 7.14 were multiplied by the corresponding standard deviation to denormalize the factor loadings, and added across variables to obtain the loadings of the complete scales on the 14 factors. The results are given in Table 7.15.

In order to facilitate factor comparison, the elements of each row in Table 7.15 were divided by the square root of the respective sum of squares. The normalized factor loadings for the complete scales are given in Table 7.16.

The data in Table 7.16 are in line with the previous contention that one factor is sufficient to account for the observed variance. The data further support the hypothesis that the R-S, F-I, SD and MA scales share a common underlying personality dimension, and that their high intercorrelations are not due to spurious correlations to any important extent.

Results similar to the ones reported above were obtained when the factor analytic technique was applied to the data for the psychiatric sample and to the combined data for the psychiatric group and university students.

Table 7.15

Principal Component Loadings for 4 Complete Scales on 14 Unrotated Factors

(N = 69)

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| SD | 4.7315 | -0.0676 | -0.0650 | -0.5166 | -0.9782 | 0.5330 |
| MS | 6.0036 | -1.2236 | -0.5481 | -0.8195 | 1.0763 | -1.1622 |
| RS | 12.5417 | 2.4339 | 0.3120 | 2.9295 | 1.8559 | -0.1266 |
| FI | 6.4149 | 0.0235 | 0.1096 | 0.0770 | -1.0802 | -0.2087 |

| | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| SD | -0.5653 | 0.1421 | 1.2970 | 0.8155 | -0.1772 | 0.1721 |
| MS | 0.7867 | -0.2439 | 1.2278 | 0.5933 | -0.0655 | 0.0780 |
| RS | 0.1586 | -0.0736 | -0.9499 | -0.3866 | -0.5187 | -1.1949 |
| FI | 0.1018 | 0.5212 | -0.8124 | -1.4061 | -0.4096 | -0.1381 |

| | 13 | 14 |
|---|---|---|
| SD | -0.4702 | 0.0273 |
| MS | -0.1829 | -0.0784 |
| RS | -1.9920 | -1.0217 |
| FI | 0.7855 | 0.4334 |

Table 7.16

Normalized Principal Component Loadings for 4 Complete Scales on 14 Unrotated Factors

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| SD | 0.9127 | -0.0130 | -0.0125 | -0.0997 | -0.1887 | 0.1028 |
| MS | 0.9091 | -0.1853 | -0.0830 | -0.1241 | 0.1630 | -0.1760 |
| RS | 0.9267 | 0.1798 | 0.0231 | 0.2165 | 0.1371 | -0.0094 |
| FI | 0.9429 | 0.0035 | 0.0161 | 0.0113 | -0.1588 | -0.0307 |

| | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| SD | -0.1091 | 0.0274 | 0.2502 | 0.1573 | -0.0342 | 0.0332 |
| MS | 0.1191 | -0.0369 | 0.1859 | 0.0898 | -0.0099 | 0.0118 |
| RS | 0.0117 | -0.0054 | -0.0702 | -0.0286 | -0.0383 | -0.0883 |
| FI | 0.0150 | 0.0766 | -0.1194 | -0.2067 | -0.0602 | -0.0203 |

| | 13 | 14 |
|---|---|---|
| SD | -0.0907 | 0.0053 |
| MS | -0.0277 | -0.0119 |
| RS | -0.1472 | -0.0755 |
| FI | 0.1155 | 0.0637 |

# CHAPTER VIII

## EXPERIMENT II

In Experiment I it was established that most of the variance of the R-S, F-I, SD and MA scales could be accounted for by a single underlying factor. It should be noted that although each of the above mentioned scales has its unique variance, the combined unique components for these scales accounted for only 15 per cent of the total variance. It was, therefore, decided to limit the focus in the present experiment to the investigation of the behavioral correlates of the above mentioned underlying factor to find out whether it corresponds to the personality dimension of repression-sensitization. Specifically, the present experiment seeks to examine the nature of this factor by investigating two hypotheses in the following order:

1. The presentation of a stressful stimulus will result in changes in both verbally reported anxiety and the physiological indices of arousal.
2. Discrepancies between the changes in the verbal and physiological indices will correlate better with the F-I scale than with any of the R-S, SD and MA scales. This correlation is expected to be negative when the discrepancy score is computed as the physiological response minus the verbal response, after the scores for the two variables have been standardized.

The rational for the above hypotheses is that sensitizers will verbally overstate the magnitude of their physiological reaction between their verbal and physiological indices of anxiety. The magnitude of the discrepancy between the verbal and physiological responses is expected to be minimal for individuals with an average score on the F-I scale.

## METHOD

### Personality Variables

The personality traits scored in the present experiment were those measured by the R-S, F-I, SD and MA scales. These scales were combined together in the same order as in Experiment 1. Because in the first experiment the subjects were highly consistant in their responses to the overlapping items, it was decided to shorten the testing session in the present experiment by deleting items common to two or more scales following the initial presentation. For example, since the SD scale preceeded the MA scale, an item which was common to both scales appeared only once in conjunction with the SD items and it was deleted from the set of MA items. This procedure made it possible to reduce the total number of items in the four scales to 182 items. The order in which these items were presented and the instructions associated with them are shown in Appendix E. As was the case in Experiment 1, the scoring keys for the SD and F-I scales were reversed so that high scores represented a low tendency to give socially desirable responses and sensitization, respectively.

The subjects also responded to the "General" and "Today" forms of the Multiple Affect Adjective Check List (MAACL) constructed by Zuckerman and Lubin (1965). The check list consisted of 132 adjectives designed to evaluate the affective states of anxiety, hostility and depression. To control for the effect of the checking-response set, for each of the three scales in the check list, some items received a score of one when endorsed while others received the same score when left blank. The total of 132 adjectives also included 43 buffer items. Table 8.1 shows, for each scale, the number of items associated with it as well as the number of items which were scored when endorsed and when left blank.

Table 8.1

Number of Keyed Items in Each Scale and Number of Buffer Items in the MAACL

| Scale | No. of Items Scored if Checked | No. of Items Scored if Blank | Total no. of Items |
|---|---|---|---|
| Anxiety | 11 | 10 | 21 |
| Hostility | 16 | 12 | 28 |
| Depression | 20 | 20 | 40 |
| Buffer Items | | | 43 |

The two forms of the check list contained the same adjectives. But the instructions associated with the "General" and

"Today" forms were designed to measure trait and state levels of affect, respectively. In the present experiment, the instructions for the "Today" form were modified to suit the experimental design. The instructions for the two forms of the MAACL are given in Appendix F. Henceforth, the terms MAACL(G) and MAACL(T) will be used to refer to the "General" and "Today" forms, respectively. All of the three scales on each form were scored in order to compare their intercorrelations with those reported by the authors. The MAACL(G) was administered twice to investigate the reliability of the three scales. However, in the final analysis only the anxiety scale was taken into account because the present study is concerned primarily with the individual's response to an anxiety-inducing stimulus. Furthermore, it was assumed that the stressful stimulus was likely to induce anxiety rather than hostility or depression.

The rationale and method for the selection of the MAACL items as well as the reliability and validity of each of the three scales are discussed in detail by Zuckerman and Lubin (1965). It will suffice to note here that the anxiety scale, which is of main concern in this study, had a test-retest reliability coefficient of 0.68 ($p<0.01$); and the scores on the scale were significantly altered following both the administration of drugs to reduce the anxiety level or the manipulation of the experimental conditions to enhance the anxiety effect (Zuckerman and Lubin, 1965). Thus, the scale seems to constitute an adequate measure of both trait and state anxiety, depending on the set of instructions associated with it. Further evidence to this effect was obtained from the data in the present experiment.

Physiological Variables

The physiological variables used were SR, SP and PV which were covered in chapters 5 and 6.

An attempt was made to record the rate of eye blinking. It was expected that repressors who seek tension reduction through avoidance behavior would exhibit a higher blinking rate during specific incidents in the stimulus variable than would sensitizers who seek to combat anxiety by approaching the noxious stimulus. However, because of the absence of the appropriate recording equipment, the blinking responses were often blurred and unsuitable for analysis. The variable was, therefore, deleted.

The recording of autonomic reactivity was done on a Grass Model 7 polygraph. Two 7P1 preamplifiers were used to obtain continuous recording of SR and SP activity. The PV was monitored by means of a PTTI-6 transducer attached to a 7P5 preamplifier.

The electrodes used in conjunction with SR and SP recording were Beckman electrode 11 mm. in diameter. The electrodes were attached to the recording sites by means of adhesive collars. Whenever the NaCl salt coating the electrodes was depleted - thus exposing the silver plates underneath it - the electrodes were either chlorided or replaced by new ones. The resistance between each pair of electrodes used for SR or SP recording was occasionally measured by placing Beckman electrode paste between the electrodes which were then held together by means of an adhesive tape. The between-electrode resistance for the SR and SP electrodes had a range of 200-263 ohms and 100-300 ohms, respectively. After use, each pair of electrodes was rinsed with warm water, and then stored in a jar of tap water with the corresponding metal pins held together by means of a metal clip. This procedure was adopted to minimize electrode polarization.

Subjects

The original sample of 78 individuals consisted of S.F.U. students, staff members as well as two high school students. Nineteen cases were deleted prior to the final analysis because of incomplete data caused by mechanical disruption or the failure of the subject to attend all of the three testing sessions (to be described below). The final sample consisted of 59 subjects, two of whom were females. The age of the subjects in the final sample had a mean of 23 years and a range of 16-37 years. It was the intention to limit the sample to male subjects as much as possible because it was expected that the two sex groups might differ in terms of their GSR activity (Montague, 1963). All subjects were paid a fee of $3.00 for participating in the experiment. Except for two Oriental males, all subjects were Caucasians. More specific information regarding the age and sex of the subjects as well as the date and time at which each subject attended each of the three sessions are given in Appendix G.

Stimuli

The stimuli were two short films called "Run Young" and "It Didn't Have to Happen", where the latter film was presented immediately following the former one. In order to facilitate the presentation of the stimuli, both films were recorded on a videotape.

The film "Run Young" constituted the control condition which lasted for five minutes and fifty seconds. The film was free of any emotional content, and it presented a low-keyed satirical attitude towards jogging. Although humourous, the film was definitely not comic. This attribute was important because the main purpose of the control condition was to provide evidence that the physiological responses recorded during the experimental condition were due to the anxiety-inducing incidents in the experimental condition, and not to the mere projection of frames on the screen. In other words, the purpose of the control film was to show that the orienting responses it elicited from the subject were much weaker than the combined orienting and defensive responses elicited in the experimental condition. To achieve this purpose, the control film had to be bland. If it was comic, the resulting high level of positive emotion on the part of the subject could have elicited autonomic responses similar in magnitude to those elicited in the experimental condition (McCurdy, 1950).

The experimental film "It Didn't Have to Happen" lasted for twelve minutes and thirty-four seconds, and it emphasized the need to follow safety regulations in a woodworking shop in order to avoid serious accidents. The film included scenes of three easy-to-pinpoint incidents. In the first incident, the right palm of a worker was cut by a rotary saw. The second incident presented a close-up of a severed right index finger from which blood was dripping. In the third incident, the failure to use the guard on a rotary saw by the operator resulted in a section of a two-by-four shooting backward at high speed and penetrating the mid-section of a fellow worker who happened to be behind him. The three incidents occured approximately 195, 512 and 662 seconds after the appearance on the screen of the first frame presenting the film title.

The above mentioned experimental film was preferred to another film titled "Subincision" which has been employed as the stressful stimulus in the studies by Lazarus and his associates because of certain advantages. For one thing, in the present film the three incidents were interposed by accident-free intervals. This characteristic made it easier to pinpoint the stressful incidents, as well as to reduce the expectancy effect. These advantages were not available in the "Subincision" film. Furthermore, all incidents in the present experimental film related only to tissue damage, while those in the "Subincision" film were characterized by both tissue damage and sexual content. Thus, the quality of anxiety induced by the latter stimulus might not be the same for all subjects.

Procedure

Each of the 59 subjects was required to attend three testing sessions with a minimum time lapse of one day between one session and the other. The last two sessions were scheduled for the same day only for subjects 47 and 68. Apart from the latter condition, the spacing of the sessions was arranged so as to fit the time schedules of both the subject and experimenter. As shown in Appendix G, the time lapse between the first two sessions had a range of 1-7 days, and a mean of 2 days. The time lapse between the second and third sessions had a range of 1-22 days and a mean of 4 days. The relatively long time lapse between the last two sessions was due to the fact that the third session was harder to allocate than any of the previous ones because it was lengthy and it was desirable to allocate it to a time when the subject was not pressed by other commitments. For the first two sessions, the subject was not always tested individually. However, subjects were never tested in groups of more than three. In the third session, though, each subject had to attend individually. All sessions were conducted in a room maintained at a temperature of $70^{\circ}$ F. Due to the presence of a double door, interference from outside noise was practically non-existant. To ease any concern on the part of the subjects regarding the effect of the data on their self-concept, they were informed that the purpose of the experiment was to investigate the relation between the paper-and-pencil tests and certain physiological variables across all subjects rather than to examine the traits of each subject. Apart from the individual's first name and - when possible - phone number, no other identification was required. More specific details regarding each session are presented in the following paragraphs.

The first session lasted for about seven minutes during which the subject responded to the MAACL(G). The subject was reminded to "work fairly fast, to give the first response which comes to mind, and not to be concerned about possible discrepancies between his responses."

The second session lasted for about thirty minutes during which the subject responded to a second copy of the MAACL(G) and then to the four MMPI-derived scales. In conjunction with the latter scales, the subject was reminded to "answer all items, for each item to respond with either 'True' or 'False', and in the case of indecision to mark that response which was likely to be the case most of the time." The subject was then instructed how to use the IBM answer sheet on which responses to the MMPI-derived scales were recorded.

The third session lasted for approximately one hour. If the subject's hands were visibly dirty he was asked to wash them with soap and water. On such an occasion it was explained to the subject that the presence of oily substance on the skin reduced contact between the latter and the electrodes. The subject was seated before a table $2\frac{1}{2}$' high and $1\frac{1}{2}$' by 3' in size. The polygraph outlets for the preamplifiers in use were screwed to the table. The polygraph was situated back-to-back with the subject, and five feet from him. The TV screen was placed on a stand 3' high and 10' from the subject.

Once the subject was seated, the recording sites were cleaned with alcohol. The SR electrodes were attached to the thenar and hypothenar areas of the right palm. As for the SP, the active electrode was placed on the hypothenar of the left palm, and the inactive electrode was placed on the dorsal part of the left forearm. An attempt was always made to avoid placing the inactive electrode directly over a blood vessel. If any electrode paste seeped underneath the sticker during the placement of an electrode, the latter was reapplied after the site was cleaned with alcohol. The PV transducer was placed on the tip of the right index finger with the photocell against the fleshy part of the limb. A strip of masking tape was placed around the transducer without exerting noticeable pressure on the limb. This was done to hold the transducer in place and to minimize the amount of light reaching the photocell from an external source. It should be noted that the magnitude of the PV response was a function of the light intensity in the transducer. The light intensity was constant for a given subject throughout the recording session, but it varied across subjects.

Due to the unavailability of an armchair to seat the subject, certain steps were taken to maintain the latter's comfort throughout the recording session and to minimize movement artifacts as much as possible. The subject was required to maintain both hands such that the lateral sides of both forearms rested on the table in order to avoid strain as well as to prevent pressing the electrodes against the surface of the table. He was further instructed to minimize motor activity (such as gross head or leg movement) as much as possible throughout the recording session. The subject was then informed that the presentation of the first film would be preceded by a short period of "basal" recording (the purpose of which is described below), and that the main lights would be turned off. Throughout the recording session only a 20-watt lamp situated on top of the polygraph was left on to facilitate the monitoring of the equipment.

The purpose of the short period of "basal" recording referred to above was to permit the electrode paste to be absorbed by the tissue, and to establish proper contact between the skin and each pair of electrodes. This time interval also permitted the blood flow in the limb under the transducer to stabilize. During this interval, improper contact between the skin and the electrodes or the inability of the subject to relax appeared on the SR and SP records as an obvious and rapid baseline drift which required continuous recentering of the pen. To minimize the duration of this drift, the polygraph was always turned on at least thirty minutes prior to the beginning of the session. However, it was the impression in the present study that the drift, which lasted between five and fifteen minutes, was to a great extent a function of the sweating activity of the individual. Subjects whose palms were relatively dry during the application of the electrodes required much more time to stabilize than those who had relatively wet palms.

Once the SR and SP baselines stabilized for a few consecutive minutes, the subject was informed that the first film would be directly presented, and he was reminded once more of the need to minimize motor activity. The videotape was then turned on. The volume of the sound track was maintained at a constant level for all subjects.

In order to facilitate the scoring of the polygraph records, the marker was activated manually the instant the first frames associated with the following episodes appeared on the screen: the beginning and the end of either film, and the occurrence of each of the three incidents in the experimental film. The marker was not activated automatically because the instruments required for this procedure were not available. The manual activation of the marker was fairly accurate. For the three incidents across the fifty-nine subjects, the timing error had a range of 0.25-2.5 secs. Only on five occasions was the error equal to 2 secs. or more. Any timing error was corrected by locating the position of the episode in concern along the time dimension with respect to the two frames associated with the beginning and end of the experimental film. The latter two frames were chosen as reference points because their occurrence was the least ambiguous of all other events.

Once the experimental film was over, the lights were turned on, the electrodes and the transducer were removed, and the electrode paste at the recording sites was wiped off. Immediately afterwards, the MASCL(T) was administered and the subject was reminded that he should mark those adjectives which best described how he felt after the <u>second</u> film. The printed instructions associated with MAACL(T) are given in Appendix F. The subject was then given a voucher for $3.00, and he was asked not to reveal the content of the videotape because such a fore-warning to others who might participate in the experiment after him was likely to alter the level of their autonomic reactivity to the content of both films.

## The Assignment of Time Intervals

In order to analyse the physiological data, the polygraph record for each subjects was divided into 10-secs. intervals, as shown in Figure 8.1. The decision to adopt a unit of 10 seconds was based on the scoring procedure reported in other studies by Lazarus and his associates as well as on the observation that a 10-sec. period was sufficient to contain the responses associated with each of the three incidents in the experimental film.

As shown in Fig. 8.1, the two films were separated by an interval of 5 secs. As a result of this procedure, the control condition consisted of 35 10-secs. intervals. The experimental condition consisted of 76 intervals, and the

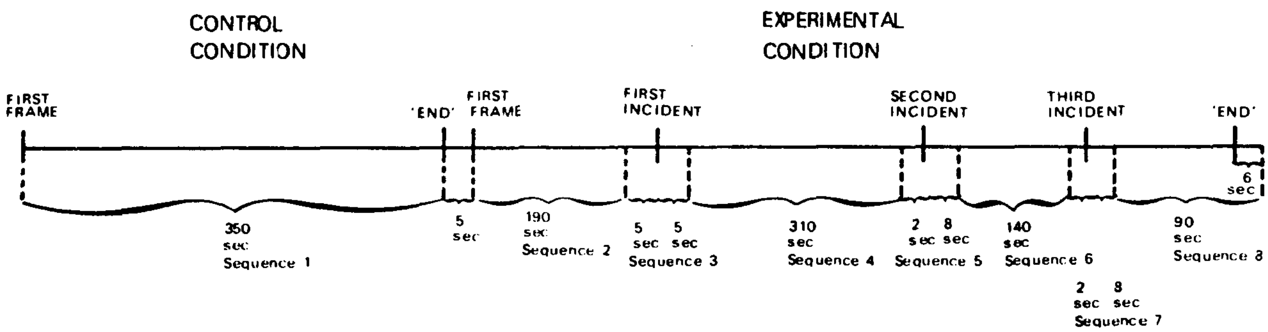


Fig. 8.1. Duration of time periods between the various episodes in the control and experimental films.

6-secs. following the first frame of the title "END" were scored as part of the second film in order to avoid having a fraction of a time interval. Fig. 8.1 also shows the location of the first frame associated with each of the three incidents. Whenever it was impossible to make the occurrence of an incident coincide with the centre of the associated time interval (as was the case with the second and third incidents), the sequencing was arranged so that the incident was located in the first half of the time interval associated with it. The rational for this procedure was that the GSR latency has a range of 1.5-3.5 secs. (Venables and Martin, 1967).

## Units of Analysis

### A. Skin Resistance

In view of the fact that SR responses are always monophasic and in order to simplify the computational procedure, only the largest response in each interval was scored. For every such response three values were computed. As shown in Fig. 8.2, these were the ISCL which is sometimes referred to as "MIN" in the following discussion, "DIFF" which represented the magnitude of the response, and "MAX" which was equal to the sum of ISCL and DIFF. In the case of a compound response, DIFF was equal to the distance between the first ISCL associated with the compound response and the tangent to the peak of the largest component.

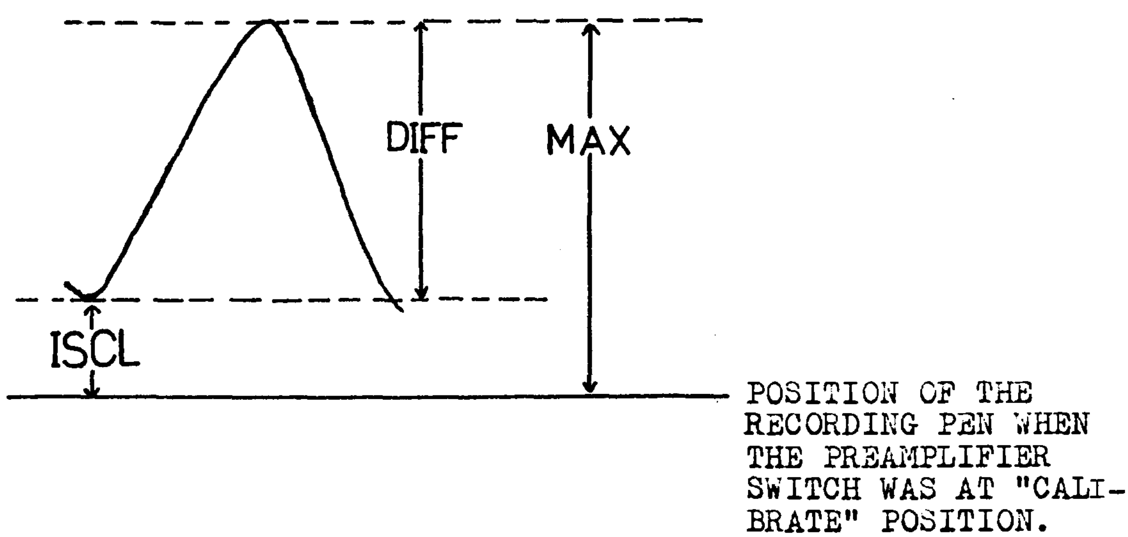


Fig. 8.2. Description of terms associated with the scoring of the SR response.

The variables MIN, MAX and ISCL were computed in log conductance units. The variable DIFF was equal to the difference between MIN and MAX.

The frequency of responses in each interval were also recorded. Any response which was 1 mm. or greater was included in the computation, irrespective of its magnitude in mhos. This variable was computed because it was reported to be an index of lability in the absence of a specific stress stimulus (Greiner and Burch, 1955), as well as an index of state anxiety (Katkin, 1966).

In order to facilitate the comparison of responses during the incident-intervals with those during other intervals in both films, the data for the 111 time intervals were grouped into eight main sequences, as shown in Fig. 8.1.

B. <u>Skin Potential</u>

SP responses can be classified into three groups which were monophasic positive (b), monophasic negative (a) and diphasic categories. In addition to the positive and negative components, a diphasic response sometimes has a third component "$a_2$" as shown in Fig. 8.3. In view of this variety, all responses which were 1 mm. or more in magnitude within a time interval were computed. For every SP response pattern the IBL and the magnitude of each component were computed in m.v. units as shown in Fig. 8.3. In the final analysis, each time interval was represented by five indices: the average of the IBL values within the interval; the average of the magnitude

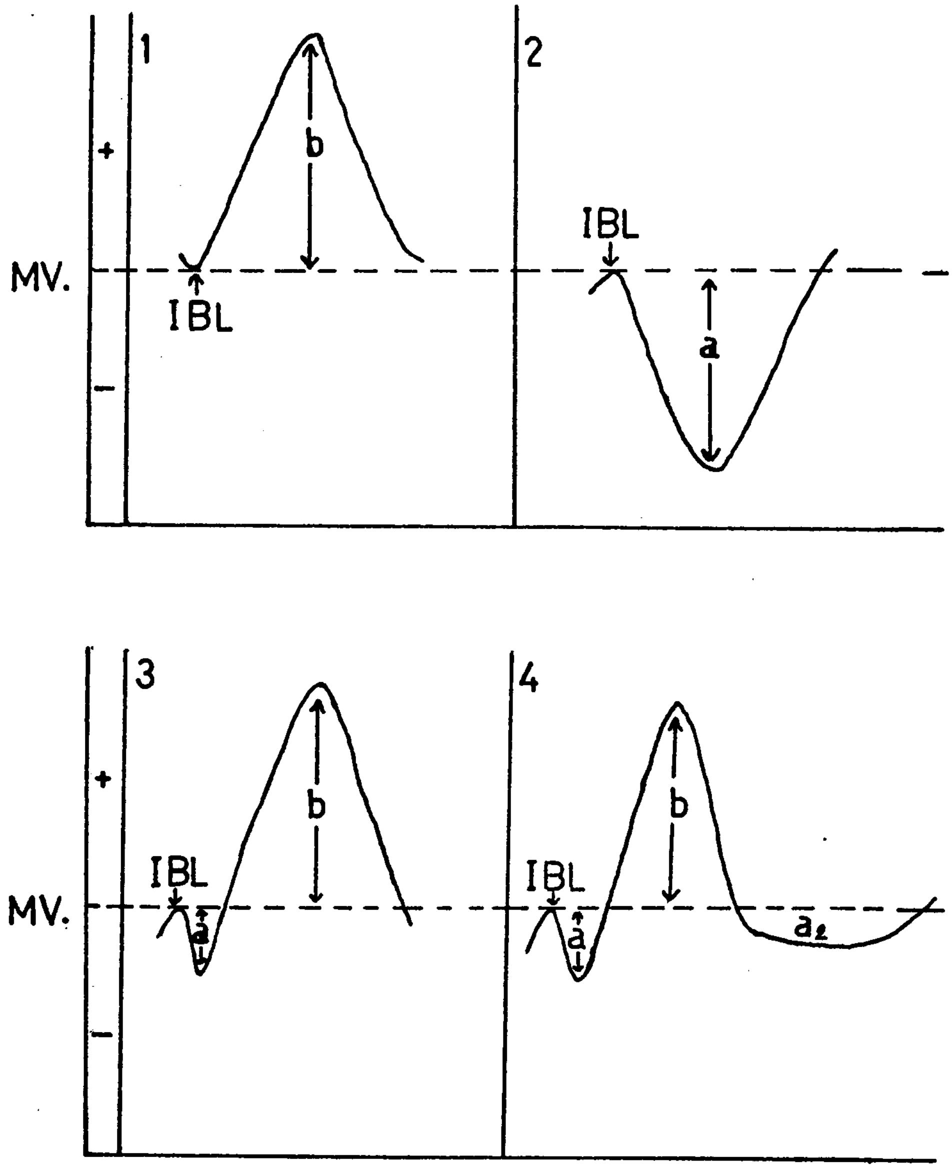


Fig. 8.3. The wave patterns of monophasic positive, monophasic negative, diphasic and triphasic skin potential responses are shown in sections 1, 2, 3 and 4, respectively. In the present experiment, the sensitivity range across all subjects varied between 0.06 and 1.33 mv/mm. Since all responses equal to 1 mm. or more were scored to the nearest 0.25 mm., it follows that all responses equal to 1.33 mv. or more have been computed to the nearest 0.33 mv. The IBL was computed in the same manner as that for the SR response.

of all "a" as well as "b" responses whether they were monophasic or diphasic components and the average of the "$a_2$" responses; and the sum (S) of the previously mentioned averages for a, b and $a_2$ components. As was the case with the SR data, the SP indices were averaged for the eight time sequences.

C. Pulse Volume

Inspection of the polygraph records showed that the PV differs from the GSR in that it was more susceptible to expectancy effect, and it took longer to reach its peak and return to the pre-stimulus level. It should also be noted that each time interval contained an average of ten PV responses, and the scoring of all responses manually would have been extremely time consuming. In view of these conditions, it was necessary to analyse the PV data in a manner different from that previously described for the GSR. The analysis was limited to those intervals in both the control and experimental conditions which were strictly essential for the evaluation of the subject's reactivity to the three stressful incidents. Those time intervals which were selected for analysis are shown in Fig. 8.4.

For each of the three incidents in the experimental condition, the analysis was restricted to the time intervals associated with it and the two intervals adjoining it. Thus, only nine of the 76 time intervals in the experimental condition were analyzed. For each of these intervals the magnitude of each response was computed in mm. Since the transducer did not permit the measurement of the absolute volume of blood in the limb, the magnitude of PV responses in the experimental condition had to be expressed as a ratio of those in the control condition in order to obtain an index of the subject's reactivity. For this purpose, three sets of time intervals, each consisting of three intervals, were selected from the control condition such that these sets were separated by latencies proportional to those which separated the three sets in the experimental condition. This procedure was taken as a precaution in case there was a constant change in the magnitude of PV responses over time. For each of the nine intervals in the control condition, the magnitude of every response was computed to the nearest 0.25 mm. The distribution of the 18 time intervals which were analyzed for PV responses across both the control and experimental conditions is shown in Fig. 8.4.

The next step was to transform the scores for the responses in the above mentioned 18 intervals into natural log units. The responses within each of the 18 intervals were then averaged. The index of PV reactivity was expressed as the difference between the overall mean for the 9 intervals in the experimental condition and that for the 9 intervals in the control condition.

## RESULTS

This section consits of three parts. The first subsection

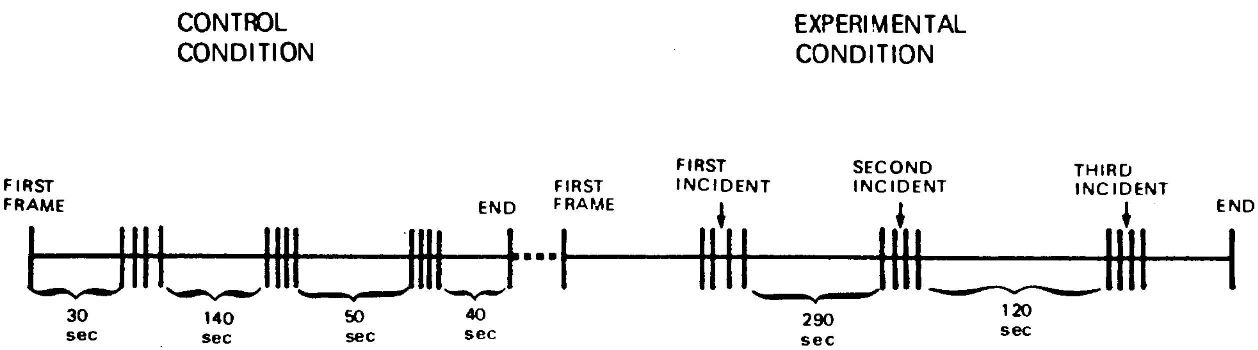


Fig. 8.4. Time periods which interposed the 3 sets of time intervals in the control conditions and their counterparts in the experimental condition that were scored for PV responses.

will present evidence regarding the reliability and validity of the MAACL. Special attention will be devoted to the anxiety scale. The second part will deal with the first hypothesis. The evidence regarding the second hypothesis will be investigated in the third part.

A. <u>The MAACL</u>

The correlation matrix for the anxiety, depression and hostility scales and their components in the two MAACL(G) forms and the MAACL(T) form is given in Table 8.2. The means and standard deviations for these indices are given in Table 8.3. The terms "ANX", "DEP", and "HOS" refer to the anxiety, depression and hostility scales, respectively. The figures "1", "2" and "3" following the previously mentioned abreviations refer to the first MAACL(G), second MAACL(G) and the MAACL(T) forms, respectively. The letters "C", "B" and "T" at the end of each term refer to items scored when endorsed, items scored when left blank, and the total score for a scale, respectively. The terms "BUF1C", "BUF1B", "TOTAL1C" and "TOTAL1B" refer to number of buffer items endorsed, buffer items left blank, overall items endorsed and overall items left blank, respectively, in the first MAACL(G) form. The substitution of the figures "2" and "3" in the above four terms refers to the same indices in the second MAACL(G) and MAACL(T) forms, respectively.

The data in Table 8.2 indicate that the intercorrelations between the two MAACL(G) forms were 0.91, 0.89 and 0.79 for the anxiety, depression and hostility scales, respectively. All three correlations were significant at the 0.001 level. The data indicates the presence of a high level of reliability for the three scales, and in particular for the anxiety scale which is of main importance in the present study. In view of the high intercorrelations between the two MAACL(G) forms, the total scores on the two forms for each scale were averaged. Only the averaged total scores for the three scales were

Table 8.2

Correlation Matrix for the Three Scales and Their Components in the MAACL(T) and the Two MAACL(G) Forms

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| ANX1C | 1 | 1.00 | | | | | | |
| ANX1B | 2 | .04 | 1.00 | | | | | |
| ANX1T | 3 | .73 | .72 | 1.00 | | | | |
| DEP1C | 4 | .83 | -.09 | .51 | 1.00 | | | |
| DEP1B | 5 | .07 | .89 | .66 | -.11 | 1.00 | | |
| DEP1T | 6 | .64 | .62 | .88 | .64 | .70 | 1.00 | |
| HOS1C | 7 | .81 | -.06 | .52 | .75 | -.06 | .49 | 1.00 |
| HOS1B | 8 | -.18 | .70 | .36 | -.25 | .56 | .25 | -.20 |
| HOS1T | 9 | .48 | .52 | .69 | .37 | .41 | .58 | .61 |
| BUF1C | 10 | .59 | -.45 | .10 | .67 | -.40 | .17 | .70 |
| BUF1B | 11 | -.59 | .45 | -.10 | -.67 | .40 | -.17 | -.70 |
| TOTAL 1C | 12 | .86 | -.23 | .44 | .90 | -.21 | .49 | .88 |
| TOTAL 1B | 13 | -.86 | .23 | -.44 | -.90 | .21 | -.49 | -.88 |
| ANX2C | 14 | .90 | -.05 | .59 | .83 | -.03 | .57 | .67 |
| ANX2B | 15 | .09 | .91 | .69 | -.04 | .83 | .61 | .03 |
| ANX2T | 16 | .69 | .62 | .91 | .55 | .57 | .84 | .49 |
| DEP2C | 17 | .82 | -.07 | .52 | .94 | -.09 | .61 | .68 |
| DEP2B | 18 | .06 | .90 | .66 | -.11 | .87 | .60 | -.03 |
| DEP2T | 19 | .57 | .72 | .89 | .51 | .68 | .89 | .41 |
| HOS2C | 20 | .78 | -.13 | .45 | .83 | -.15 | .48 | .80 |
| HOS2B | 21 | -.09 | .75 | .45 | -.22 | .62 | .32 | -.07 |
| HOS2T | 22 | .50 | .51 | .70 | .43 | .40 | .62 | .53 |
| BUF2C | 23 | .66 | -.46 | .14 | .71 | -.42 | .18 | .64 |
| BUF2B | 24 | -.66 | .46 | -.14 | -.71 | .42 | -.18 | -.64 |
| TOTAL 2C | 25 | .83 | -.27 | .39 | .88 | -.26 | .44 | .75 |
| TOTAL 2B | 26 | -.83 | .27 | -.39 | -.88 | .26 | -.44 | -.75 |
| ANX3C | 27 | .15 | -.14 | .01 | .09 | -.11 | -.02 | .02 |
| ANX3B | 28 | -.07 | .28 | .14 | -.04 | .13 | .07 | -.07 |
| ANX3T | 29 | .08 | .01 | .06 | .04 | -.04 | .00 | -.03 |
| DEP3C | 30 | .23 | -.22 | .01 | .28 | -.30 | -.03 | .03 |
| DEP3B | 31 | .07 | .31 | .26 | .04 | .22 | .20 | -.02 |
| DEP3T | 32 | .17 | .12 | .20 | .17 | .01 | .14 | .00 |
| HOS3C | 33 | -.11 | -.11 | -.15 | -.17 | -.02 | -.14 | -.06 |
| HOS3B | 34 | -.21 | .12 | -.06 | -.24 | .04 | -.14 | -.17 |
| HOS3T | 35 | -.20 | .02 | -.13 | -.26 | .01 | -.17 | -.15 |
| BUF3C | 36 | .11 | -.28 | -.12 | .10 | -.17 | -.06 | .15 |
| BUF3B | 37 | -.12 | .28 | .11 | -.10 | .16 | .05 | -.15 |
| TOTAL 3C | 38 | .16 | -.32 | -.11 | .13 | -.24 | -.09 | .08 |
| TOTAL 3B | 39 | -.16 | .32 | .10 | -.13 | .24 | .09 | -.08 |

(Table continued on next page)

Table 8.2 continued

| | | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|
| ANX1C | 1 | | | | | | | |
| ANX1B | 2 | | | | | | | |
| ANX1T | 3 | | | | | | | |
| DEP1C | 4 | | | | | | | |
| DEP1B | 5 | | | | | | | |
| DEP1T | 6 | | | | | | | |
| HOS1C | 7 | | | | | | | |
| HOS1B | 8 | 1.00 | | | | | | |
| HOS1T | 9 | .66 | 1.00 | | | | | |
| BUF1C | 10 | -.57 | .08 | 1.00 | | | | |
| BUF1B | 11 | .57 | -.08 | -1.00 | 1.00 | | | |
| TOTAL 1C | 12 | -.40 | .36 | .89 | -.89 | 1.00 | | |
| TOTAL 1B | 13 | .40 | -.36 | -.89 | .89 | -1.00 | 1.00 | |
| ANX2C | 14 | -.25 | .32 | .56 | -.56 | .80 | -.80 | 1.00 |
| ANX2B | 15 | .72 | .61 | -.45 | .45 | -.19 | .19 | -.01 |
| ANX2T | 16 | .34 | .66 | .07 | -.07 | .43 | -.43 | .70 |
| DEP2C | 17 | -.30 | .28 | .61 | -.61 | .84 | -.84 | .87 |
| DEP2B | 18 | .65 | .50 | -.47 | .47 | -.23 | .23 | -.05 |
| DEP2T | 19 | .36 | .60 | -.01 | .01 | .34 | -.34 | .51 |
| HOS2C | 20 | -.28 | .39 | .67 | -.67 | .85 | -.85 | .79 |
| HOS2B | 21 | .82 | .61 | -.53 | .53 | -.33 | .33 | -.19 |
| HOS2T | 22 | .47 | .79 | .06 | -.06 | .36 | -.36 | .43 |
| BUF2C | 23 | -.58 | .03 | .86 | -.86 | .84 | -.84 | .70 |
| BUF2B | 24 | .58 | -.03 | -.86 | .86 | -.84 | .84 | -.70 |
| TOTAL 2C | 25 | -.45 | .22 | .79 | -.79 | .92 | -.92 | .88 |
| TOTAL 2B | 26 | .45 | -.22 | -.79 | .79 | -.92 | .92 | -.88 |
| ANX3C | 27 | -.18 | -.13 | .09 | -.09 | .10 | -.10 | .15 |
| ANX3B | 28 | .33 | .21 | -.31 | .31 | -.18 | .18 | -.08 |
| ANX3T | 29 | -.01 | -.03 | -.09 | .09 | -.02 | .02 | .06 |
| DEP3C | 30 | -.25 | -.18 | .16 | -.16 | .20 | -.20 | .27 |
| DEP3B | 31 | .30 | .22 | -.30 | .30 | -.11 | .11 | .03 |
| DEP3T | 32 | .09 | .08 | -.15 | .15 | .02 | -.02 | .17 |
| HOS3C | 33 | -.02 | -.06 | -.06 | .06 | -.11 | .11 | -.11 |
| HOS3B | 34 | .29 | .10 | -.35 | .35 | -.30 | .30 | -.21 |
| HOS3T | 35 | .19 | .03 | -.28 | .28 | -.27 | .27 | -.21 |
| BUF3C | 36 | -.43 | -.23 | .40 | -.40 | .26 | -.26 | .12 |
| BUF3B | 37 | .44 | .24 | -.40 | .40 | -.26 | .26 | -.13 |
| TOTAL 3C | 38 | -.41 | -.27 | .29 | -.29 | .21 | -.21 | .17 |
| TOTAL 3B | 39 | .40 | .26 | -.29 | .29 | -.21 | .21 | -.17 |

(Table continued on next page)

Table 8.2 continued

| | | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|
| ANX1C | 1 | | | | | | | |
| ANX1B | 2 | | | | | | | |
| ANX1T | 3 | | | | | | | |
| DEP1C | 4 | | | | | | | |
| DEP1B | 5 | | | | | | | |
| DEP1T | 6 | | | | | | | |
| HOS1C | 7 | | | | | | | |
| HOS1B | 8 | | | | | | | |
| HOS1T | 9 | | | | | | | |
| BUF1C | 10 | | | | | | | |
| BUF1B | 11 | | | | | | | |
| TOTAL 1C | 12 | | | | | | | |
| TOTAL 1B | 13 | | | | | | | |
| ANX2C | 14 | | | | | | | |
| ANX2B | 15 | 1.00 | | | | | | |
| ANX2T | 16 | .71 | 1.00 | | | | | |
| DEP2C | 17 | -.05 | .58 | 1.00 | | | | |
| DEP2B | 18 | .91 | .62 | -.11 | 1.00 | | | |
| DEP2T | 19 | .74 | .89 | .55 | .77 | 1.00 | | |
| HOS2C | 20 | -.12 | .47 | .85 | -.16 | .41 | 1.00 | |
| HOS2B | 21 | .80 | .44 | -.24 | .76 | .49 | -.17 | 1.00 |
| HOS2T | 22 | .57 | .70 | .43 | .50 | .70 | .60 | .69 |
| BUF2C | 23 | -.48 | .14 | .70 | -.55 | -.02 | .76 | -.59 |
| BUF2B | 24 | .48 | -.14 | -.70 | .55 | .02 | -.76 | .59 |
| TOTAL 2C | 25 | -.26 | .43 | .91 | -.33 | .30 | .91 | -.41 |
| TOTAL 2B | 26 | .26 | -.43 | -.91 | .33 | -.30 | -.91 | .41 |
| ANX3C | 27 | -.17 | -.02 | .06 | -.13 | -.07 | .11 | -.04 |
| ANX3B | 28 | .30 | .16 | -.07 | .28 | .19 | -.04 | .40 |
| ANX3T | 29 | -.02 | .03 | -.00 | .03 | .02 | .03 | .12 |
| DEP3C | 30 | -.24 | .01 | .24 | -.23 | -.04 | .17 | -.28 |
| DEP3B | 31 | .34 | .26 | .07 | .33 | .32 | .05 | .31 |
| DEP3T | 32 | .13 | .21 | .18 | .13 | .22 | .13 | .09 |
| HOS3C | 33 | -.03 | -.10 | -.20 | .01 | -.12 | -.10 | .02 |
| HOS3B | 34 | .17 | -.02 | -.27 | .20 | .00 | -.15 | .37 |
| HOS3T | 35 | .10 | -.07 | -.30 | .15 | -.07 | -.16 | .27 |
| BUF3C | 36 | -.29 | -.12 | .10 | -.27 | -.16 | .11 | -.40 |
| BUF3B | 37 | .29 | .11 | -.11 | .27 | .16 | -.10 | .40 |
| TOTAL 3C | 38 | -.33 | -.11 | .10 | -.28 | -.17 | .11 | -.35 |
| TOTAL 3B | 39 | .32 | .11 | -.10 | .27 | .17 | -.11 | .35 |

(Table continued on next page)

Table 8.2 continued

| | | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
|---|---|---|---|---|---|---|---|---|
| ANX1C | 1 | | | | | | | |
| ANX1B | 2 | | | | | | | |
| ANX1T | 3 | | | | | | | |
| DEP1C | 4 | | | | | | | |
| DEP1B | 5 | | | | | | | |
| DEP1T | 6 | | | | | | | |
| HOS1C | 7 | | | | | | | |
| HOS1B | 8 | | | | | | | |
| HOS1T | 9 | | | | | | | |
| BUF1C | 10 | | | | | | | |
| BUF1B | 11 | | | | | | | |
| TOTAL 1C | 12 | | | | | | | |
| TOTAL 1B | 13 | | | | | | | |
| ANX2C | 14 | | | | | | | |
| ANX2B | 15 | | | | | | | |
| ANX2T | 16 | | | | | | | |
| DEP2C | 17 | | | | | | | |
| DEP2B | 18 | | | | | | | |
| DEP2T | 19 | | | | | | | |
| HOS2C | 20 | | | | | | | |
| HOS2B | 21 | | | | | | | |
| HOS2T | 22 | 1.00 | | | | | | |
| BUF2C | 23 | .08 | 1.00 | | | | | |
| BUF2B | 24 | -.08 | -1.00 | 1.00 | | | | |
| TOTAL 2C | 25 | .34 | .92 | -.92 | 1.00 | | | |
| TOTAL 2B | 26 | -.34 | -.92 | .92 | -1.00 | 1.00 | | |
| ANX3C | 27 | .04 | .11 | -.11 | .12 | -.12 | 1.00 | |
| ANX3B | 28 | .29 | -.25 | .25 | -.16 | .16 | .25 | 1.00 |
| ANX3T | 29 | .11 | -.02 | .02 | .01 | -.01 | .79 | .71 |
| DEP3C | 30 | -.11 | .32 | -.32 | .30 | -.30 | .44 | .15 |
| DEP3B | 31 | .28 | -.19 | .19 | -.06 | .06 | .06 | .73 |
| DEP3T | 32 | .16 | .03 | -.03 | .11 | -.11 | .27 | .64 |
| HOS3C | 33 | -.05 | -.07 | .07 | -.12 | .12 | .30 | .18 |
| HOS3B | 34 | .20 | -.32 | .32 | -.29 | .29 | .09 | .64 |
| HOS3T | 35 | .11 | -.26 | .26 | -.27 | .27 | .23 | .54 |
| BUF3C | 36 | -.26 | .37 | -.37 | .25 | -.25 | .16 | -.46 |
| BUF3B | 37 | .26 | -.37 | .37 | -.25 | .25 | -.17 | .45 |
| TOTAL 3C | 38 | -.21 | .34 | -.34 | .24 | -.24 | .60 | -.07 |
| TOTAL 3B | 39 | .20 | -.34 | .34 | -.24 | .24 | -.60 | .07 |

(Table continued on next page)

Table 8.2 continued

| | | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
|---|---|---|---|---|---|---|---|---|
| ANX1C | 1 | | | | | | | |
| ANX1B | 2 | | | | | | | |
| ANX1T | 3 | | | | | | | |
| DEP1C | 4 | | | | | | | |
| DEP1B | 5 | | | | | | | |
| DEP1T | 6 | | | | | | | |
| HOS1C | 7 | | | | | | | |
| HOS1B | 8 | | | | | | | |
| HOS1T | 9 | | | | | | | |
| BUF1C | 10 | | | | | | | |
| BUF1B | 11 | | | | | | | |
| TOTAL 1C | 12 | | | | | | | |
| TOTAL 1B | 13 | | | | | | | |
| ANX2C | 14 | | | | | | | |
| ANX2B | 15 | | | | | | | |
| ANX2T | 16 | | | | | | | |
| DEP2C | 17 | | | | | | | |
| DEP2B | 18 | | | | | | | |
| DEP2T | 19 | | | | | | | |
| HOS2C | 20 | | | | | | | |
| HOS2B | 21 | | | | | | | |
| HOS2T | 22 | | | | | | | |
| BUF2C | 23 | | | | | | | |
| BUF2B | 24 | | | | | | | |
| TOTAL 2C | 25 | | | | | | | |
| TOTAL 2B | 26 | | | | | | | |
| ANX3C | 27 | | | | | | | |
| ANX3B | 28 | | | | | | | |
| ANX3T | 29 | 1.00 | | | | | | |
| DEP3C | 30 | .44 | 1.00 | | | | | |
| DEP3B | 31 | .46 | .20 | 1.00 | | | | |
| DEP3T | 32 | .58 | .67 | .86 | 1.00 | | | |
| HOS3C | 33 | .34 | .29 | .16 | .27 | 1.00 | | |
| HOS3B | 34 | .45 | -.01 | .71 | .54 | .30 | 1.00 | |
| HOS3T | 35 | .50 | .16 | .58 | .52 | .75 | .85 | 1.00 |
| BUF3C | 36 | -.12 | .23 | -.60 | -.34 | .21 | -.62 | -.31 |
| BUF3B | 37 | .11 | -.23 | .59 | .33 | -.21 | .61 | .31 |
| TOTAL 3C | 38 | .44 | .70 | -.19 | .22 | .59 | -.21 | .17 |
| TOTAL 3B | 39 | -.44 | -.70 | .19 | -.21 | -.59 | .22 | -.17 |

(Table continued on next page)

Table 8.2 continued

| | | 36 | 37 | 38 | 39 |
|---|---|---|---|---|---|
| ANX1C | 1 | | | | |
| ANX1B | 2 | | | | |
| ANX1T | 3 | | | | |
| DEP1C | 4 | | | | |
| DEP1B | 5 | | | | |
| DEP1T | 6 | | | | |
| HOS1C | 7 | | | | |
| HOS1B | 8 | | | | |
| HOS1T | 9 | | | | |
| BUF1C | 10 | | | | |
| BUF1B | 11 | | | | |
| TOTAL 1C | 12 | | | | |
| TOTAL 1B | 13 | | | | |
| ANX2C | 14 | | | | |
| ANX2B | 15 | | | | |
| ANX2T | 16 | | | | |
| DEP2C | 17 | | | | |
| DEP2B | 18 | | | | |
| DEP2T | 19 | | | | |
| HOS2C | 20 | | | | |
| HOS2B | 21 | | | | |
| HOS2T | 22 | | | | |
| BUF2C | 23 | | | | |
| BUF2B | 24 | | | | |
| TOTAL 2C | 25 | | | | |
| TOTAL 2B | 26 | | | | |
| ANX3C | 27 | | | | |
| ANX3B | 28 | | | | |
| ANX3T | 29 | | | | |
| DEP3C | 30 | | | | |
| DEP3B | 31 | | | | |
| DEP3T | 32 | | | | |
| HOS3C | 33 | | | | |
| HOS3B | 34 | | | | |
| HOS3T | 35 | | | | |
| BUF3C | 36 | 1.00 | | | |
| BUF3B | 37 | -1.00 | 1.00 | | |
| TOTAL 3C | 38 | .73 | -.74 | 1.00 | |
| TOTAL 3B | 39 | -.73 | .74 | -1.00 | 1.00 |

Table 8.3

Mean Scores and Standard Deviations for the Three Scales and Their Components in the MAACL(T) and the Two MAACL(G) Forms
(N = 59)

| Variable | | Mean | Standard Deviation |
|---|---|---|---|
| ANX1C | 1 | 2.32 | 2.97 |
| ANX1B | 2 | 5.56 | 2.94 |
| ANX1T | 3 | 7.88 | 4.27 |
| DEP1C | 4 | 3.39 | 4.46 |
| DEP1B | 5 | 11.36 | 4.76 |
| DEP1T | 6 | 14.73 | 6.13 |
| HOS1C | 7 | 2.37 | 2.85 |
| HOS1B | 8 | 6.37 | 2.98 |
| HOS1T | 9 | 8.75 | 3.69 |
| BUF1C | 10 | 13.66 | 6.67 |
| BUF1B | 11 | 29.34 | 6.67 |
| TOTAL 1C | 12 | 21.75 | 15.02 |
| TOTAL 1B | 13 | 110.25 | 15.02 |
| ANX2C | 14 | 2.00 | 3.08 |
| ANX2B | 15 | 5.51 | 3.15 |
| ANX2T | 16 | 7.51 | 4.40 |
| DEP2C | 17 | 2.69 | 4.48 |
| DEP2B | 18 | 10.59 | 5.93 |
| DEP2T | 19 | 13.29 | 7.03 |
| HOS2C | 20 | 1.88 | 2.95 |
| HOS2B | 21 | 5.61 | 3.25 |
| HOS2T | 22 | 7.47 | 4.04 |
| BUF2C | 23 | 12.98 | 7.99 |
| BUF2B | 24 | 30.02 | 7.99 |
| TOTAL 2C | 25 | 19.56 | 16.84 |
| TOTAL 2B | 26 | 112.44 | 16.84 |
| ANX3C | 27 | 2.73 | 2.65 |
| ANX3B | 28 | 8.17 | 1.90 |
| ANX3T | 29 | 10.75 | 3.51 |
| DEP3C | 30 | 2.00 | 2.74 |
| DEP3B | 31 | 15.51 | 4.03 |
| DEP3T | 32 | 17.49 | 5.29 |
| HOS3C | 33 | 1.80 | 2.21 |
| HOS3B | 34 | 9.31 | 2.78 |
| HOS3T | 35 | 11.10 | 4.02 |
| BUF3C | 36 | 6.93 | 4.41 |
| BUF3B | 37 | 36.12 | 4.47 |
| TOTAL 3C | 38 | 13.31 | 8.13 |
| TOTAL 3B | 39 | 118.68 | 8.11 |

included in the final analysis.

The data in Table 8.2 suggest that the anxiety scale is valid in terms of its ability to control for the checking-response. ANX1C correlated 0.59 with BUF1C and ANX1B correlated 0.45 with BUF1B. In contrast, ANX1T correlated 0.10 and -0.10 with BUF1C and BUF1B, respectively. Thus, the present scoring key for the anxiety scale reduced the percentage of total variance which can be accounted for by the checking-response to 1% from the possible percentage of 36%. This evidence provides support for the validity of the anxiety scale. Further evidence regarding its construct validity is presented in the second part of this section where the mean for the anxiety score in the control condition is compared with that in the experimental condition.

B. Experimental Effect

The correlation matrix - as well as the means and standard deviations - for the R-S, F-I, SD, MA and MAACL scales, and the physiological indices are given in Appendix H.

It is shown in Appendix H that the mean of the anxiety scale across the two MAACL(G) forms (i.e., ANXAV) was equal to 7.69. In the experimental condition, the scale had a mean of 10.75. The difference between the two means was significant at the 0.001 level ($t = 4.3255$, $df = 58$). This suggested the experimental condition was effective in increasing anxiety, and provides evidence for the construct validity of the anxiety scale.

A two-way analysis of variance was performed to test for a significant difference among the means for SCR (DIF) across the eight sequences. The summary of the analysis of variance is given in Table 8.4

Table 8.4

The Means for SCR (DIF) Across the 8 Time Sequences, and the Associated Analysis of Variance

| | Time Sequences | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Means | 0.03495 | 0.04916 | 0.06119 | 0.05049 | 0.21190 | 0.06314 |
| | 7 | 8 | | | | |
| Means | 0.11915 | 0.04530 | | | | |

Analysis of Variance

| Source of Variance | df | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Subject (S) | 58 | 0.883579 | 0.015234 | |
| Sequence (T) | 7 | 1.452746 | 0.207535 | 48.050 |
| ST | 406 | 1.753584 | 0.004319 | |

The presence of an overall F-ratio significant at the 0.001 level, suggested the need for further analysis to ascertain to what extent each of the eight means differed from the others. This was investigated by computing the Newman-Keuls test, the results of which are given in Table 8.5.

Table 8.5

Summary of the Newman-Keuls Test for the Significance of the Differences Between the SCDIF Mean Scores Across the 8 Sequences

| | Time Sequences Ordered in Terms of the Increasing Magnitude of the Corresponding Mean Scores | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 8 | 2 | 4 | 3 | 6 | 7 | 5 |
| 1 | | | | | | | * | * |
| 8 | | | | | | | * | * |
| 2 | | | | | | | * | * |
| 4 | | | | | | | * | * |
| 3 | | | | | | | * | * |
| 6 | | | | | | | * | * |
| 7 | | | | | | | | * |
| 5 | | | | | | | | |

* $p<0.05$

The means for the frequency of SR responses (SRD) across the eight sequences and the results of the associated analysis of variance are given in Table 8.6. Again, the presence of an overall F-ratio significant at the 0.001 level justified the comparison of the individual means with one another by means of the Newman-Keuls test, the results of which are given in Table 8.7.

Regarding SP, the analysis of variance was performed only

Table 8.6

The Means for the Frequency of SR (SRD) Across the 8 Time Sequences, and the Associated Analysis of Variance

| | Time Sequences | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Means | 1.23393 | 1.34935 | 1.92089 | 1.35643 | 2.19774 | 1.58047 |
| | 7 | 8 | | | | |
| Means | 2.09610 | 1.49364 | | | | |

Analysis of Variance

| Source of Variance | df | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Subject (S) | 58 | 193.6083 | 3.338075 | |
| Sequence (T) | 7 | 56.12509 | 8.017870 | 41.218 |
| ST | 406 | 78.97629 | 0.194523 | |

for the sum of the averaged components "S", the computation of which was previously outlined in the section titled "Units of Analysis". The means for "S" and the summary of the associated analysis of variance are given in Table 8.8. The results of the Newman-Keuls test are given in Table 8.9. The analysis was not extended to each of the three SP components separately because the evaluation of the physiological basis for each of the components and their behavioral significance was beyond the scope of the present study.

Table 8.7

Summary of the Newman-Keuls Test for the Significance of the Differences Between the SRD Mean Scores Across the 8 Sequences

| | Time Sequences Ordered in Terms of the Increasing Magnitude of the Corresponding Mean Scores | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 4 | 8 | 6 | 3 | 7 | 5 |
| 1 | | | | * | * | * | * | * |
| 2 | | | | | * | * | * | * |
| 4 | | | | | * | * | * | * |
| 8 | | | | | | * | * | * |
| 6 | | | | | | * | * | * |
| 3 | | | | | | | * | * |
| 7 | | | | | | | | |
| 5 | | | | | | | | |

* $p < 0.05$

Table 8.8

The Means for the Magnitude of the Total SP Response (SPS) Across the 8 Time Sequences, and the Associated Analysis of Variance

| | Time Sequences | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Means | 0.61236 | 0.77929 | 2.76332 | 0.77008 | 1.79547 | 0.97521 |
| | 7 | 8 | | | | |
| Means | 2.17243 | 0.95920 | | | | |

Analysis of Variance

| Source of Variance | df | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Subject (S) | 58 | 495.2610 | 8.53898 | |
| Sequence (T) | 7 | 257.9199 | 36.84570 | 28.096 |
| ST | 406 | 532.4304 | 1.31147 | |

Table 8.9

Summary of the Newman-Keuls Test for the Significance of the Differences Between the SPS Mean Scores Across the 8 Sequences

| | Time Sequences Ordered in Terms of the Increasing Magnitude of the Corresponding Mean Scores | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 4 | 2 | 8 | 6 | 5 | 7 | 3 |
| 1 | | | | | | * | * | * |
| 4 | | | | | | * | * | * |
| 2 | | | | | | * | * | * |
| 8 | | | | | | * | * | * |
| 6 | | | | | | * | * | * |
| 5 | | | | | | | | * |
| 7 | | | | | | | | * |
| 3 | | | | | | | | |

* $p < 0.05$

To investigate whether there was a significant decrease in the SP baseline (ISPL) during the stress incidents, an analysis of variance was performed for the ISPL means across the eight sequences. A summary of the analysis of variance and the results of the associated Newman-Keuls test are given in Tables 8.10 and 8.11, respectively.

Table 8.10

The Means for the Magnitude of the Skin Potential Instantaneous Basal Level (SPBL) Across the 8 Time Sequences, and the Associated Analysis of Variance

| | Time Sequences | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Means | 18.86714 | 15.59694 | 14.68029 | 14.95077 | 13.34159 |
| | 6 | 7 | 8 | | |
| Means | 15.02647 | 13.49282 | 16.50612 | | |

Analysis of Variance

| Source of Variance | df | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Subject (S) | 58 | 185622.0 | 3200.379 | |
| Sequence (T) | 7 | 1295.006 | 185.0009 | 9.151 |
| ST | 406 | 8208.055 | 20.21687 | |

Table 8.11

Summary of the Newman-Keuls Test for the Significance of the Differences Between the SPBL Mean Scores Across the 8 Sequences

| | Time Sequences Ordered in Terms of the Increasing Magnitude of the Corresponding Mean Scores | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 5 | 7 | 3 | 4 | 6 | 2 | 8 | 1 |
| 5 | | | | | | | * | * |
| 7 | | | | | | | * | * |
| 3 | | | | | | | | * |
| 4 | | | | | | | | * |
| 6 | | | | | | | | * |
| 2 | | | | | | | | * |
| 8 | | | | | | | | * |
| 1 | | | | | | | | |

* $p<0.05$

The presence of a significant decrease in the instantaneous SC baseline (MIN) during the stress incidents was also investigated. The corresponding results for the analysis of variance and the Newman-Keuls test are given in Tables 8.12 and 8.13, respectively.

It should be noted here that the above mentioned procedure for evaluating differences among the means for the eight

Table 8.12

The Means for the Magnitude of the Skin Conductance Instantaneous Basal Level (MIN) Across the 8 Time Sequences, and the Associated Analysis of Variance

| | Time Sequences | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Means | -11.09350 | -11.03372 | -11.00970 | -11.00079 | -11.00337 |
| | 6 | 7 | 8 | | |
| Means | -10.89353 | -10.83952 | -10.83060 | | |

Analysis of Variance

| Source of Variance | df | Sum of Squares | Mean Square | F |
|---|---|---|---|---|
| Subject (S) | 58 | 179.2018 | 3.089685 | |
| Sequence (T) | 7 | 3.827659 | 0.546808 | 40.056 |
| ST | 406 | 5.542382 | 0.013651 | |

Table 8.13

Summary of the Newman-Keuls Test for the Significance of the Differences Between the SCMIN Mean Scores Across the 8 Sequences

| | Time Sequences Ordered in Terms of the Increasing Magnitude of the Corresponding Mean Scores | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 5 | 4 | 6 | 7 | 8 |
| 1 | | * | * | * | * | * | * | * |
| 2 | | | | | | * | * | * |
| 3 | | | | | | * | * | * |
| 5 | | | | | | * | * | * |
| 4 | | | | | | * | * | * |
| 6 | | | | | | | * | * |
| 7 | | | | | | | | |
| 8 | | | | | | | | |

* $p < 0.05$

sequences was not applied for the PV data, because the magnitude of PV responses in the control condition was a function of the light intensity which, although constant for a given individual throughout the session, varied across individuals. Furthermore, reactivity in this context was defined as the ratio of the magnitude of responses in the experimental condition to that in the control condition. Thus, analysis of variance could not be performed either for the control or for the experimental time intervals. During the rest of the "Results" section it will become apparent that the PV variable had a relatively minor role in the present study because of its zero correlation with the paper-and-pencil tests. The absence of a correlation among these variables will be examined in the "Discussion" section.

### C. <u>The MMPI-Derived Scales and the Discrepancy Between the Verbal and Physiological Responses</u>

This section deals with the second hypothesis which was outlined at the beginning of the present chapter.

The data in Appendix H suggests that, to some extent, there was a discrepancy between the subjects' verbal and physiological responses. The anxiety scale in the experimental condition (ANXL) correlated negatively with some of the physiological variables in sequences 2 to 8. Reference to Appendix H shows that ANXL correlated -0.27 and -0.25 with SAV and SBA, respectively. But although both of these correlations were significant at the 0.05 level, they accounted for only 6% of the variance.

Given that there was a certain degree of discrepancy between the verbal and physiological responses, the next step was to find out to what extent it was reflected by scores on each of the four MMPI-derived scales. On way to investigate this relation was to determine the accuracy of predicting the scores on each scale from the magnitude of the discrepancy between the verbal and physiological responses. This approach, however, would have required an a priori decision as to whether the MMPI-derived scale or the discrepancy score should be defined as the predictor. But this issue was not the contention in the present study. An alternative approach was to correlate each of the scales with the difference between the standardized scores for the verbal and physiological responses, as shown in equation 8.1.

$$r_{\Psi(\emptyset - V)} = \frac{r_{\Psi\emptyset_e} - r_{\Psi V_e}}{\sqrt{2(1 - r_{\emptyset_e V_e})}} \qquad (8.1)$$

The term $\Psi$ is the MMPI-derived scale, $\emptyset_e$ and $V_e$ represent the standardized physiological and verbal scores, respectively, in the experimental condition.

Equation 8.1 indicates that the scores for the anxiety scale and the physiological variable in the control condition were not taken into account. This decision was based on the assumption that once it was shown that the experimental condition had significantly increased the magnitude of the verbal and physiological indices, it was permissable to ignore the scores for these variables in the control condition because of their relatively low correlations with their counterparts in the experimental condition. Thus, although $r_{30,105}$, $r_{81,99}$ and $r_{70,115}$ were equal to 0.39, 0.59 and 0.60, respectively, and significant at the 0.01 level, each of these coefficients accounted for only a small percentage of the total variance. The physiological variables that were substituted for $\emptyset_e$ in equation 8.1 where SRDAV, SAV, DIFAV and PVDIF, which were considered to be appropriate indices of autonomic reactivity. The results obtained when equation 8.1 was solved for these variables are given in Table 8.14.

The data in Table 8.14 shows that the correlations which should be investigated with respect to the significance of the difference between each pair of them were only those associated with SRDAV. These comparisons were performed by means of a series of t-tests, the results of which are given in Table 8.15. It is recognized here that the computation of a series of t-tests is statistically inappropriate because it tends to overestimate the level of significance. But since most of the t-tests failed to achieve the 0.05 significance level, it was decided to dispense with a more accurate - but complex - procedure for testing the significance of the differences among the various correlation coefficients.

From Table 8.14 it is apparent that although $r_{FI(SRDAV-V_e)}$ was significant at the 0.05 level, it accounted for only a small fraction of the variance. Furthermore, the positive sign of the coefficient indicates that, in contrast to the second hypothesis, sensitizers undergo a greater level of physiological arousal than they are willing to admit verbally. A possible reason for this outcome could have been that equation 8.1 was unsuitable for testing the hypothesis. The

Table 8.14

The Correlation of the Difference Between the Standardized Physiological and Verbal Responses and Each of the Four MMPI Scales Computed by Equation 8.1

(N = 59)

| VARIABLE CORRELATED | PEARSON'S PRODUCT MOMENT CORRELATION | P |
|---|---|---|
| FI(SRDAV-Ve) | 0.26 | 0.05 |
| RS(SRDAV-Ve) | 0.18 | n.s. |
| MA(SRDAV-Ve) | 0.15 | n.s |
| DS(SRDAV-Ve) | 0.11 | n.s. |
| FI(SAV-Ve) | 0.08 | n.s |
| RS(SAV-Ve) | 0.01 | n.s. |
| MA(SAV-Ve) | -0.14 | n.s. |
| DS(SAV-Ve) | -0.09 | n.s. |
| FI(DIFAV-Ve) | -0.02 | n.s. |
| RS(DIFAV-Ve) | -0.05 | n.s. |
| MS(DIFAV-Ve) | -0.12 | n.s. |
| DS(DIFAV-Ve) | -0.14 | n.s. |
| FI(PVDIF-Ve) | -0.03 | n.s. |
| RS(PVDIF-Ve) | -0.05 | n.s. |
| MA(PVDIF-Ve) | -0.15 | n.s. |
| DS(PVDIF-Ve) | -0.06 | n.s. |

Table 8.15

Results of the T-Tests Computed to Evaluate the Significance of the Differences Between the Correlation Coefficients Computed by Means of Equation 8.1

(N = 59)

| Pair of Correlation Coefficients Compared | T | P |
|---|---|---|
| F-I, SD | 1.9178 | 0.1 |
| F-I, MA | 1.4881 | 0.2 |
| F-I, RS | 1.4862 | 0.2 |
| R-S, SD | 0.9630 | n.s. |
| R-S, MA | 0.4031 | n.s. |
| MA, SD | 0.4755 | n.s. |

rationale for this argument was that although the correlations between the physiological variables in the control condition and their counterparts in the experimental condition were small in magnitude, they were all significant at the 0.01 level. It was, therefore, decided to reanalyze the data for the same four physiological variables after their respective levels in the control condition were partialled out. This procedure was performed by computing the following equation:

$$r_{\Psi(V_e - \tilde{\emptyset})} = \frac{r_{\Psi V_e} - r_{\Psi \tilde{\emptyset}}}{\sqrt{2(1 - r_{V_e \tilde{\emptyset}})}} \qquad (8.2)$$

where, $r_{\psi\tilde{\phi}} = \dfrac{r_{\psi\phi_e} - r_{\phi_e\phi_c}\, r_{\psi\phi_c}}{\sqrt{1 - r^2_{\phi_e\phi_c}}}$ and $r_{V_e\tilde{\phi}} = \dfrac{r_{V_e\phi_e} - r_{\phi_e\phi_c}\, r_{V_e\phi_c}}{\sqrt{1 - r^2_{\phi_e\phi_c}}}$

In the above equations, $V_e$ and $\Psi$ were previously defined. The term $\tilde{\phi}$ is the residual of the magnitude of the physiological response in the experimental condition ($\phi_e$) which has been adjusted for its corresponding magnitude in the control condition ($\phi_c$).

It is apparent from equation 8.2 that the magnitude of $r_{\psi(V_e - \tilde{\phi})}$ is a function of the magnitude of the correlation between the MMPI-derived scale and the physiological variable in both the control and experimental conditions. It was, therefore, decided to compute equation 8.2 initially for $\phi$ = SRDAV because this variable correlated higher with the MMPI-derived scales than any of the other physiological variables. If these correlations were found to be significantly different from zero, then equation 8.2 would be solved for SAV, DIFAV and PVDIF. However, the magnitude of the correlation ($V_e - \tilde{\phi}$) with the F-I, R-S, MS and SD scales were only -0.14, -0.07, -0.08 and 0.02, respectively.

An alternative approach to the investigation of the second hypothesis was to substitute the residual of the MAACL anxiety score in the experimental condition ($V_e$), after it has been adjusted for the corresponding anxiety score in the control condition ($V_c$), in equation 8.1 and to leave all other terms unaltered. However, if the residual of $V_e$ is represented by

$\tilde{V}$, it can be shown that $V_e$ and $\tilde{V}$ are interchangeable because of the high correlation between them. That is,

$$r_{V_e,\tilde{V}} = 1 - r^2_{V_cV_e} = 1 - (0.05)^2 = 0.999.$$

Thus, the substitution of V for $V_e$ in equation 8.1 would have given results very similar to those shown in Table 8.14.

At this point it can be argued that the second hypothesis is actually concerned with the magnitude of change in both the verbal and physiological responses due to the experimental condition. That is, both the verbal and physiological variables must be adjusted for their corresponding levels in the control condition. Thus, the second hypothesis must be tested by means of equation 8.3, the terms in which were previously defined:

$$r_{\psi,(\tilde{V} - \tilde{\emptyset})} = \frac{r_{\psi\tilde{V}} - r_{\psi\tilde{\emptyset}}}{\sqrt{2\,(1 - r_{\tilde{V}\tilde{\emptyset}})}} \qquad (8.3)$$

where $$r_{\psi\tilde{V}} = \frac{r_{\psi V_e} - r_{V_cV_e}\, r_{\psi V_e}}{\sqrt{1 - r^2_{V_cV_e}}}$$

and $$r_{\tilde{V}\tilde{\emptyset}} = \frac{r_{V_e\emptyset_e} - r_{V_e\emptyset_c}\, r_{\emptyset_e\emptyset_c} - r_{\emptyset_eV_c}\, r_{V_cV_e} + r_{V_c\emptyset_c} r_{V_cV_e} r_{\emptyset_c\emptyset_e}}{2\sqrt{(1 - r_{V_eV_c})(1 - r_{\emptyset_e\emptyset_c})}}$$

For the same reason previously mentioned, it was decided to compute equation 8.3 for SRDAV initially, and then for SAV, DIFAV and PVDIF. The correlation between $(\tilde{V} - \tilde{\emptyset})$ and each of the F-I, R-S, MA and SD scales was -0.16, -0.09, -0.09 and 0.02, respectively.

The failure, so far, to find a strong relation between the MMPI-derived scales and the discrepancy between the verbal and physiological responses to the stressful stimulus could have been due to the presence of a non-linear relation between $\psi$ and $(V - \tilde{\emptyset})$. One way to investigate the presence of such a relation was to dichotomize the F-I scores across the median, and to compare the means for the two groups with respect to ANXAV, ANXL, ANXDF, SRD1 and SRDAV. The results are summarized in Table 8.16. The data in this table indicates the second hypothesis is substantiated in the control condition but not in the experimental condition. This phenomenon and its implications are discussed in the following section.

## DISCUSSION

The purpose of this section is to summarize the evidence relevant to each of the two hypotheses stated at the beginning of the chapter, and to suggest possible reasons for the failure of the second hypothesis to receive complete confirmation.

The first hypothesis was confirmed. The experimental condition did induce a significant change in the anxiety score and in the SR and SP indices of autonomic reactivity. The mean for ANXL was significantly higher ($p < 0.001$) than that for ANXAV. There was also a significant increase ($p < 0.001$) in the frequency of SR responses (SRD) as well as in the amplitude of the total SP response (S) and in that of the SC response

Table 8.16

The Mean Scores and the Associated T-tests for the Upper and Lower 50 Percentiles of the F-I Scale Across 5 Variables

| Variable | The Mean for the Upper 50 Percentile F-I Scores | The Mean for the Lower 50 Percentile F-I Scores | T | P |
|---|---|---|---|---|
| SRD1 | 1.3054 | 1.1646 | 0.7517 | n.s. |
| SRDAV | 2.2529 | 1.8966 | 1.7842 | 0.1 |
| ANXAV | 9.5862 | 6.0 | 3.7356 | 0.001 |
| ANXL | 10.62 | 10.72 | 0.1107 | n.s. |
| ANXDF | 1.03 | 4.72 | 2.7955 | 0.01 |

(DIFF). Furthermore, the stress incidents induced a significant decrease ($p<0.001$) in the instantaneous basal levels for skin potential (ISPL) and skin resistance (ISRL). It should be noted that an increase in the ISCL during the experimental condition was congruent with the hypothesized decrease in the ISRL because one variable is the reciprocal of the other. It was not possible, however, to determine whether the experimental condition induced vasoconstrictive activity because the recording procedure made it essential to express the PV reactivity index as the ratio of the magnitude of responses in the experimental condition to that in the control condition.

The data suggested the presence of a discrepancy between the verbal and physiological responses in the experimental condition. There was a negative correlation ($p<0.05$) between

ANXL and each of MINAV and SAV. Thus, some of the subjects who scored high on the ANXL exhibited a lower level of autonomic reactivity than those who reported a lower level of anxiety in the experimental condition. But it should be noted that the two correlations were small in magnitude, and they accounted for only a small percentage of the total variance. Since it was previously shown that the ANXL was a valid scale because of the significant difference between its mean and that for ANXAV, the low correlations between ANXL and the physiological indices could have been due to the fact that the latter do not covary uniformly with one another. The data in Appendix H suggest that was the case. For example, the correlations between DIFAV and each of SRDAV, MINAV, BLAV and SAV were 0.32, -0.15, 0.21 and 0.31, respectively. Thus, the autonomic indices had rather low correlations with one another. This issue will receive further consideration in the following discussion.

The second hypothesis suggested that sensitizers, in contrast with repressors, would endorse a higher level of anxiety on the MAACL(T) while simultaneously exhibiting a lower level of autonomic reactivity to the stressful stimulus. The data presented in Table 8.14 do not support the hypothesis. In fact, the presence of a positive correlation ($r = 0.26$, $p < 0.05$) between the F-I scale and ($SRDAV - V_e$) suggests that sensitizers undergo a higher level of autonomic reactivity than they are willing to admit verbally. On the other hand, the correlation must be interpreted with caution because it accounts for only 9% of the common variance. In fact, reference to Table 8.16 indicates that the second hypothesis was substantiated in the control condition but not in the experimental condition. In the control condition sensitizers did not differ from repressors with respect to the frequency of skin resistance responses (SRD1), yet they reported a significantly higher level of anxiety (ANXAV). In the experimental condition, however, the data requires interpretation. The two groups did not differ with respect to verbalized anxiety (ANXL), though sensitizers showed a slightly higher level of SRR frequency (SRDAV) than repressors. But the latter difference was not statistically significant at the 0.05 level. In any case, the ambiguity of the situation can be attributed to the fact that both repressors and sensitizers had similar means with respect to ANXL. This absence of variance resulted in a zero correlation between ANXL and the F-I scale, which in turn could be responsible for the slightly positive correlation between the F-I scale and (SRDAV - $V_e$) - see equation 8.1.

A second factor which could account for the failure of the second hypothesis to achieve confirmation was the absence of significant correlations between the paper-and-pencil tests and any of the physiological variables but the SRD and its derivatives such as SRD1, SRDAV and SRDBA. This could be attributed to the inadequacy of the paper-and-pencil tests in reflecting autonomic reactivity or to the fact that the various physiological indices - as defined at the beginning of the current chapter - do not vary concomitantly with one another.

It is the thesis in the present study that the latter factor was the case. The data in Appendix H indicates that most of the 108 physiological variables can be effectively classified into categories where the components of a given category correlate highly with one another, and show equally high correlations with the components of another category only if the components of one are transformations of those in the other. These categories and their components are given in Table 8.17. For example, the data in Table 8.17 shows that the variables MAX1 to MAX8 in Group A correlate as high with one another as they do with MAXAV and MAXBA in group A1, because the latter two variables are linear transformations of the variables in Group A. But none of the components in A or A1 correlates equally high with any of the indices for SP or PV.

It is beyond the scope of the present study to investigate the extent to which the lack of covariance among the autonomic indices affected the magnitude of the correlations between the physiological variables and the paper-and-pencil tests. But further evidence that such a phenomenon has occurred is indicated by the relative changes in SCDIF, SPS and SRD across the eight sequences presented in Figs. 8.5, 8.6 and 8.7, respectively. In this context reference should be made to Tables 8.5, 8.7 and 8.9 which summarize the results of the Newman-Keuls tests for SCDIF, SRD and SPS, respectively. Thus the level of SPS was higher ($p<0.05$) in sequence 3 than in sequence 5, while the opposite was true for SCDIF and SRD. The data also suggested

Table 8.17

Categories of Physiological Variables,* and the Variables Within Each Category Which Correlate 0.7 or More With One Another

| CATEGORY | INTERCORRELATED VARIABLES |
|---|---|
| A | $r_{14,15} - r_{14,29}$, $r_{15,16} - r_{15,29}$, $r_{16,17} - r_{16,29}$, $r_{17,18} - r_{17,29}$, $r_{18,19} - r_{18,29}$, $r_{19,20} - r_{19,29}$, $r_{20,21} - r_{20,29}$, $r_{21,22} - r_{21,29}$, $4_{22,23} - r_{22,29}$, $r_{23,24} - r_{23,29}$, $r_{24,25} - r_{24,29}$, $r_{25,26} - r_{25,29}$, $r_{26,27} - r_{26,29}$, $r_{27,28} - r_{27,29}$, $r_{28,29}$ |
| A1 | $r_{101,14} - r_{101,29}$, $r_{102,14} - r_{102,29}$, $r_{103,14} - r_{103,29}$, $r_{104,14} - r_{104,29}$ |
| B | $r_{38,39} - r_{38,43}$, $r_{38,45}$, $r_{39,41} - r_{39,43}$, $r_{39,45}$, $r_{40,41} - r_{40,43}$, $r_{40,45}$, $r_{41,42} - r_{41,43}$, $r_{41,45}$, $r_{42,43}$, $r_{42,45}$, $r_{43,45}$ |
| B1 | $r_{70,38}$, $r_{72,38}$, $r_{72,40}$, $r_{74,38} - r_{74,43}$, $r_{74,75}$, $r_{75,38} - r_{75,39}$, $r_{75,41}$, $r_{75,43}$, $r_{75,45}$, $r_{77,38} - r_{77,43}$, $r_{77,45}$ |

* The variables are presented in pairs and indexed as in the Correlation matrix given in Appendix H.

(Table 8.17 continued on next page)

Table 8.17 continued

| CATEGORY | INTERCORRELATED VARIABLES |
|---|---|
| B2 | $r_{109,38} - r_{109,45}$, $r_{110,38} - r_{110,45}$ |
| B3 | $r_{113,38} - r_{113,43}$, $r_{113,45}$, $r_{114,38} - r_{114,39}$, $r_{114,41}$, $r_{114,43}$, $r_{114,45}$, $r_{115,38} - r_{115,43}$, $r_{116,38} - r_{116,39}$, $r_{116,41}$, $r_{116,43}$ |
| C | $r_{46,48} - r_{46,49}$, $r_{47,48} - r_{47,49}$, $r_{47,51}$, $r_{48,49}$, $r_{48,51}$, $r_{49,51}$ |
| C1 | $r_{70,46}$, $r_{71,47} - r_{71,49}$, $r_{73,47} - r_{73,49}$, $r_{73,51}$ |
| C2 | $r_{111,47} - r_{111,51}$, $r_{112,46} - r_{112,49}$, $r_{112,51}$ |
| E | $r_{70,71} - r_{70,73}$, $r_{70,75}$, $r_{70,77}$, $r_{71,73}$, $r_{71,75}$, $r_{72,73}$, $r_{72,75}$, $r_{72,77}$, $r_{73,75}$, $r_{74,75}$, $r_{74,77}$, $r_{75,77}$ |
| E1 | $r_{90,72}$, $r_{90,74}$, $r_{90,75}$, $r_{90,76}$ |
| E2 | $r_{115,72} - r_{115,77}$, $r_{116,70} - r_{116,75}$, $r_{116,77}$ |
| F | $r_{81,82}$, $r_{81,84}$, $r_{81,86}$, $r_{81,88}$, $r_{82,83} - r_{82,84}$, $r_{82,86}$, $r_{82,88}$, $r_{83,84}$, $r_{83,86}$, $r_{84,86} - r_{84,88}$, $r_{85,86} - r_{85,87}$, $r_{86,87} - r_{86,88}$, $r_{87,88}$ |

(Table 8.17 continued on next page)

Table 8.17 continued

| CATEGORY | INTERCORRELATED VARIABLES |
|---|---|
| F1 | $r_{99,\,82} - r_{99,\,88}$, $r_{100,\,81} - r_{100,\,88}$ |
| G | $r_{91,\,92} - r_{91,\,98}$, $r_{92,\,93} - r_{92,\,98}$, $r_{93,\,94} - r_{93,\,98}$, $r_{94,\,95} - r_{94,\,98}$, $r_{95,\,96} - r_{95,\,98}$, $r_{96,\,97} - r_{96,\,98}$, $r_{97,\,98}$ |
| G1 | $r_{107,\,91} - r_{107,\,98}$, $r_{108,\,91} - r_{108,\,98}$ |
| H | $r_{101,\,102} - r_{101,\,104}$, $r_{102,\,103} - r_{102,\,104}$, $r_{103,\,104}$ |

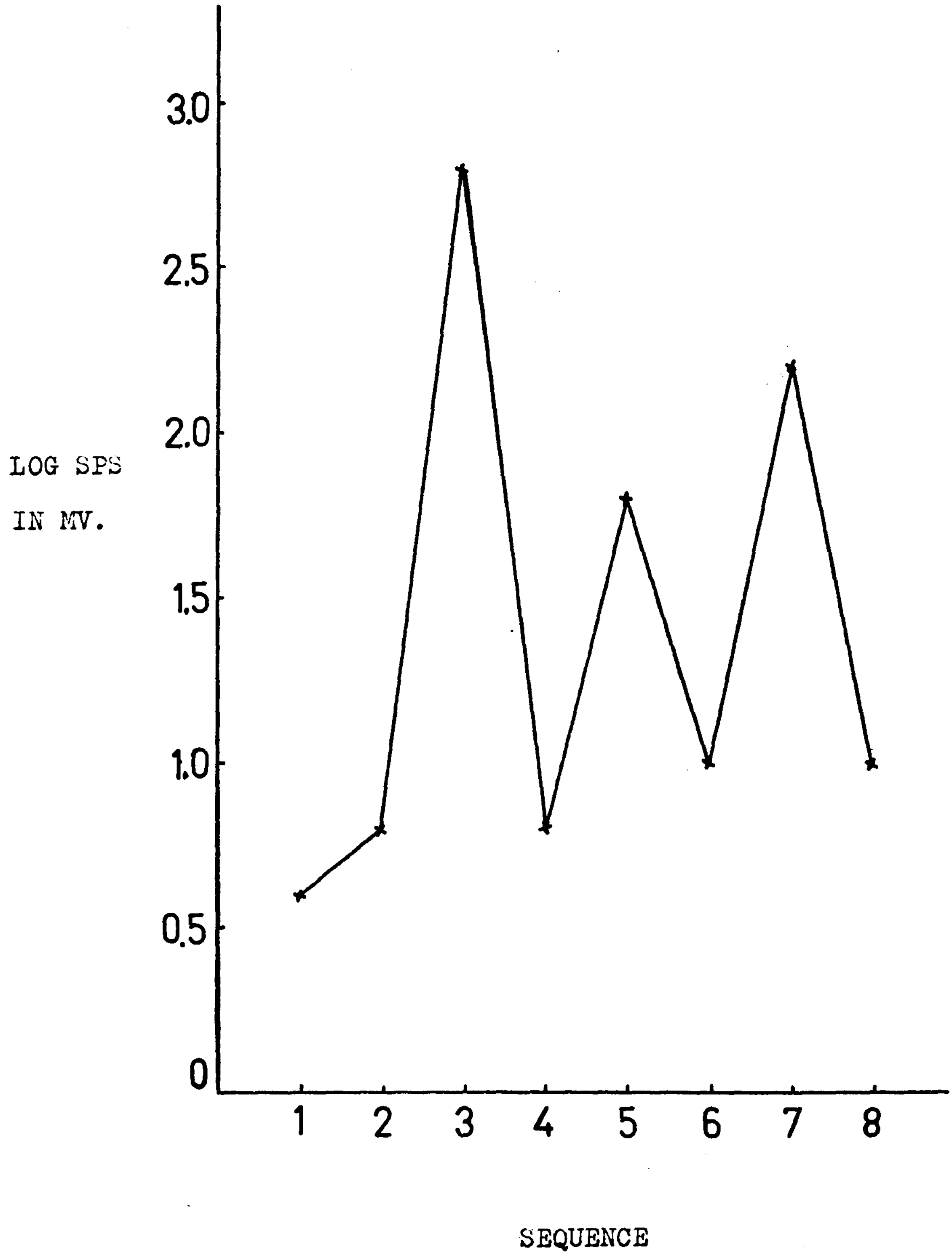


Fig. 8.5 The mean for SPS across the 8 sequences

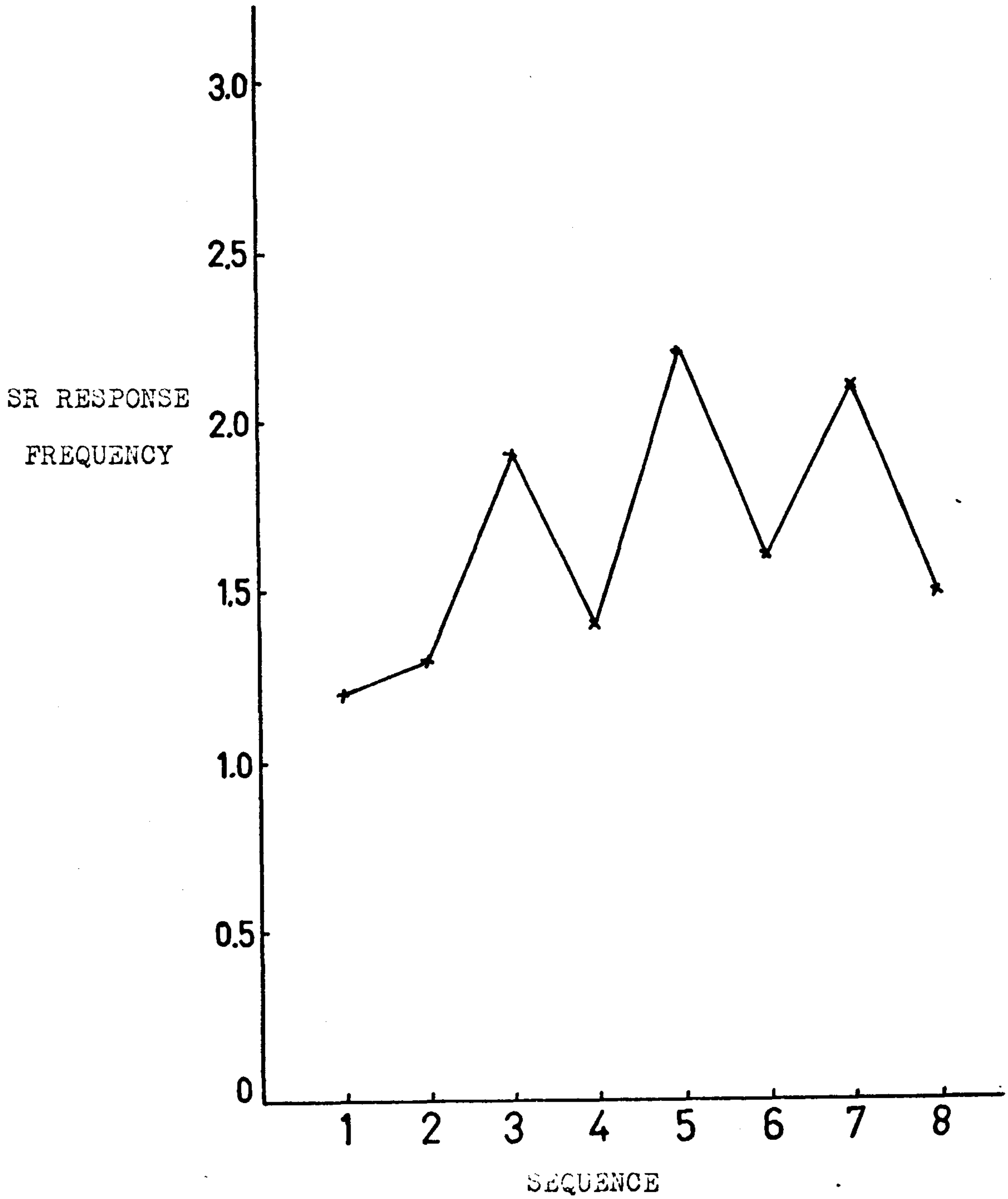


Fig. 8.6 The mean for SRD across the 8 sequences

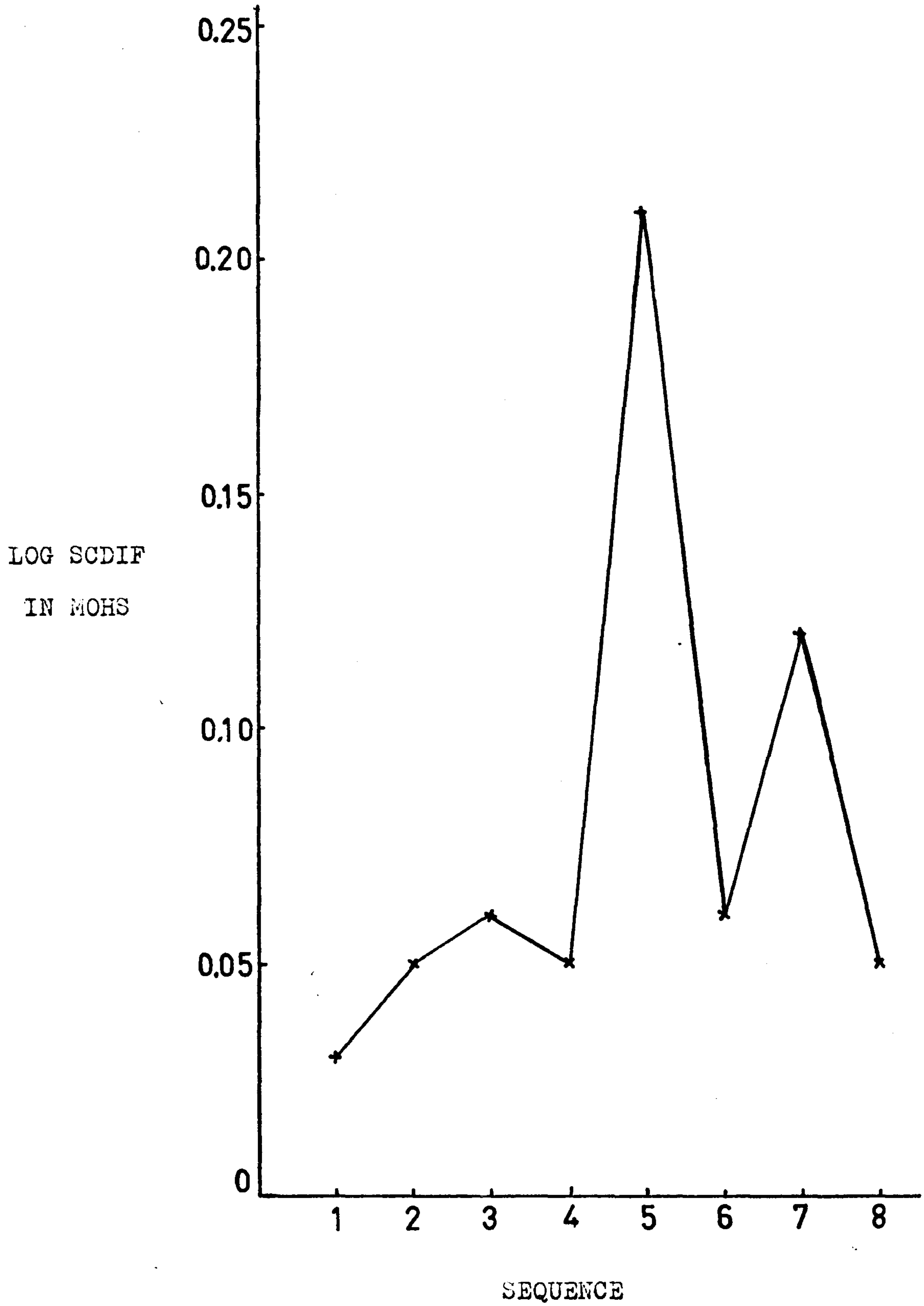


Fig. 8.7 The mean for SCDIF across the 8 sequences

that the magnitude of the disynchronization between the different levels for any two variables was inversely related to the degree to which these two variables are influenced by the same physiological processes. Thus, the trend of changes in the level of SRD across the eight sequences had a closer resemblance to that for SCDIF than to that for SPS. Persumably, the physiological processes which influence SRD are more similar to those responsible for SCDIF than to those underlying SPS. Since the data was averaged across subjects, it follows that the increases in the stress levels induced by the three incidents were subjectively perceived in a similar manner by most of the subjects. These changes in the stress levels could have been due to that the stimuli associated with them differed in quality, intensity or both. It is hard to argue that it would have been better to use a standard stimulus such as faradic stimulation instead of the experimental film, because an electric shock of constant intensity could give rise to different levels of subjective evaluation across trials by the same individuals.

In view of the above discussion it is not surprising that the physiological variables have low correlations with one another as well as with the paper-and-pencil tests. It should also be noted that the second hypothesis, although not substantiated, could not be rejected because the implicit assumption that the autonomic indices are equivalent to one another - and which is essential for the unequivocal evaluation of the hypothesis - was not satisfied.

Perhaps it is appropriate at this point to comment on the role of the PV in the present study. It was mentioned in chapter 6 that the PV was included in the study because, appart from the desire to have an additional index of autonomic arousal, it was expected to differentiate between repressors and sensitizers. Repressors were expected to exhibit in the control condition a relatively low level of vasoconstrictive activity which would decrease still further in the experimental condition. Sensitizers were expected to exhibit in the control condition a relatively high level of vasoconstrictive activity which would increase still further in the experimental condition. But it was not possible to compare scores on either the F-I or R-S scale with the magnitude of the PV response in the control condition, because the latter was a function of the light intensity which varied across individuals. The other alternative was to compare the repression-sensitization dimension with the ratio of the magnitude of PV responses in the experimental condition to that in the control condition. But the data in Appendix H indicates that this index of reactivity (i.e. PVDIF) correlated zero with both the R-S and F-I scales. This could be due to the lack of validity of the F-I scale as a measure of the repression-sensitization dimension, to the inadequacy of the PV as an index of autonomic reactivity or to the selection of a homogeneous sample. The data in part C of the "Results" section indicate the F-I scale is a valid measure of the repression-sensitization because the scores on the scale are related to the discrepancy between the verbal and autonomic indices of anxiety in the control condition. On the other hand, PV can not be ruled out as an index of autonomic reactivity, because most of the studies reported in chapter 6 indicate that it is appropriate for this purpose. However, these studies - unlike the experiment by Furedy and Gagnon (1968) which stated the PV is a poor index of autonomic reactivity - compared the data for normals with that for psychiatric patients. It follows that the low correlation between the F-I scale and PVDIF obtained in the present study could be due to the homogeneity of the sample. It is beyond the scope of the present study to explain why the F-I scale correlated higher with some of the GSR indices than with PVDIF. It will suffice to note that the two variables are mediated by different physiological processes. Changes in the PV have been attributed to the direct influence of the CNS over the vasomotor system (Ackner, 1956), while changes in the GSR have been attributed to changes in the concentration of acetylcholine at the recording site (Wilcott, 1967).

The results of the second experiment can be summarized in the following points:

1. The stress stimulus was associated with an increase in skin conductance, the overall magnitude of the skin potential response and the frequency of skin resistance responses. The instantaneous basal levels for both skin resistance and skin potential decreased during the experimental condition.

2. In the experimental condition there was a negative correlation (though not a strong one) between scores on the MAACL(T) anxiety scale and some of the physiological indices of autonomic reactivity.
3. The hypothesis that sensitizers report a higher level of anxiety than they exhibit physiologically was substantiated to some extent in the control condition but not in the experimental condition. This was attributed to the low correlations among the MMPI-derived scales, MAACL(T) anxiety scale and the physiological indices; and to the low correlations among the various physiological indices.
4. The levels of anxiety induced by the three incidents in the experimental condition were reflected differentially by changes in the SP and SR indices. This could have been due to the possibility that the stress levels induced by the three incidents differed in quality, intensity or both.

# CHAPTER IX

## SUMMARY

The purpose of this chapter is twofold. The first objective is to present the three main implications of the present study. This will be followed by the discussion of certain issues which were neglected or only briefly mentioned in the previous chapters.

The present study has emphasized the need to modify the concept of social desirability as formulated by Edwards (1957b). There are individuals who unconsciously overestimate their abilities as well as those who exaggerate their inadequacy and reactivity to stress. It was also argued that the bipolar dimension of the discrepancy between self-evaluation and actual performance is better represented by the concept of repression-sensitization rather than by that of social desirability. The former concept is of particular importance in personality testing because it is likely to influence self-evaluation and interview data in both the clinical setting as well as in personnel selection.

It is the thesis in the present study that concepts such as "repression", "sensitization", "denial", etc. must be operationally defined in terms of the discrepancy between self-evaluation measures and scores on physiological indices or ratings by qualified individuals. Furthermore, a scale can be said to measure a trait such as repression only if it satisfies the above-mentioned criterion. It is inappropriate to describe an individual as exhibiting repression merely because he has endorsed a relatively large proportion of positive personality items, because this can be due to conscientiousness as well as to repression.

The third implication relates to the need to adopt a specific factor analytic technique when factoring scales which share common items. The literature reviewed in the present study indicated that the factor analysis of MMPI-derived scales was always confounded by spurious correlations due to item-overlap among the scales. This problem can be overcome by applying the factor analytic technique suggested by Dr. R. Koopman and which was outlined in chapter 7.

It was reported in Experiment 2 that although those who scored above and below the median on the F-I scale differed in terms of the discrepancy between their autonomic and verbal responses in the control condition, there was only a weak correlation between the F-I scale and the discrepancy scores in general. This phenomenon was attributed to the possibility that the relation between the F-I scale and the discrepancy scores was non-linear, as well as to the fact that the stress levels associated with the three incidents in the experimental condition were reflected differentially by the SR and SP indices. Another argument would be that the F-I items are somewhat ineffective in predicting the discrepancy scores, and that there is a need to modify the content of the scale to increase its correlation with the discrepancy scores. But such a venture is unlikely to be fruitful as long as the same stressful event is reflected differentially by the autonomic indices. A more promising approach would be to use moderator variables to increase the correlation between the F-I scale and the discrepancy between the verbal response and the various autonomic indices. The latter approach can be effective if the correlation between the F-I scale and the discrepancy scores is low because of heteroscedasticity (Ghiselli and Sanders, 1967).

It was previously reported in Experiment 2 that there is no evidence that sensitizers have a dominant sympathetic system because of the zero correlation between the F-I scale and PVDIF. But a dominant sympathetic system is also characterized by a relatively high frequency of GSR responses in the absence of a stressful stimulus (Silverman et al., 1959). In this respect, it can be seen from Appendix H that the F-I scale correlated 0.34 ($p<0.01$) with the frequency of SR responses in the control condition. A separate analysis of the data showed that in the control condition, the frequency of SP responses correlated 0.88 ($p<0.001$) with that of the SR responses, and it also correlated 0.36 ($p<0.01$) with the F-I scale. Thus, sensitizers do seem to have a dominant sympathetic system. A corollary of the above mentioned data, and the data reported in Experiment 2 as well as by Lazarus and his associates, is that the F-I scale is a measure of sympathetic dominance rather than the discrepancy between the autonomic and verbal indices of reactivity to a stressful stimulus.

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# APPENDIX A

## SD, MA, R-S AND F-I SCALES AS PRESENTED IN EXPERIMENT 1

This inventory is intended to investigate the relationship between a number of personality variables. I need the results for a pilot study, and my line of activity for the coming year will depend on the analysis of the data. Your co-operation is very much appreciated. But, if you have strong feelings against answering the inventory you can opt out.

Your score will be treated confidentially; no identification material is required unless you want to know your personal score. In the latter case, please write down your I.D. number in the specified space on the answer sheet. Results can be obtained in two weeks time from me, in room AQ 6012, Tuesday and Thursday, 11:30 - 12:30.

### PROCEDURE

Please answer all statements. In case of uncertainty, mark that response which is most true most of the time. The omission of a statement will complicate the analysis and interpretation of the data.

Work as fast as possible and record your first impression of each statement. This procedure is essential to preserve the reliability of the inventory. Do not refer back to statements previously answered. Do not bother about any apparent inconsistency in your responding. If you come across a statement you have already answered, please treat it as if you have seen it for the first time.

Important. Prior to starting on the inventory, please indicate age and sex in the specified space on the answer sheet.

SAMPLE

| | | T | F |
|---|---|---|---|
| 1. | Schizophrenia is a psychotic reaction. | 1 ___ | ___ |
| 2. | Classical conditioning is a psychoanalytic concept. | 2 ___ | ___ |

1. My hands and feet are usually warm enough.
2. I am very seldom troubled by constipation.
3. I find it hard to keep my mind on a task or job.
4. Most any time I would rather sit and daydream than do anything else.
5. My family does not like the work I have chosen (or the work I intend to choose for my life work).
6. My sleep is fitful and disturbed.
7. I am liked by most people who know me.
8. I am happy most of the time.
9. Criticism or scolding hurts me terribly.
10. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.
11. I have had periods in which I carried on activities without knowing later what I had been doing.
12. I cry easily.
13. I do not tire quickly.
14. I am not afraid to handle money.
15. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things.
16. I frequently notice my hand shakes when I try to do something.
17. It does not bother me particularly to see animals suffer.

18. I dream frequently about things that are best kept to myself.

19. My parents and family find more fault with me than they should.

20. I have a reason for feeling jealous of one or more members of my family.

21. No one cares much what happens to you.

22. I usually expect to succeed in things I do.

23. I sweat very easily even on cool days.

24. When in a group of people I have trouble thinking of the right things to talk about.

25. I can easily make other people afraid of me, and sometimes do for the fun of it.

26. I am never happier than when alone.

27. Life is a strain on me much of the time.

28. I am easily embarrassed.

29. I cannot keep my mind on one thing.

30. I feel anxiety about something or someone almost all the time.

31. I have been afraid of things or people that I knew could not hurt me.

32. I am not usually self-conscious.

33. People often disappoint me.

34. I feel hungry almost all the time.

35. I worry quite a bit over possible misfortunes.

36. It makes me nervous to have to wait.

37. I blush no more often than others.

38. I shrink from facing a crisis or difficulty.

39. I sometimes feel that I am about to go to pieces.

40. My hands and feet are usually warm enough.

41. I work under a great deal of tension.

42. I have diarrhea once a month or more.

43. I am very seldom troubled by constipation.

44. I am troubled by attacks of nausea.

45. I have nightmares every few nights.

46. I find it hard to keep my mind on a task or job.

47. My sleep is fitful and disturbed.

48. I wish I could be as happy as others seem to be.

49. I am certainly lacking in self-confidence.

50. I am happy most of the time.

51. I have a great deal of stomach trouble.

52. I certainly feel useless at times.

53. I cry easily.

54. I do not tire quickly.

55. I frequently notice my hand shakes when I try to do something.

56. I have very few headaches.

57. Sometimes when embarrassed, I break out in a sweat which annoys me greatly.

58. I frequently find myself worrying about something.

59. I hardly ever notice my heart pounding and I am seldom short of breath.

60. I have periods of such restlessness that I cannot sit long in a chair.

61. I dream frequently about things that are best kept to myself.

62. I believe I am no more nervous than most others.

63. I sweat very easily even on cool days.

64. I am entirely self-confident.

65. I have very few fears compared to my friends.

66. Life is a strain for me much of the time.

67. I am easily embarrassed.

68. I worry over money and business.

69. I cannot keep my mind on one thing.

70. I feel anxiety about something or someone almost all the time.

71. Sometimes I become so excited that I find it hard to get to sleep.

72. I have been afraid of things or people that I knew could not hurt me.

73. I am inclined to take things hard.

74. I am more sensitive than most other people.

75. I am unusually self-conscious.

76. I have sometimes felt that difficulties were piling up so high that I could not overcome them.

77. I am usually calm and not easily upset.

78. At times I think I am no good at all.

79. I feel hungry almost all the time.

80. I worry quite a bit over possible misfortunes.

81. It makes me nervous to have to wait.

82. I have had periods in which I lost sleep over worry.

83. I must admit that I have sometimes been worried beyond reason over something that really did not matter.

84. I am a high-strung person.

85. I practically never blush.

86. I blush no more often than others.

87. I am often afraid that I am going to blush.

88. I shrink from facing a crisis or difficulty.

89. I sometimes feel that I am about to go to pieces.

90. I wake up freshed and rested most mornings.

91. My hands and feet are usually warm enough.

92. My daily life is full of things that keep me interested.

93. There seems to be a lump in my throat much of the time.

94. Once in a while I think of things too bad to talk about.

95. At times I have fits of laughing and crying that I cannot control.

96. I feel that it is certainly best to keep my mouth shut when I'm in trouble.

97. I find it hard to keep my mind on a task or job.

98. I seldom worry about my health.

99. I have had periods of days, weeks, or months when I couldn't "get going".

100. My sleep is fitful and disturbed.

101. Much of the time my head seems to hurt all over.

102. I am in just as good physical health as most of my friends.

103. I prefer to pass by school friends, or people I know but have not seen for a long time, unless they speak to me first.

104. I am almost never bothered by pains over the heart or in my chest.

105. I am a good mixer.

106. I wish I could be as happy as others seem to be.

107. Most of the time I feel blue.

108. I am certainly lacking in self-confidence.

109. I usually feel that life is worth while.

110. It takes a lot of argument to convince most people of the truth.

111. I think most people would lie to get ahead.

112. I do many things which I regret afterwards (I regret things more or more often than others seem to).

113. I have very few quarrels with members of my family.

114. My hardest battles are with myself.

115. I have little or no trouble with my muscles twitching or jumping.

116. I don't seem to care what happens to me.

117. Much of the time I feel as if I have done something wrong or evil.

118. I am happy most of the time.

119. Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right.

120. Often I feel as if there is a tight band about my head.

121. I seem to be about as capable and smart as most others around me.

122. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it.

123. Often I can't understand why I have been so cross and grouchy.

124. I do not worry about catching diseases.

125. I commonly wonder what hidden reason another person may have for doing something for me.

126. Criticism or scolding hurts me terribly.

127. My conduct is largely controlled by the customs of those about me.

128. I certainly feel useless at times.

129. At times I feel like picking a fist fight with someone.

130. I have often lost out on things because I couldn't make up my mind soon enough.

131. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.

132. Most nights I go to sleep without thoughts or ideas bothering me.

133. I cry easily.

134. I cannot understand what I read as well as I used to.

135. I have never felt better in my life than I do now.

136. I resent having anyone take me so cleverly that I have had to admit that it was one on me.

137. I do not tire quickly.

138. I like to study and read about things that I am working at.

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

140. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things.

141. I frequently have to fight against showing that I am bashful.

142. I seldom or ever have dizzy spells.

143. My memory seems to be all right.

144. I am worried about sex matters.

145. I find it hard to make talk when I meet new people.

146. I am afraid of losing my mind.

147. I frequently notice my hand shakes when I try to do something.

148. I can read a long while without tiring my eyes.

149. I feel weak all over much of the time.

150. I have very few headaches.

151. Sometimes, when embarrassed, I break out in a sweat which annoys me greatly.

152. I have had no difficulty in keeping my balance in walking.

153. I wish I were not so shy.

154. I enjoy many different kinds of play and recreation.

155. In walking I am very careful to step over sidewalk cracks.

156. I frequently find myself worrying about something.

157. I hardly ever notice my heart pounding and I am seldom short of breath.

158. I get mad easily and then get over it soon.

159. I brood a great deal.

160. I have periods of such great restlessness that I cannot sit long in a chair.

161. I dream frequently about things that are best kept to myself.

162. I believe I am no more nervous than most others.

163. I have few or no pains.

164. I have difficulty in starting to do things.

165. It is safer to trust nobody.

166. Once a week or oftener I become very excited.

167. When in a group of people I have trouble thinking of the right thing to talk about.

168. When I leave home I do not worry about whether the door is locked and the windows are closed.

169. I have often felt that strangers were looking at me critically.

170. I drink an unusually large amount of water every day.

171. I am always disgusted with the law when a criminal is freed through the argument of a smart lawyer.

172. I work under a great deal of tension.

173. I am likely not to speak to people until they speak to me.

174. Life is a strain for me much of the time.

175. In school I found it very hard to talk before the class.

176. Even when I am with people I feel lonely much of the time.

177. I think nearly anyone would tell a lie to keep out of trouble.

178. I am easily embarrassed.

179. I worry over money and business.

180. I easily become impatient with people.

181. I feel anxiety about something or someone almost all the time.

182. Sometimes I become so excited that I find it hard to get to sleep.

183. I forget right away what people say to me.

184. I usually have to stop and think before I act even in trifling matters.

185. Often I cross the street in order not to meet someone I see.

186. I often feel as if things were not real.

187. I have a habit of counting things that are not important such as bulbs on electric signs, and so forth.

188. I have strange and peculiar thoughts.

189. I have been afraid of things or people that I knew could not hurt me.

190. I have no dread of going into a room by myself where other people have already gathered and are talking.

191. I have more trouble concentrating than others seem to have.

192. I have several times given up doing a thing because I thought too little of my ability.

193. Bad words, often terrible words, come into my mind and I cannot get rid of them.

194. Sometimes some unimportant thought will run through my mind and bother me for days.

195. Almost every day something happens to frighten me.

196. I am inclined to take things hard.

197. I am more sensitive then most other people.

198. At periods my mind seems to work more slowly than usual.

199. I very seldom have spells of the blues.

200. I wish I could get over worrying about things I have said that may have injured other people's feelings.

201. People often disappoint me.

202. I feel unable to tell anyone all about myself.

203. My plans have frequently seemed so full of difficulties that I have had to give them up.

204. Often, even though everything is going fine for me, I feel that I don't care about anything.

205. I have sometimes felt that difficulties were piling up so high that I could not overcome them.

206. I often think, "I wish I were a child again."

207. It makes me feel like a failure when I hear of the success of someone I know well.

208. I am apt to take disappointments so keenly that I can't put them out of my mind.

209. At times I think I am no good at all.

210. I worry quite a bit over possible misfortunes.

211. I am apt to pass up something I want to do because others feel that I am not going about it in the right way.

212. I have several times had a change of heart about my life work.

213. I have a daydream life about which I do not tell other people.

214. I have often felt guilty because I have pretended to feel more sorry about something than I really was.

215. I feel tired a good deal of the time.

216. I sometimes feel that I am about to go to pieces.

217. I have nightmares every few nights.

218. I have not lived the right kind of life.

219. I sometimes keep on at a thing until others lose their patience with me.

220. I am certainly lacking in self-confidence.

221. I do many things which I regret afterwards (I regret things more or more often than others seem to).

222. Much of the time I feel as if I have done something wrong or evil.

223. Someone has it in for me.

224. I believe I am being plotted against.

225. I am afraid when I look down from a high place.

226. I do not have a great fear of snakes.

227. There is very little love and companionship in my family as compared to other homes.

228. I have been disappointed in love.

229. Once a week or oftener I become very excited.

230. At times I have been so entertained by the cleverness of a crook that I have hoped he would get by with it.

231. I have often felt that strangers were looking at me critically.

232. Once in a while I feel hate toward members of my family whom I usually love.

233. Life is a strain for me much of the time.

234. Even when I am with people I feel lonely much of the time.

235. Once in a while I think of things too bad to talk about.

236. I am sure I get a raw deal from life.

237. I am easily embarrassed.

238. No one seems to understand me.

239. I usually have to stop and think before I act even in trifling matters.

240. Bad words, often terrible words, come into my mind and I cannot get rid of them.

241. Sometimes some unimportant thought will run through my mind and bother me for days.

242. I am inclined to take things hard.

243. People say insulting and vulgar things about me.

244. Even when I am with people I feel lonely much of the time.

245. When I am feeling very happy and active, someone who is blue or low will spoil it all.

246. People often disappoint me.

247. I feel unable to tell anyone all about myself.

248. If given the chance I could do some things that would be of great benefit to the world.

249. At times I have worn myself out by undertaking too much.

250. It makes me feel like a failure when I hear of the success of someone I know well.

251. I am apt to take disappointments so keenly that I can't put them out of my mind.

252. It bothers me to have someone watch me at work even though I know I can do it well.

253. At times I think I am no good at all.

254. One or more members of my family is very nervous.

255. It makes me nervous to have to wait.

256. I do not mind meeting strangers.

257. I feel like giving up quickly when things go wrong.

258. I am afraid of finding myself in a closet or small closed place.

259. I have often felt guilty because I have pretended to feel more sorry about something than I really was.

260. I sometimes feel that I am about to go to pieces.

Thank you.

# APPENDIX B

Age, Sex, Scores on the SD, MA, R-S and F-I Scales, and Discrepancy Scores for 69 Subjects in Experiment 1

| ID | AGE | SEX | SCALE | | | | DISCREPANCY SCORE |
|---|---|---|---|---|---|---|---|
| | | | SD | MA | R-S | F-I | |
| 1 | 17 | F | 15 | 18 | 60 | 18 | 13 |
| 2 | 18 | F | 17 | 23 | 47 | 17 | 18 |
| 3 | 25 | M | 15 | 23 | 71 | 27 | 18 |
| 4 | 18 | F | 20 | 26 | 65 | 22 | 24 |
| 5 | 17 | F | 14 | 23 | 57 | 15 | 25 |
| 6 | 17 | F | 14 | 27 | 75 | 23 | 11 |
| 7 | 18 | F | 10 | 21 | 56 | 16 | 23 |
| 8 | 18 | F | 7 | 12 | 53 | 10 | 16 |
| 9 | 18 | F | 12 | 21 | 60 | 13 | 18 |
| 10 | 17 | M | 18 | 30 | 69 | 24 | 23 |
| 11 | 18 | M | 10 | 16 | 46 | 10 | 19 |
| 12 | 18 | F | 12 | 20 | 56 | 14 | 15 |
| 13 | 18 | M | 20 | 24 | 74 | 26 | 23 |
| 14 | 18 | M | 12 | 18 | 60 | 15 | 21 |
| 15 | 21 | M | 22 | 30 | 82 | 30 | 14 |
| 16 | 18 | F | 15 | 22 | 60 | 23 | 22 |
| 17 | 18 | M | 13 | 25 | 60 | 21 | 19 |
| 18 | 19 | F | 24 | 34 | 91 | 34 | 9 |
| 19 | 18 | M | 11 | 22 | 55 | 22 | 15 |
| 20 | 19 | M | 12 | 17 | 55 | 15 | 11 |
| 21 | 31 | F | 16 | 30 | 73 | 23 | 15 |
| 22 | 19 | M | 22 | 30 | 83 | 23 | 6 |
| 23 | 18 | F | 13 | 25 | 48 | 15 | 12 |
| 24 | 19 | M | 12 | 15 | 39 | 8 | 7 |
| 25 | 20 | F | 13 | 28 | 68 | 19 | 15 |
| 26 | 33 | F | 3 | 11 | 38 | 10 | 17 |
| 27 | 37 | F | 16 | 19 | 56 | 13 | 10 |
| 28 | 20 | F | 9 | 9 | 54 | 14 | 22 |
| 29 | 18 | M | 10 | 17 | 64 | 14 | 18 |
| 30 | 23 | M | 6 | 12 | 45 | 13 | 14 |
| 31 | 18 | M | 6 | 13 | 44 | 8 | 19 |
| 32 | 20 | M | 8 | 20 | 47 | 8 | 12 |
| 33 | 18 | M | 10 | 20 | 47 | 9 | 15 |
| 34 | 23 | F | 20 | 28 | 88 | 21 | 19 |
| 35 | 17 | F | 6 | 10 | 49 | 11 | 13 |

Appendix B continued

| ID | AGE | SEX | SCALE | | | | DISCREPANCY SCORE |
|---|---|---|---|---|---|---|---|
| | | | SD | MA | R-S | F-I | |
| 36 | 19 | M | 16 | 21 | 51 | 18 | 19 |
| 37 | 17 | F | 7 | 15 | 38 | 11 | 12 |
| 38 | 24 | M | 17 | 29 | 61 | 20 | 7 |
| 39 | 18 | M | 19 | 31 | 79 | 21 | 21 |
| 40 | 18 | F | 15 | 25 | 61 | 14 | 18 |
| 41 | 21 | M | 14 | 30 | 79 | 26 | 8 |
| 42 | 31 | F | 14 | 19 | 51 | 17 | 11 |
| 43 | 18 | M | 14 | 24 | 58 | 10 | 18 |
| 44 | 19 | F | 11 | 24 | 48 | 16 | 12 |
| 45 | 18 | F | 10 | 18 | 60 | 12 | 14 |
| 46 | 18 | F | 9 | 19 | 58 | 10 | 17 |
| 47 | 18 | F | 11 | 16 | 66 | 23 | 17 |
| 48 | 27 | M | 7 | 12 | 45 | 10 | 21 |
| 49 | 19 | M | 5 | 11 | 36 | 8 | 7 |
| 50 | 26 | F | 11 | 16 | 43 | 14 | 11 |
| 51 | 26 | F | 11 | 19 | 57 | 11 | 12 |
| 52 | 18 | F | 9 | 14 | 46 | 12 | 9 |
| 53 | 18 | F | 13 | 24 | 51 | 15 | 11 |
| 54 | 26 | M | 7 | 18 | 56 | 12 | 17 |
| 55 | 30 | M | 10 | 14 | 63 | 13 | 21 |
| 56 | 19 | M | 13 | 12 | 50 | 16 | 17 |
| 57 | 19 | M | 19 | 27 | 82 | 31 | 18 |
| 58 | 17 | M | 9 | 22 | 63 | 22 | 12 |
| 59 | 18 | F | 20 | 26 | 54 | 20 | 12 |
| 60 | 17 | F | 9 | 14 | 55 | 17 | 13 |
| 61 | 18 | M | 16 | 29 | 84 | 26 | 14 |
| 62 | 18 | F | 11 | 19 | 53 | 17 | 19 |
| 63 | 26 | M | 10 | 15 | 51 | 10 | 21 |
| 64 | 25 | M | 12 | 14 | 50 | 13 | 20 |
| 65 | 19 | M | 1 | 9 | 30 | 1 | 8 |
| 66 | 18 | F | 16 | 25 | 60 | 17 | 13 |
| 67 | 18 | F | 27 | 31 | 83 | 31 | 18 |
| 68 | 19 | M | 1 | 7 | 38 | 5 | 10 |
| 69 | 18 | F | 20 | 32 | 76 | 30 | 6 |

# APPENDIX C

## Common Items Assigned to Each of the R-S, F-I, SD and MA Scales

| SCALE | COMMON ITEMS INDEXED AS IN APPENDIX A |
|---|---|
| R-S | 94, 108, 117, 118, 131, 133, 151, 156, 157, 161, 162, 167, 169, 176, 178, 179, 182, 184, 202, 207, 210 |
| F-I | 221, 229, 235, 240, 241, 246, 251, 253, 259 |
| SD | 1, 2, 3, 9, 15, 16, 29, 30, 37, 39 |
| MA | 45, 47, 48, 52, 54, 56, 60, 63, 66, 72, 73, 74, 76, 79, 81, 88 |

APPENDIX D

**Age and Sex of 50 Psychiatric Patients Reported in Experiment 1; and Their Scores on the SD, MA, R-S and F-I Scales, and the F Scale of the MMPI***

| ID | AGE | SEX | F | SD | MA | R-S | F-I |
|---|---|---|---|---|---|---|---|
| 1 | 28 | F | 6 | 19 | 31 | 67 | 22 |
| 2 | 27 | F | 9 | 19 | 28 | 74 | 32 |
| 3 | 29 | F | 5 | 13 | 19 | 51 | 17 |
| 4 | 27 | F | 4 | 18 | 32 | 80 | 27 |
| 5 | 24 | F | 10 | 18 | 28 | 80 | 27 |
| 6 | 30 | F | 3 | 10 | 12 | 37 | 8 |
| 7 | 21 | F | 3 | 14 | 19 | 48 | 11 |
| 8 | 50 | F | 7 | 18 | 33 | 76 | 26 |
| 9 | 18 | F | 9 | 20 | 28 | 72 | 19 |
| 10 | 22 | F | 10 | 16 | 28 | 65 | 16 |
| 11 | 21 | F | 9 | 18 | 28 | 71 | 20 |
| 12 | 19 | F | 9 | 17 | 25 | 66 | 16 |
| 13 | 25 | F | 5 | 16 | 21 | 56 | 14 |
| 14 | 20 | F | 4 | 12 | 21 | 52 | 15 |
| 15 | 24 | F | 7 | 17 | 30 | 68 | 23 |
| 16 | 26 | F | 9 | 20 | 30 | 80 | 25 |
| 17 | 20 | F | 1 | 17 | 20 | 52 | 17 |
| 18 | 21 | F | 9 | 22 | 34 | 90 | 24 |
| 19 | 25 | F | 10 | 17 | 23 | 70 | 24 |
| 20 | 25 | F | 11 | 18 | 22 | 72 | 19 |
| 21 | 31 | F | 5 | 16 | 26 | 62 | 10 |
| 22 | 21 | F | 0 | 10 | 13 | 34 | 4 |
| 23 | 23 | F | 6 | 12 | 15 | 35 | 8 |
| 24 | 17 | F | 6 | 16 | 28 | 41 | 17 |
| 25 | 26 | F | 5 | 22 | 31 | 75 | 18 |
| 26 | 30 | F | 4 | 19 | 31 | 76 | 24 |
| 27 | 29 | F | 9 | 22 | 32 | 85 | 26 |
| 28 | 29 | F | 9 | 25 | 31 | 90 | 26 |
| 29 | 25 | F | 1 | 13 | 18 | 34 | 10 |
| 30 | 50 | F | 5 | 17 | 18 | 49 | 13 |
| 31 | 21 | F | 3 | 8 | 19 | 38 | 11 |
| 32 | 28 | F | 10 | 19 | 27 | 69 | 20 |
| 33 | 17 | F | 15 | 20 | 28 | 71 | 23 |
| 34 | 36 | F | 5 | 11 | 22 | 31 | 2 |
| 35 | 35 | F | 6 | 16 | 25 | 57 | 15 |

| ID | AGE | SEX | F | SD | MA | R-S | F-I |
|---|---|---|---|---|---|---|---|
| 36 | 29 | F | 16 | 25 | 36 | 90 | 29 |
| 37 | 43 | F | 12 | 23 | 31 | 62 | 15 |
| 38 | 22 | F | 14 | 22 | 35 | 76 | 28 |
| 39 | 44 | F | 3 | 18 | 22 | 61 | 21 |
| 40 | 35 | F | 5 | 13 | 27 | 52 | 9 |
| 41 | 35 | F | 7 | 16 | 25 | 51 | 13 |
| 42 | 50 | F | 5 | 15 | 19 | 52 | 12 |
| 43 | 18 | F | 0 | 11 | 13 | 34 | 4 |
| 44 | 29 | F | 5 | 15 | 27 | 57 | 15 |
| 45 | 20 | F | 9 | 14 | 21 | 67 | 21 |
| 46 | 27 | F | 1 | 9 | 11 | 31 | 2 |
| 47 | 38 | F | 15 | 22 | 31 | 84 | 26 |
| 48 | 48 | F | 2 | 10 | 12 | 32 | 7 |
| 49 | 40 | F | 5 | 19 | 34 | 80 | 21 |
| 50 | 42 | F | 15 | 19 | 23 | 71 | 17 |

* An attempt was made to select subjects from a low age group, whenever possible, and whose F scores was less than or equal to 16.

# APPENDIX E

## SD, MA, R-S AND F-I SCALES AS PRESENTED IN EXPERIMENT 2

This inventory is intended to investigate the relationship between a number of personality variables. I need the results for a pilot study, and my line of activity for the coming year will depend on the analysis of the data. Your co-operation is very much appreciated. But, if you have strong feelings against answering the inventory you can opt out.

Your score will be treated confidentially; no identification material is required unless you want to know your personal score. In the latter case, please write down your I.D. number in the specified space on the answer sheet.

### PROCEDURE

Please answer all statements. In case of uncertainty, mark that response which is most true most of the time. The omission of a statement will complicate the analysis and interpretation of the data.

Work as fast as possible and record your first impression of each statement. This procedure is essential to preserve the reliability of the inventory. Do not refer back to statements previously answered. Do not bother about any apparent inconsistency in your responding. If you come across a statement you have already answered, please treat it as if you have seen it for the first time. Important. Prior to starting on the inventory, please indicate age and sex in the specified space on the answer sheet.

SAMPLE

| | | | |
|---|---|---|---|
| 1. Schizophrenia is a psychotic reaction. | 1 | T | F |
| 2. Classical conditioning is a psychoanalytic concept. | 2 | | |

1. My hands and feet are usually warm enough.
2. I am very seldom troubled by constipation.
3. I find it hard to keep my mind on a task or job.
4. Most any time I would rather sit and daydream than do anything else.
5. My family does not like the work I have chosen (or the work I intend to choose for my life work).
6. My sleep is fitful and disturbed.
7. I am liked by most people who know me.
8. I am happy most of the time.
9. Criticism or scolding hurts me terribly.
10. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.
11. I have had periods in which I carried on activities without knowing later what I had been doing.
12. I cry easily.
13. I do not tire quickly.
14. I am not afraid to handle money.
15. It makes me uncomfortable to put on a stunt at a party even when others are doing the same sort of things.
16. I frequently notice my hand shakes when I try to do something.
17. It does not bother me particularly to see animals suffer.
18. I dream frequently about things that are best kept to myself.

19. My parents and family find more fault with me than they should.

20. I have a reason for feeling jealous of one or more members of my family.

21. No one cares much what happens to you.

22. I usually expect to succeed in things I do.

23. I sweat very easily even on cool days.

24. When in a group of people I have trouble thinking of the right things to talk about.

25. I can easily make other people afraid of me, and sometimes do for the fun of it.

26. I am never happier than when alone.

27. Life is a strain on me much of the time.

28. I am easily embarrassed.

29. I cannot keep my mind on one thing.

30. I feel anxiety about something or someone almost all the time.

31. I have been afraid of things or people that I knew could not hurt me.

32. I am not usually self-conscious.

33. People often disappoint me.

34. I feel hungry almost all the time.

35. I worry quite a bit over possible misfortunes.

36. It makes me nervous to have to wait.

37. I blush no more often than others.

38. I shrink from facing a crisis or difficulty.

39. I sometimes feel that I am about to go to pieces.

40. I work under a great deal of tension.

41. I have diarrhea once a month or more.

42. I am troubled by attacks of nausea.

43. I have nightmares every few nights.

44. I wish I could be as happy as others seem to be.

45. I have a great deal of stomach trouble.

46. I certainly feel useless at times.

47. I have very few headaches.

48. Sometimes when embarrassed, I break out in a sweat which annoys me greatly.

49. I frequently find myself worrying about something.

50. I hardly ever notice my heart pounding and I am seldom short of breath.

51. I have periods of such restlessness that I cannot sit long in a chair.

52. I believe I am no more nervous than most others.

53. I am entirely self-confident.

54. I have very few fears compared to my friends.

55. I worry over money and business.

56. Sometimes I become so excited that I find it hard to get to sleep.

57. I am more sensitive than most other people.

58. I am unusually self-conscious.

59. I have sometimes felt that difficulties were piling up so high that I could not overcome them.

60. I am usually calm and not easily upset.

61. I have had periods in which I lost sleep over worry.

62. I must admit that I have sometimes been worried beyond reason over something that really did not matter.

63. I am a high-strung person.

64. I practically never blush.

65. I am often afraid that I am going to blush.

66. I wake up freshed and rested most mornings.

67. My daily life is full of things that keep me interested.

68. There seems to be a lump in my throat much of the time.

69. Once in a while I think of things too bad to talk about.

70. At times I have fits of laughing and crying that I cannot control.

71. I feel that it is certainly best to keep my mouth shut when I'm in trouble.

72. I seldom worry about my health.

73. I have had periods of days, weeks, or months when I couldn't "get going."

74. Much of the time my head seems to hurt all over.

75. I am in just as good physical health as most of my friends.

76. I prefer to pass by school friends, or people I know but have not seen for a long time, unless they speak to me first.

77. I am almost never bothered by pains over the heart or in my chest.

78. I am a good mixer.

79. Most of the time I feel blue.

80. I usually feel that life is worth while.

81. It takes a lot of argument to convince most people of the truth.

82. I think most people would lie to get ahead.

83. I do many things which I regret afterwards (I regret things more or more often than others seem to).

84. I have very few quarrels with members of my family.

85. My hardest battles are with myself.

86. I have little or no trouble with my muscles twitching or jumping.

87. I don't seem to care what happens to me.

88. Much of the time I feel as if I have done something wrong or evil.

89. Some people are so bossy that I feel like doing the opposite of what they request, even though I know they are right.

90. Often I feel as if there is a tight band about my head.

91. I seem to be about as capable and smart as most others around me.

92. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it.

93. Often I can't understand why I have been so cross and grouchy.

94. I do not worry about catching diseases.

95. I commonly wonder what hidden reason another person may have for doing something for me.

96. My conduct is largely controlled by the customs of those about me.

97. At times I feel like picking a fist fight with someone.

98. I have often lost out on things because I couldn't make up my mind soon enough.

99. Most nights I go to sleep without thoughts or ideas bothering me.

100. I cannot understand what I read as well as I used to.

101. I have never felt better in my life than I do now.

102. I resent having anyone take me so cleverly that I have had to admit that it was one on me.

103. I like to study and read about things that I am working at.

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

105. I frequently have to fight against showing that I am bashful.

106. I seldom or ever have dizzy spells.

107. My memory seems to be all right.

108. I am worried about sex matters.

109. I find it hard to make talk when I meet new people.

110. I am afraid of losing my mind.

111. I can read a long while without tiring my eyes.

112. I feel weak all over much of the time.

113. I have had no difficulty in keeping my balance in walking.

114. I wish I were not so shy.

115. I enjoy many different kinds of play and recreation.

116. In walking I am very careful to step over sidewalk cracks.

117. I get mad easily and then get over it soon.

118. I brood a great deal.

119. I have few or no pains.

120. I have difficulty in starting to do things.

121. It is safer to trust nobody.

122. Once a week or oftener I become very excited.

123. When I leave home I do not worry about whether the door is locked and the windows are closed.

124. I have often felt that strangers were looking at me critically.

125. I drink an unusually large amount of water every day.

126. I am always disgusted with the law when a criminal is freed through the argument of a smart lawyer.

127. I work under a great deal of tension.

128. I am likely not to speak to people until they speak to me.

129. In school I found it very hard to talk before the class.

130. Even when I am with people I feel lonely much of the time.

131. I think nearly anyone would tell a lie to keep out of trouble.

132. I easily become impatient with people.

133. I forget right away what people say to me.

134. I usually have to stop and think before I act even in trifling matters.

135. Often I cross the street in order not to meet someone I see.

136. I often feel as if things were not real.

137. I have a habit of counting things that are not important such as bulbs on electric signs, and so forth.

138. I have strange and peculiar thoughts.

139. I have no dread of going into a room by myself where other people have already gathered and are talking.

140. I have more trouble concentrating than others seem to have.

141. I have several times given up doing a thing because I thought too little of my ability.

142. Bad words, often terrible words, come into my mind and I cannot get rid of them.

143. Sometimes some unimportant thought will run through my mind and bother me for days.

144. Almost every day something happens to frighten me.

145. At periods my mind seems to work more slowly than usual.

146. I very seldom have spells of the blues.

147. I wish I could get over worrying about things I have said that may have injured other people's feelings.

148. I feel unable to tell anyone all about myself.

149. My plans have frequently seemed so full of difficulties that I have had to give them up.

150. Often, even though everything is going fine for me, I feel that I don't care about anything.

1. I often think, "I wish I were a child again."

2. It makes me feel like a failure when I hear of the success of someone I know well.

3. I am apt to take disappointments so keenly that I can't put them out of my mind.

4. I am apt to pass up something I want to do because others feel that I am not going about it in the right way.

5. I have several times had a change of heart about my life work.

6. I have a daydream life about which I do not tell other people.

7. I have often felt guilty because I have pretended to feel more sorry about something than I really was.

8. I feel tired a good deal of the time.

9. I have not lived the right kind of life.

10. I sometimes keep on at a thing until others lose their patience with me.

11. Someone has it in for me.

12. I believe I am being plotted against.

13. I am afraid when I look down from a high place.

14. I do not have a great fear of snakes.

15. There is very little love and companionship in my family as compared to other homes.

16. I have been disappointed in love.

17. At times I have been so entertained by the cleverness of a crook that I have hoped he would get by with it.

18. Once in a while I feel hate toward members of my family whom I usually love.

19. I am certainly lacking in self-confidence.

20. I am sure I get a raw deal from life.

21. No one seems to understand me.

22. People say insulting and vulgar things about me.

23. When I am feeling very happy and active, someone who is blue or low will spoil it all.

24. If given the chance I could do some things that would be of great benefit to the world.

25. At times I have worn myself out by undertaking too much.

26. It bothers me to have someone watch me at work even though I know I can do it well.

27. One or more members of my family is very nervous.

28. I do not mind meeting strangers.

29. I feel like giving up quickly when things go wrong.

30. I am afraid of finding myself in a closet or small closed place.

31. At times I think I am no good at all.

32. I am inclined to take things hard.

Thank you.

# APPENDIX F

## THE INSTRUCTIONS FOR THE MAACL(G) AND MAACL(T) FORMS AS ADOPTED IN EXPERIMENT 2

Instructions for the MAACL(G) Form

On this sheet you will find words which describe different kinds of moods and feelings. Mark an X in the boxes beside the words which describe how you generally feel - every day. Some of the words may sound alike, but we want you to check all the words that describe your feelings. Work rapidly.

Instructions for the MAACL(T) Form

Mark those words which describe how you feel now - after the second film. Work fast.

APPENDIX G

Age, Sex and Testing Dates for 59 Subjects

in Experiment 2*

| ID | SEX | AGE | FIRST SESSION | SECOND SESSION | THIRD SESSION |
|---|---|---|---|---|---|
| 7 | M | 23 | 13.1.72 | 17.1.72 | 2.2.72 |
| 10 | M | 20 | 18.1.72 | 19.1.72 | 3.2.72 |
| 12 | M | 18 | 18.1.72 | 19.1.72 | 24.1.72 |
| 14 | M | 28 | 19.1.72 | 24.1.72 | 7.2.72 |
| 17 | M | 19 | 20.1.72 | 21.1.72 | 2.2.72 |
| 18 | M | 21 | 20.1.72 | 21.1.72 | 25.1.72 |
| 19 | M | 24 | 20.1.72 | 21.1.72 | 4.2.72 |
| 20 | F | 28 | 21.1.72 | 24.1.72 | 7.2.72 |
| 22 | M | 18 | 25.1.72 | 26.1.72 | 17.2.72 |
| 23 | M | 37 | 26.1.72 | 28.1.72 | 4.2.72 |
| 24 | M | 25 | 26.1.72 | | 8.2.72 |
| 25 | M | 18 | 7.2.72 | 8.2.72 | 9.2.72 |
| 26 | M | 19 | 7.2.72 | 8.2.72 | 9.2.72 |
| 27 | M | 18 | 7.2.72 | 8.2.72 | 10.2.72 |
| 28 | M | 22 | 8.2.72 | 9.2.72 | 11.2.72 |
| 29 | M | 22 | 8.2.72 | 9.2.72 | 14.2.72 |
| 31 | M | 21 | 10.2.72 | 14.2.72 | 15.2.72 |
| 32 | M | 33 | 11.2.72 | 14.2.72 | 16.2.72 |
| 34 | M | 22 | 14.2.72 | 16.2.72 | 23.2.72 |
| 35 | M | 26 | 14.2.72 | 15.2.72 | 16.2.72 |
| 37 | F | 23 | 14.2.72 | 15.2.72 | 17.2.72 |
| 38 | M | 19 | 15.2.72 | 16.2.72 | 18.2.72 |
| 40 | M | 20 | 15.2.72 | 16.2.72 | 21.2.72 |
| 41 | M | 24 | 15.2.72 | 16.2.72 | 22.2.72 |
| 43 | M | 27 | 16.2.72 | 21.2.72 | 23.2.72 |
| 44 | M | 19 | 18.2.72 | 21.2.72 | 22.2.72 |
| 45 | M | 20 | 21.2.72 | 22.2.72 | 2.3.72 |
| 46 | M | 32 | 21.2.72 | 22.2.72 | 24.2.72 |
| 47 | M | 20 | 23.2.72 | 1.3.72 | 1.3.72 |
| 48 | M | 22 | 24.2.72 | 28.2.72 | 1.3.72 |
| 49 | M | 21 | 25.2.72 | 28.2.72 | 2.3.72 |
| 50 | M | 23 | 25.2.72 | 28.2.72 | 1.3.72 |
| 51 | M | 20 | 28.2.72 | 7.3.72 | 9.3.72 |
| 52 | M | 25 | 1.3.72 | 8.3.72 | 10.3.72 |
| 53 | M | 19 | 9.3.72 | 13.3.72 | 14.3.72 |
| 54 | M | 24 | 10.3.72 | 13.3.72 | 14.3.72 |
| 55 | M | 20 | 14.3.72 | 15.3.72 | 17.3.72 |
| 56 | M | 25 | 14.3.72 | 15.3.72 | 28.3.72 |
| 57 | M | 22 | 15.3.72 | 18.3.72 | 21.3.72 |

Appendix G continued

| ID | SEX | AGE | FIRST SESSION | SECOND SESSION | THIRD SESSION |
|---|---|---|---|---|---|
| 58 | M | 20 | 15.3.72 | 17.3.72 | 18.3.72 |
| 59 | M | 22 | 22.3.72 | 23.3.72 | 24.3.72 |
| 60 | M | 18 | 24.3.72 | 27.3.72 | 30.3.72 |
| 61 | M | 20 | 29.3.72 | 30.3.72 | 4.4.72 |
| 62 | M | 21 | 5.4.72 | 6.4.72 | 7.4.72 |
| 63 | M | 22 | 13.4.72 | 14.4.72 | 17.4.72 |
| 64 | M | 27 | 25.4.72 | 26.4.72 | 27.4.72 |
| 65 | M | 23 | 25.4.72 | 26.4.72 | 1.5.72 |
| 66 | M | 19 | 1.5.72 | 3.5.72 | 6.5.72 |
| 67 | M | 21 | 5.5.72 | 6.5.72 | 8.5.72 |
| 68 | M | 25 | 8.5.72 | 9.5.72 | 9.5.72 |
| 69 | M | 25 | 8.5.72 | 9.5.72 | 11.5.72 |
| 70 | M | 22 | 17.5.72 | 18.5.72 | 19.5.72 |
| 71 | M | 27 | 17.5.72 | 18.5.72 | 19.5.72 |
| 73 | M | 17 | 18.5.72 | 19.5.72 | 23.5.72 |
| 74 | M | 16 | 18.5.72 | 19.5.72 | 23.5.72 |
| 75 | M | 25 | 18.5.72 | 19.5.72 | 23.5.72 |
| 76 | M | 25 | 25.5.72 | 26.5.72 | 30.5.72 |
| 77 | M | 25 | 26.5.72 | 29.5.72 | 31.5.72 |
| 78 | M | 27 | 2.6.72 | 5.6.72 | 6.6.72 |

* Missing IDs correspond to those subjects who were deleted because of incomplete data.

# APPENDIX H

CORRELATION MATRIX FOR THE SCALES AND PHYSIOLOGICAL VARIABLES REPORTED IN EXPERIMENT 2, AND THE ASSOCIATED MEAN SCORES AND STANDARD DEVIATIONS.

CORRELATIONS

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | 1.00 | .80 | .85 | .81 | .51 | .56 | .27 | -.33 | -.32 | -.24 |
| MS | 2 | .80 | 1.00 | .84 | .83 | .55 | .57 | .27 | -.33 | -.29 | -.26 |
| RS | 3 | .85 | .84 | 1.00 | .91 | .60 | .61 | .36 | -.45 | -.39 | -.31 |
| IF | 4 | .81 | .83 | .91 | 1.00 | .62 | .63 | .36 | -.51 | -.39 | -.32 |
| ANX AV | 5 | .51 | .55 | .60 | .62 | 1.00 | .92 | .75 | -.76 | -.64 | -.60 |
| DEPAV | 6 | .56 | .57 | .61 | .63 | .92 | 1.00 | .68 | -.72 | -.72 | -.57 |
| HOSAV | 7 | .27 | .27 | .36 | .36 | .75 | .68 | 1.00 | -.56 | -.49 | -.64 |
| ANX DF | 8 | -.33 | -.33 | -.45 | -.51 | -.76 | -.72 | -.56 | 1.00 | .76 | .70 |
| DEPDF | 9 | -.32 | -.29 | -.39 | -.39 | -.64 | -.72 | -.49 | .76 | 1.00 | .71 |
| HOSDF | 10 | -.24 | -.26 | -.31 | -.32 | -.60 | -.57 | -.64 | .70 | .71 | 1.00 |
| ANXL | 11 | .11 | .15 | .04 | -.03 | .05 | .01 | .05 | .62 | .39 | .35 |
| DEPL | 12 | .23 | .28 | .18 | .21 | .21 | .19 | .13 | .21 | .54 | .31 |
| HOSL | 13 | -.06 | -.09 | -.08 | -.09 | -.10 | -.12 | .08 | .40 | .47 | .72 |
| MIN1 | 14 | .03 | -.05 | -.10 | -.00 | -.18 | -.16 | -.07 | -.04 | .02 | -.03 |
| MIN2 | 15 | .02 | -.04 | -.11 | .00 | -.19 | -.15 | -.09 | -.02 | .03 | -.02 |
| MIN3 | 16 | .03 | -.01 | -.08 | .03 | -.15 | -.12 | -.07 | -.05 | -.00 | -.04 |
| MIN4 | 17 | .05 | .02 | -.05 | .04 | -.15 | -.11 | -.08 | -.06 | .00 | -.06 |
| MIN5 | 18 | .06 | .04 | -.04 | .05 | -.15 | -.11 | -.10 | -.04 | .01 | -.05 |
| MIN6 | 19 | .04 | .01 | -.05 | .04 | -.15 | -.13 | -.06 | -.06 | .02 | -.08 |
| MIN7 | 20 | .02 | -.00 | -.06 | .03 | -.16 | -.15 | -.06 | -.07 | .02 | -.10 |
| MIN8 | 21 | .01 | -.02 | -.07 | .03 | -.17 | -.15 | -.06 | -.07 | .00 | -.10 |
| MAX1 | 22 | .03 | -.06 | -.10 | -.00 | -.19 | -.16 | -.08 | -.03 | .03 | -.03 |
| MAX2 | 23 | .02 | -.03 | -.10 | .01 | -.19 | -.16 | -.10 | -.01 | .04 | -.01 |
| MAX3 | 24 | .04 | .01 | -.06 | .05 | -.15 | -.11 | -.08 | -.06 | -.00 | -.05 |
| MAX4 | 25 | .06 | .03 | -.05 | .04 | -.16 | -.11 | -.09 | -.06 | .01 | -.06 |
| MAX5 | 26 | .02 | .01 | -.07 | .01 | -.19 | -.15 | -.14 | -.01 | .06 | -.02 |
| MAX6 | 27 | .04 | .02 | -.05 | .05 | -.16 | -.13 | -.07 | -.07 | .02 | -.09 |
| MAX7 | 28 | .02 | .00 | -.07 | .03 | -.19 | -.15 | -.10 | -.04 | .03 | -.09 |
| MAX8 | 29 | .02 | -.01 | -.06 | .04 | -.17 | -.15 | -.08 | -.07 | .00 | -.09 |
| DIF1 | 30 | .04 | -.08 | .02 | -.04 | -.14 | -.11 | -.14 | .05 | .13 | .19 |
| DIF2 | 31 | .02 | .07 | .05 | .04 | -.09 | -.08 | -.19 | .07 | .20 | .14 |
| DIF3 | 32 | .10 | .17 | .14 | .11 | .06 | .08 | -.14 | -.08 | .00 | -.07 |
| DIF4 | 33 | .12 | .17 | .12 | .05 | -.07 | .01 | -.21 | -.02 | .08 | .01 |
| DIF5 | 34 | -.19 | -.12 | -.11 | -.16 | -.17 | -.17 | -.15 | .16 | .20 | .15 |
| DIF6 | 35 | .06 | .10 | .07 | .05 | -.09 | .02 | -.25 | -.07 | .00 | -.11 |
| DIF7 | 36 | -.00 | .01 | -.02 | -.01 | -.15 | -.00 | -.24 | .16 | .07 | .05 |
| DIF8 | 37 | .18 | .08 | .10 | .04 | -.07 | -.01 | -.30 | -.05 | .01 | .07 |
| A1 | 38 | .14 | .01 | .07 | .08 | -.06 | -.06 | .06 | -.07 | -.08 | -.10 |
| A2 | 39 | .19 | .11 | .14 | .14 | -.01 | .03 | .08 | -.13 | -.15 | -.15 |
| A3 | 40 | .13 | -.08 | .06 | .13 | -.03 | -.03 | .09 | -.09 | -.12 | -.13 |
| A4 | 41 | .25 | .13 | .16 | .16 | .01 | .04 | .06 | -.14 | -.18 | -.16 |
| A5 | 42 | .15 | -.04 | .06 | .11 | -.09 | -.08 | -.04 | -.09 | -.15 | -.05 |
| A6 | 43 | .15 | -.00 | .07 | .09 | -.10 | -.08 | -.03 | -.10 | -.13 | -.09 |
| A7 | 44 | .11 | .02 | .14 | .25 | .13 | .07 | .14 | -.24 | -.15 | -.12 |
| A8 | 45 | .16 | .01 | .08 | .12 | -.09 | -.06 | -.07 | -.09 | -.13 | -.06 |
| B1 | 46 | .08 | .03 | .10 | .08 | -.06 | -.06 | .01 | .01 | .01 | -.02 |
| B2 | 47 | -.09 | .02 | -.06 | -.02 | -.12 | -.18 | -.07 | .13 | .20 | .09 |
| B3 | 48 | -.08 | .02 | -.00 | .02 | -.07 | -.09 | -.03 | .05 | .11 | .02 |
| B4 | 49 | -.06 | .06 | .00 | .00 | -.09 | -.10 | -.06 | .04 | .09 | -.03 |
| B5 | 50 | -.00 | .10 | .10 | .03 | .14 | .13 | .04 | -.13 | -.10 | -.17 |
| B6 | 51 | .00 | .08 | .07 | .04 | .01 | .01 | -.05 | -.05 | .02 | -.15 |
| B7 | 52 | -.21 | -.17 | -.22 | -.18 | -.04 | -.02 | .09 | -.04 | -.01 | -.07 |
| B8 | 53 | -.05 | -.12 | -.06 | -.10 | -.05 | -.08 | .00 | -.09 | -.01 | -.10 |
| C1 | 54 | .07 | .13 | .15 | .17 | .21 | .09 | .19 | -.28 | -.19 | -.28 |
| C2 | 55 | .01 | -.02 | .05 | .00 | -.08 | -.07 | -.04 | .05 | .25 | .28 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | -.15 | -.10 | -.08 | -.07 | -.08 | -.07 | -.15 | .12 | -.09 | .13 |
| C5 | 58 | -.15 | -.15 | -.09 | -.07 | -.10 | -.05 | -.17 | .11 | .00 | .09 |

CORRELATIONS

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | .10 | .19 | .19 | .18 | .22 | .08 | .25 | -.24 | -.19 | -.29 |
| C7 | 60 | .07 | .05 | -.03 | -.02 | .06 | .03 | .07 | -.09 | .02 | -.02 |
| C8 | 61 | .13 | .27 | .13 | .13 | .05 | .08 | .07 | -.11 | -.12 | -.13 |
| TR1 | 62 | .14 | .02 | .11 | .11 | -.09 | -.10 | .03 | -.04 | -.04 | -.08 |
| TR2 | 63 | .01 | .06 | .01 | .05 | -.13 | -.17 | -.04 | .05 | .10 | .01 |
| TR3 | 64 | .04 | -.03 | .03 | .13 | -.07 | -.09 | .04 | -.07 | -.06 | -.07 |
| TR4 | 65 | .08 | .11 | .08 | .08 | -.09 | -.09 | -.03 | -.05 | -.03 | -.12 |
| TR5 | 66 | .12 | -.02 | .05 | .09 | -.08 | -.06 | -.06 | -.12 | -.14 | -.09 |
| TR6 | 67 | .11 | .04 | .09 | .09 | -.09 | -.08 | -.09 | -.11 | -.08 | -.17 |
| TR7 | 68 | -.13 | -.17 | -.14 | -.02 | .03 | -.00 | .14 | -.19 | -.10 | -.11 |
| TR8 | 69 | .10 | -.06 | .03 | .04 | -.12 | -.11 | -.08 | -.12 | -.11 | -.11 |
| S1 | 70 | .15 | .03 | .13 | .12 | -.08 | -.09 | .05 | -.05 | -.05 | -.09 |
| S2 | 71 | .03 | .07 | .03 | .06 | -.11 | -.15 | -.02 | .04 | .10 | -.00 |
| S3 | 72 | .05 | -.05 | .05 | .13 | -.08 | -.10 | .05 | -.04 | -.01 | -.10 |
| S4 | 73 | .10 | .13 | .10 | .10 | -.07 | -.07 | -.02 | -.06 | -.03 | -.13 |
| S5 | 74 | .13 | .00 | .10 | .11 | -.02 | -.01 | -.03 | -.14 | -.19 | -.12 |
| S6 | 75 | .13 | .06 | .11 | .10 | -.07 | -.06 | -.06 | -.12 | -.10 | -.18 |
| S7 | 76 | -.10 | -.14 | -.11 | .00 | .07 | .04 | .20 | -.23 | -.12 | -.16 |
| S8 | 77 | .12 | -.05 | .04 | .05 | -.11 | -.09 | -.06 | -.14 | -.13 | -.12 |
| PVCON | 78 | .04 | -.05 | .06 | .05 | .03 | .03 | .07 | .01 | .01 | .06 |
| PVEXP | 79 | .03 | -.13 | .01 | -.01 | .04 | .10 | .09 | -.05 | -.11 | .02 |
| PVDIF | 80 | .00 | -.13 | -.05 | -.09 | .02 | .11 | .05 | -.09 | -.18 | -.05 |
| SRD1 | 81 | .37 | .26 | .33 | .34 | .05 | .04 | -.10 | -.05 | .07 | .09 |
| SRD2 | 82 | .33 | .34 | .32 | .35 | .09 | .07 | -.03 | -.08 | .08 | .03 |
| SRD3 | 83 | .15 | .29 | .20 | .25 | -.06 | -.07 | -.06 | .05 | .22 | .02 |
| SRD4 | 84 | .25 | .30 | .25 | .26 | .02 | .01 | -.11 | -.01 | .13 | .05 |
| SRD5 | 85 | .22 | .31 | .27 | .29 | .01 | .04 | -.03 | -.04 | .06 | -.08 |
| SRD6 | 86 | .26 | .32 | .29 | .29 | .00 | .04 | -.09 | -.00 | .05 | -.02 |
| SRD7 | 87 | .34 | .37 | .33 | .37 | .09 | .15 | .08 | -.10 | -.03 | -.17 |
| SRD8 | 88 | .25 | .31 | .24 | .28 | .03 | .05 | -.11 | -.05 | .07 | .06 |
| MIN1-7 | 89 | .04 | -.18 | -.13 | -.11 | -.09 | -.05 | -.05 | .10 | .01 | .21 |
| Z.S&DIF357 | 90 | -.00 | -.05 | .01 | .05 | -.08 | -.05 | -.07 | -.05 | -.03 | -.08 |
| BL1 | 91 | .04 | -.23 | -.01 | -.10 | -.13 | -.10 | -.19 | .15 | .10 | .14 |
| BL2 | 92 | .04 | -.21 | -.01 | -.08 | -.14 | -.12 | -.19 | .16 | .12 | .12 |
| BL3 | 93 | .07 | -.18 | .02 | -.05 | -.09 | -.06 | -.16 | .10 | .05 | .07 |
| BL4 | 94 | .07 | -.18 | .02 | -.05 | -.09 | -.07 | -.17 | .12 | .07 | .07 |
| BL5 | 95 | .08 | -.20 | .02 | -.05 | -.07 | -.05 | -.12 | .06 | .03 | .04 |
| BL6 | 96 | .07 | -.19 | .02 | -.05 | -.09 | -.06 | -.13 | .09 | .04 | .05 |
| BL7 | 97 | .06 | -.22 | -.01 | -.09 | -.10 | -.08 | -.10 | .08 | .01 | .05 |
| BL8 | 98 | .06 | -.21 | .00 | -.06 | -.10 | -.08 | -.12 | .10 | .02 | .04 |
| SRDAV | 99 | .27 | .36 | .30 | .34 | .01 | .04 | -.01 | -.03 | .10 | -.08 |
| SRDBA | 100 | .30 | .34 | .30 | .32 | .04 | .05 | -.09 | -.04 | .09 | .03 |
| MAXAV | 101 | .03 | .01 | -.07 | .03 | -.18 | -.14 | -.11 | -.04 | .03 | -.06 |
| MAXBA | 102 | .04 | -.00 | -.07 | .03 | -.17 | -.14 | -.09 | -.05 | .02 | -.06 |
| MINAV | 103 | .04 | .01 | -.06 | .04 | -.16 | -.13 | -.08 | -.06 | .01 | -.07 |
| MINBA | 104 | .03 | -.01 | -.07 | .03 | -.17 | -.14 | -.08 | -.05 | .01 | -.06 |
| DIFAV | 105 | -.08 | -.01 | -.03 | -.07 | -.15 | -.08 | -.24 | .14 | .15 | .08 |
| DIFBA | 106 | .10 | .13 | .10 | .05 | -.09 | -.02 | -.28 | -.02 | .09 | .03 |
| BLAV | 107 | .07 | -.20 | .01 | -.07 | -.09 | -.07 | -.13 | .08 | .03 | .05 |
| BLBA | 108 | .06 | -.20 | .01 | -.06 | -.11 | -.08 | -.16 | .12 | .06 | .07 |
| AAV | 109 | .15 | -.04 | .09 | .17 | -.01 | -.03 | .06 | -.14 | -.15 | -.11 |
| ABA | 110 | .18 | .05 | .11 | .12 | -.06 | -.03 | -.01 | -.11 | -.15 | -.10 |
| BAV | 111 | -.14 | -.04 | -.07 | -.06 | -.02 | -.02 | .03 | -.03 | .03 | -.07 |
| BBA | 112 | -.06 | .01 | -.01 | -.02 | -.07 | -.10 | -.05 | .01 | .09 | -.05 |
| TRAV | 113 | .02 | -.08 | -.01 | .09 | -.05 | -.07 | .05 | -.15 | -.12 | -.11 |
| TRBA | 114 | .09 | .03 | .06 | .07 | -.12 | -.13 | -.07 | -.07 | -.05 | -.11 |
| SAV | 115 | .04 | -.07 | .03 | .11 | -.02 | -.04 | .08 | -.16 | -.12 | -.15 |
| SBA | 116 | .11 | .05 | .08 | .09 | -.10 | -.10 | -.04 | -.09 | -.05 | -.13 |

CORRELATIONS

| | | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .11 | .23 | -.06 | .03 | .02 | .03 | .05 | .06 | .04 | .02 |
| MS | 2 | .15 | .28 | -.09 | -.05 | -.04 | -.01 | .02 | .04 | .01 | -.00 |
| RS | 3 | .04 | .18 | -.08 | -.10 | -.11 | -.08 | -.05 | -.04 | -.05 | -.06 |
| IF | 4 | -.03 | .21 | -.09 | -.00 | .00 | .03 | .04 | .05 | .04 | .03 |
| ANXAV | 5 | .05 | .21 | -.10 | -.18 | -.19 | -.15 | -.15 | -.15 | -.15 | -.16 |
| DEPAV | 6 | .01 | .19 | -.12 | -.16 | -.15 | -.12 | -.11 | -.11 | -.13 | -.15 |
| HOSAV | 7 | .05 | .13 | .08 | -.07 | -.09 | -.07 | -.08 | -.10 | -.06 | -.06 |
| ANXDF | 8 | .62 | .21 | .40 | -.04 | -.02 | -.05 | -.06 | -.04 | -.06 | -.07 |
| DEPDF | 9 | .39 | .54 | .47 | .02 | .03 | -.00 | .00 | .01 | .02 | .02 |
| HOSDF | 10 | .35 | .31 | .72 | -.03 | -.02 | -.04 | -.06 | -.05 | -.08 | -.10 |
| ANXL | 11 | 1.00 | .58 | .50 | -.28 | -.25 | -.27 | -.27 | -.24 | -.28 | -.30 |
| DEPL | 12 | .58 | 1.00 | .52 | -.16 | -.15 | -.15 | -.14 | -.12 | -.14 | -.16 |
| HOSL | 13 | .50 | .52 | 1.00 | -.11 | -.11 | -.12 | -.16 | -.16 | -.17 | -.18 |
| MIN1 | 14 | -.28 | -.16 | -.11 | 1.00 | .99 | .97 | .97 | .95 | .97 | .96 |
| MIN2 | 15 | -.25 | -.15 | -.11 | .99 | 1.00 | .99 | .99 | .97 | .98 | .96 |
| MIN3 | 16 | -.27 | -.15 | -.12 | .97 | .99 | 1.00 | .98 | .97 | .97 | .96 |
| MIN4 | 17 | -.27 | -.14 | -.16 | .97 | .99 | .98 | 1.00 | .99 | .99 | .97 |
| MIN5 | 18 | -.24 | -.12 | -.16 | .95 | .97 | .97 | .99 | 1.00 | .97 | .94 |
| MIN6 | 19 | -.28 | -.14 | -.17 | .97 | .98 | .97 | .99 | .97 | 1.00 | .99 |
| MIN7 | 20 | -.30 | -.16 | -.18 | .96 | .96 | .96 | .97 | .94 | .99 | 1.00 |
| MIN8 | 21 | -.31 | -.18 | -.18 | .95 | .95 | .95 | .96 | .94 | .98 | .98 |
| MAX1 | 22 | -.28 | -.16 | -.10 | 1.00 | .99 | .97 | .97 | .95 | .97 | .95 |
| MAX2 | 23 | -.25 | -.14 | -.11 | .98 | 1.00 | .99 | .99 | .97 | .98 | .96 |
| MAX3 | 24 | -.27 | -.14 | -.14 | .96 | .98 | .99 | .99 | .97 | .98 | .96 |
| MAX4 | 25 | -.27 | -.13 | -.17 | .96 | .98 | .98 | 1.00 | .99 | .99 | .97 |
| MAX5 | 26 | -.24 | -.10 | -.15 | .92 | .95 | .96 | .97 | .97 | .96 | .93 |
| MAX6 | 27 | -.30 | -.13 | -.19 | .96 | .97 | .97 | .98 | .97 | 1.00 | .99 |
| MAX7 | 28 | -.29 | -.14 | -.21 | .93 | .94 | .95 | .96 | .93 | .98 | .98 |
| MAX8 | 29 | -.32 | -.18 | -.19 | .95 | .95 | .95 | .96 | .94 | .98 | .98 |
| DIF1 | 30 | -.09 | .05 | .11 | .12 | .12 | .13 | .12 | .12 | .11 | .10 |
| DIF2 | 31 | -.01 | .19 | .01 | -.12 | -.06 | -.01 | -.03 | -.02 | -.03 | -.03 |
| DIF3 | 32 | -.05 | .10 | -.22 | -.02 | -.00 | -.02 | .08 | .09 | .09 | .08 |
| DIF4 | 33 | -.11 | .11 | -.18 | -.11 | -.06 | -.02 | .01 | .05 | .00 | -.01 |
| DIF5 | 34 | .03 | .08 | .06 | -.19 | -.17 | -.14 | -.18 | -.21 | -.15 | -.15 |
| DIF6 | 35 | -.21 | .02 | -.37 | -.10 | -.07 | -.06 | -.03 | -.05 | -.00 | .01 |
| DIF7 | 36 | .06 | .10 | -.16 | -.18 | -.16 | -.12 | -.13 | -.14 | -.13 | -.16 |
| DIF8 | 37 | -.15 | .01 | -.19 | -.25 | -.25 | -.27 | -.22 | -.19 | -.22 | -.23 |
| A1 | 38 | -.17 | -.19 | -.08 | .20 | .18 | .19 | .18 | .18 | .22 | .20 |
| A2 | 39 | -.21 | -.18 | -.12 | .10 | .10 | .11 | .10 | .10 | .13 | .11 |
| A3 | 40 | -.18 | -.21 | -.09 | .09 | .05 | .04 | .05 | .03 | .08 | .07 |
| A4 | 41 | -.21 | -.21 | -.15 | .12 | .09 | .10 | .11 | .12 | .13 | .10 |
| A5 | 42 | -.25 | -.31 | -.09 | .05 | .02 | .01 | .01 | -.01 | .04 | .03 |
| A6 | 43 | -.27 | -.28 | -.14 | .06 | .03 | .02 | .02 | .01 | .06 | .06 |
| A7 | 44 | -.21 | -.13 | -.04 | -.09 | -.12 | -.13 | -.13 | -.13 | -.12 | -.13 |
| A8 | 45 | -.24 | -.25 | -.14 | .04 | .02 | .02 | .03 | .04 | .05 | .03 |
| B1 | 46 | -.06 | -.06 | -.02 | .26 | .25 | .25 | .22 | .20 | .24 | .27 |
| B2 | 47 | .05 | .06 | .05 | .16 | .20 | .22 | .20 | .20 | .21 | .24 |
| B3 | 48 | -.01 | .05 | -.00 | .26 | .29 | .31 | .29 | .28 | .30 | .32 |
| B4 | 49 | -.05 | -.00 | -.10 | .20 | .24 | .27 | .26 | .26 | .27 | .30 |
| B5 | 50 | -.03 | .02 | -.18 | -.07 | -.04 | -.01 | .00 | .00 | -.01 | -.03 |
| B6 | 51 | -.06 | .04 | -.24 | .19 | .21 | .21 | .24 | .22 | .26 | .28 |
| B7 | 52 | -.10 | -.04 | -.01 | .08 | .13 | .17 | .13 | .10 | .15 | .17 |
| B8 | 53 | -.20 | -.11 | -.12 | .20 | .17 | .16 | .15 | .09 | .21 | .25 |
| C1 | 54 | -.18 | -.15 | -.19 | .07 | .05 | .06 | .05 | .06 | .07 | .07 |
| C2 | 55 | -.03 | .26 | .32 | -.07 | -.07 | -.06 | -.07 | -.05 | -.06 | -.09 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | .08 | -.21 | .03 | -.10 | -.11 | -.10 | -.12 | -.11 | -.12 | -.08 |
| C5 | 58 | .05 | -.06 | -.04 | -.17 | -.18 | -.19 | -.19 | -.18 | -.18 | -.12 |

COFRELATIONS

| | | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | -.11 | -.17 | -.16 | -.08 | -.10 | -.08 | -.09 | -.08 | -.05 | -.05 |
| C7 | 60 | -.07 | .06 | .03 | .04 | -.01 | .01 | -.02 | -.02 | -.01 | .02 |
| C8 | 61 | -.11 | -.07 | -.10 | -.08 | -.08 | -.08 | -.08 | -.07 | -.09 | -.07 |
| TR1 | 62 | -.17 | -.19 | -.08 | .32 | .30 | .30 | .28 | .27 | .32 | .33 |
| TR2 | 63 | -.08 | -.06 | -.03 | .21 | .24 | .27 | .25 | .24 | .27 | .28 |
| TR3 | 64 | -.19 | -.20 | -.06 | .25 | .25 | .25 | .24 | .22 | .27 | .29 |
| TR4 | 65 | -.18 | -.16 | -.18 | .26 | .28 | .30 | .30 | .30 | .32 | .33 |
| TR5 | 66 | -.27 | -.27 | -.17 | .05 | .05 | .04 | .05 | .04 | .08 | .06 |
| TR6 | 67 | -.27 | -.21 | -.29 | .19 | .17 | .17 | .19 | .17 | .24 | .25 |
| TR7 | 68 | -.26 | -.15 | -.02 | .03 | .05 | .08 | .04 | .02 | .06 | .07 |
| TR8 | 69 | -.33 | -.30 | -.21 | .15 | .12 | .11 | .11 | .08 | .16 | .17 |
| S1 | 70 | -.17 | -.18 | -.07 | .32 | .30 | .31 | .29 | .27 | .33 | .33 |
| S2 | 71 | -.07 | -.04 | -.02 | .19 | .22 | .26 | .24 | .23 | .26 | .27 |
| S3 | 72 | -.16 | -.14 | -.08 | .27 | .27 | .27 | .26 | .24 | .30 | .30 |
| S4 | 73 | -.17 | -.13 | -.18 | .25 | .27 | .30 | .30 | .30 | .32 | .33 |
| S5 | 74 | -.25 | -.29 | -.18 | -.01 | -.02 | -.02 | -.01 | -.03 | .02 | .00 |
| S6 | 75 | -.27 | -.21 | -.29 | .18 | .17 | .17 | .18 | .16 | .24 | .25 |
| S7 | 76 | -.26 | -.11 | -.02 | .02 | .03 | .07 | .03 | -.00 | .05 | .08 |
| S8 | 77 | -.34 | -.29 | -.21 | .15 | .12 | .11 | .11 | .08 | .17 | .18 |
| PVCON | 78 | .05 | .05 | .14 | .21 | .21 | .19 | .18 | .14 | .19 | .20 |
| PVEXP | 79 | -.03 | -.04 | .11 | -.01 | .00 | -.00 | -.03 | -.06 | -.04 | -.01 |
| PVDIF | 80 | -.11 | -.12 | -.01 | -.29 | -.26 | -.24 | -.26 | -.26 | -.29 | -.28 |
| SRD1 | 81 | -.03 | .15 | .03 | .33 | .33 | .34 | .34 | .35 | .34 | .34 |
| SRD2 | 82 | -.01 | .19 | .01 | .29 | .33 | .38 | .37 | .39 | .36 | .37 |
| SRD3 | 83 | .00 | .22 | -.03 | .34 | .38 | .43 | .42 | .43 | .45 | .45 |
| SRD4 | 84 | .00 | .20 | -.03 | .25 | .29 | .32 | .35 | .39 | .34 | .34 |
| SRD5 | 85 | -.06 | .13 | -.13 | .22 | .25 | .28 | .31 | .32 | .30 | .30 |
| SRD6 | 86 | .00 | .12 | -.10 | .35 | .40 | .42 | .45 | .49 | .45 | .47 |
| SRD7 | 87 | -.04 | .14 | -.14 | .29 | .31 | .33 | .34 | .34 | .36 | .38 |
| SRD8 | 88 | -.04 | .16 | -.03 | .20 | .24 | .24 | .27 | .28 | .28 | .30 |
| MIN1-7 | 89 | .04 | -.04 | .23 | .27 | .21 | .16 | .12 | .12 | .05 | -.03 |
| Z.S&DIF357 | 90 | -.18 | -.10 | -.16 | -.01 | .00 | .03 | .02 | -.01 | .06 | .05 |
| BL1 | 91 | .07 | .02 | .01 | -.15 | -.15 | -.13 | -.16 | -.15 | -.14 | -.16 |
| BL2 | 92 | .08 | .02 | -.02 | -.17 | -.16 | -.13 | -.16 | -.15 | -.15 | -.18 |
| BL3 | 93 | .05 | -.00 | -.05 | -.20 | -.19 | -.16 | -.19 | -.17 | -.19 | -.21 |
| BL4 | 94 | .07 | .02 | -.06 | -.21 | -.19 | -.16 | -.18 | -.16 | -.18 | -.21 |
| BL5 | 95 | .00 | -.03 | -.05 | -.22 | -.23 | -.21 | -.23 | -.21 | -.21 | -.23 |
| BL6 | 96 | .03 | -.03 | -.06 | -.21 | -.21 | -.18 | -.21 | -.19 | -.19 | -.21 |
| BL7 | 97 | .01 | -.08 | -.03 | -.21 | -.22 | -.21 | -.23 | -.21 | -.21 | -.23 |
| BL8 | 98 | .03 | -.06 | -.06 | -.22 | -.22 | -.21 | -.22 | -.21 | -.21 | -.23 |
| SRDAV | 99 | -.04 | .19 | -.11 | .32 | .36 | .40 | .41 | .41 | .42 | .43 |
| SRDBA | 100 | -.01 | .18 | -.04 | .30 | .34 | .37 | .40 | .42 | .39 | .41 |
| MAXAV | 101 | -.27 | -.13 | -.17 | .96 | .97 | .98 | .99 | .98 | .99 | .97 |
| MAXBA | 102 | -.29 | -.15 | -.16 | .98 | .99 | .98 | .99 | .98 | 1.00 | .98 |
| MINAV | 103 | -.27 | -.14 | -.16 | .97 | .99 | .99 | 1.00 | .99 | .99 | .98 |
| MINBA | 104 | -.28 | -.15 | -.15 | .98 | .99 | .98 | .99 | .98 | 1.00 | .98 |
| DIFAV | 105 | .03 | .12 | -.10 | -.20 | -.17 | -.14 | -.14 | -.16 | -.12 | -.13 |
| DIFBA | 106 | -.14 | .10 | -.22 | -.16 | -.12 | -.10 | -.07 | -.06 | -.06 | -.06 |
| BLAV | 107 | .02 | -.04 | -.05 | -.22 | -.22 | -.20 | -.22 | -.20 | -.21 | -.23 |
| BLBA | 108 | .05 | -.01 | -.05 | -.21 | -.20 | -.17 | -.20 | -.18 | -.18 | -.21 |
| AAV | 109 | -.23 | -.25 | -.09 | .04 | .00 | -.01 | -.01 | -.02 | .02 | .01 |
| ABA | 110 | -.24 | -.25 | -.15 | .07 | .05 | .05 | .05 | .05 | .08 | .06 |
| BAV | 111 | -.06 | .01 | -.06 | .16 | .21 | .24 | .22 | .20 | .23 | .24 |
| BBA | 112 | -.08 | .00 | -.12 | .22 | .24 | .25 | .25 | .22 | .28 | .31 |
| TRAV | 113 | -.29 | -.25 | -.10 | .15 | .16 | .16 | .15 | .13 | .18 | .19 |
| TRBA | 114 | -.26 | -.22 | -.21 | .22 | .22 | .22 | .23 | .21 | .27 | .28 |
| SAV | 115 | -.27 | -.22 | -.12 | .14 | .14 | .16 | .14 | .11 | .18 | .18 |
| SBA | 116 | -.25 | -.20 | -.20 | .21 | .21 | .22 | .22 | .21 | .27 | .28 |

CORRELATIONS

| | | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .01 | .03 | .02 | .04 | .06 | .02 | .04 | .02 | .02 | .04 |
| MS | 2 | -.02 | -.06 | -.03 | .01 | .03 | .01 | .02 | .00 | -.01 | -.08 |
| RS | 3 | -.07 | -.10 | -.10 | -.06 | -.05 | -.07 | -.05 | -.07 | -.06 | .02 |
| IF | 4 | .03 | -.00 | .01 | .05 | .04 | .01 | .05 | .03 | .04 | -.04 |
| ANXAV | 5 | -.17 | -.19 | -.19 | -.15 | -.16 | -.19 | -.16 | -.19 | -.17 | -.14 |
| DEPAV | 6 | -.15 | -.16 | -.16 | -.11 | -.11 | -.15 | -.13 | -.15 | -.15 | -.11 |
| HOSAV | 7 | -.06 | -.08 | -.10 | -.08 | -.09 | -.14 | -.07 | -.10 | -.08 | -.14 |
| ANXDF | 8 | -.07 | -.03 | -.01 | -.06 | -.06 | -.01 | -.07 | -.04 | -.07 | .05 |
| DEPDF | 9 | .00 | .03 | .04 | -.00 | .01 | .06 | .02 | .03 | .00 | .13 |
| HOSDF | 10 | -.10 | -.03 | -.01 | -.05 | -.06 | -.02 | -.09 | -.09 | -.09 | .19 |
| ANXL | 11 | -.31 | -.28 | -.25 | -.27 | -.27 | -.24 | -.30 | -.29 | -.32 | -.09 |
| DEPL | 12 | -.18 | -.16 | -.14 | -.14 | -.13 | -.10 | -.13 | -.14 | -.18 | .05 |
| HOSL | 13 | -.18 | -.10 | -.11 | -.14 | -.17 | -.15 | -.19 | -.21 | -.19 | .11 |
| MIN1 | 14 | .95 | 1.00 | .98 | .96 | .96 | .92 | .96 | .93 | .95 | .12 |
| MIN2 | 15 | .95 | .99 | 1.00 | .98 | .98 | .95 | .97 | .94 | .95 | .12 |
| MIN3 | 16 | .95 | .97 | .99 | .99 | .98 | .96 | .97 | .95 | .95 | .13 |
| MIN4 | 17 | .96 | .97 | .99 | .99 | 1.00 | .97 | .98 | .96 | .96 | .12 |
| MIN5 | 18 | .94 | .95 | .97 | .97 | .99 | .97 | .97 | .93 | .94 | .12 |
| MIN6 | 19 | .98 | .97 | .98 | .98 | .99 | .96 | 1.00 | .98 | .98 | .11 |
| MIN7 | 20 | .98 | .95 | .96 | .96 | .97 | .93 | .99 | .98 | .98 | .10 |
| MIN8 | 21 | 1.00 | .95 | .95 | .95 | .96 | .92 | .98 | .98 | 1.00 | .05 |
| MAX1 | 22 | .95 | 1.00 | .98 | .96 | .96 | .93 | .96 | .93 | .95 | .15 |
| MAX2 | 23 | .95 | .98 | 1.00 | .99 | .98 | .96 | .97 | .95 | .94 | .16 |
| MAX3 | 24 | .95 | .96 | .99 | 1.00 | .99 | .97 | .98 | .95 | .95 | .16 |
| MAX4 | 25 | .96 | .96 | .98 | .99 | 1.00 | .98 | .98 | .96 | .96 | .15 |
| MAX5 | 26 | .92 | .93 | .96 | .97 | .98 | 1.00 | .96 | .93 | .92 | .22 |
| MAX6 | 27 | .98 | .96 | .97 | .98 | .98 | .96 | 1.00 | .98 | .98 | .14 |
| MAX7 | 28 | .98 | .93 | .95 | .95 | .96 | .93 | .98 | 1.00 | .98 | .13 |
| MAX8 | 29 | 1.00 | .95 | .94 | .95 | .96 | .92 | .98 | .98 | 1.00 | .07 |
| DIF1 | 30 | .05 | .15 | .16 | .16 | .15 | .22 | .14 | .13 | .07 | 1.00 |
| DIF2 | 31 | -.10 | -.09 | -.01 | .05 | .01 | .13 | .00 | .02 | -.08 | .68 |
| DIF3 | 32 | .04 | -.01 | .02 | .10 | .11 | .16 | .12 | .11 | .05 | .26 |
| DIF4 | 33 | -.06 | -.09 | -.02 | .04 | .06 | .17 | .05 | .07 | -.03 | .66 |
| DIF5 | 34 | -.17 | -.17 | -.14 | -.10 | -.16 | .02 | -.12 | -.08 | -.16 | .43 |
| DIF6 | 35 | -.01 | -.08 | -.05 | -.00 | .00 | .06 | .05 | .13 | .02 | .50 |
| DIF7 | 36 | -.06 | -.18 | -.14 | -.11 | -.11 | -.06 | -.09 | .03 | -.04 | .14 |
| DIF8 | 37 | -.22 | -.23 | -.23 | -.24 | -.19 | -.15 | -.18 | -.16 | -.17 | .40 |
| A1 | 38 | .24 | .20 | .18 | .20 | .19 | .21 | .23 | .24 | .25 | .08 |
| A2 | 39 | .14 | .10 | .10 | .12 | .12 | .15 | .15 | .17 | .15 | .17 |
| A3 | 40 | .13 | .08 | .04 | .03 | .04 | .02 | .08 | .11 | .14 | -.15 |
| A4 | 41 | .15 | .12 | .10 | .11 | .12 | .15 | .14 | .16 | .16 | .12 |
| A5 | 42 | .10 | .05 | .01 | .01 | .01 | .01 | .05 | .07 | .11 | -.05 |
| A6 | 43 | .10 | .06 | .02 | .02 | .02 | .04 | .08 | .11 | .12 | .05 |
| A7 | 44 | -.07 | -.10 | -.12 | -.14 | -.13 | -.13 | -.12 | -.13 | -.07 | -.09 |
| A8 | 45 | .08 | .04 | .02 | .03 | .03 | .06 | .06 | .08 | .10 | .04 |
| B1 | 46 | .22 | .27 | .26 | .26 | .24 | .24 | .26 | .26 | .23 | .49 |
| B2 | 47 | .19 | .16 | .22 | .26 | .22 | .26 | .22 | .23 | .19 | .21 |
| B3 | 48 | .28 | .27 | .31 | .34 | .30 | .33 | .31 | .33 | .27 | .19 |
| B4 | 49 | .24 | .21 | .26 | .30 | .28 | .31 | .28 | .30 | .24 | .22 |
| B5 | 50 | -.02 | -.07 | -.03 | .02 | .02 | .04 | .01 | .02 | -.02 | .09 |
| B6 | 51 | .23 | .20 | .23 | .27 | .25 | .27 | .29 | .30 | .24 | .21 |
| B7 | 52 | .14 | .09 | .14 | .19 | .14 | .16 | .16 | .20 | .14 | .12 |
| B8 | 53 | .20 | .20 | .18 | .18 | .16 | .14 | .22 | .25 | .21 | .15 |
| C1 | 54 | .06 | .08 | .05 | .05 | .05 | .07 | .08 | .07 | .07 | .20 |
| C2 | 55 | -.10 | -.06 | -.05 | -.06 | -.06 | -.01 | -.06 | -.09 | -.09 | .29 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | -.11 | -.10 | -.10 | -.10 | -.12 | -.10 | -.12 | -.09 | -.12 | .09 |
| C5 | 58 | -.07 | -.17 | -.19 | -.20 | -.20 | -.22 | -.18 | -.09 | -.06 | -.19 |

CORRELATIONS

| | | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | -.03 | -.07 | -.10 | -.10 | -.09 | -.07 | -.05 | -.05 | -.03 | .07 |
| C7 | 60 | .01 | .04 | -.01 | .01 | -.02 | -.02 | -.01 | .01 | .00 | -.04 |
| C8 | 61 | -.11 | -.08 | -.08 | -.08 | -.08 | -.08 | -.08 | -.08 | -.10 | .10 |
| TR1 | 62 | .32 | .33 | .31 | .32 | .30 | .32 | .34 | .35 | .33 | .39 |
| TR2 | 63 | .26 | .21 | .26 | .31 | .27 | .32 | .29 | .31 | .26 | .26 |
| TR3 | 64 | .31 | .25 | .25 | .26 | .25 | .25 | .28 | .32 | .31 | .03 |
| TR4 | 65 | .31 | .26 | .29 | .34 | .32 | .36 | .34 | .37 | .32 | .26 |
| TR5 | 66 | .12 | .05 | .04 | .06 | .06 | .07 | .10 | .12 | .13 | -.01 |
| TR6 | 67 | .25 | .19 | .18 | .21 | .20 | .23 | .27 | .31 | .27 | .17 |
| TR7 | 68 | .08 | .03 | .06 | .10 | .05 | .08 | .06 | .10 | .08 | .06 |
| TR8 | 69 | .20 | .15 | .12 | .13 | .12 | .14 | .18 | .23 | .21 | .11 |
| S1 | 70 | .32 | .33 | .31 | .32 | .30 | .32 | .34 | .36 | .33 | .40 |
| S2 | 71 | .24 | .20 | .25 | .30 | .26 | .31 | .28 | .30 | .25 | .28 |
| S3 | 72 | .32 | .27 | .27 | .28 | .27 | .27 | .31 | .34 | .33 | .02 |
| S4 | 73 | .30 | .26 | .29 | .34 | .32 | .37 | .34 | .36 | .31 | .27 |
| S5 | 74 | .07 | -.01 | -.02 | -.00 | -.01 | .01 | .03 | .07 | .08 | -.02 |
| S6 | 75 | .25 | .19 | .18 | .21 | .20 | .23 | .27 | .31 | .26 | .19 |
| S7 | 76 | .08 | .02 | .04 | .09 | .03 | .06 | .06 | .10 | .08 | .04 |
| S8 | 77 | .20 | .15 | .12 | .13 | .12 | .14 | .19 | .23 | .21 | .13 |
| PVCON | 78 | .19 | .21 | .20 | .18 | .17 | .16 | .19 | .21 | .18 | .07 |
| PVEXP | 79 | -.06 | -.02 | -.00 | -.02 | -.03 | -.04 | -.04 | -.03 | -.07 | -.02 |
| PVDIF | 80 | -.32 | -.29 | -.26 | -.25 | -.26 | -.26 | -.30 | -.30 | -.32 | -.12 |
| SRD1 | 81 | .29 | .35 | .35 | .35 | .36 | .38 | .35 | .33 | .30 | .64 |
| SRD2 | 82 | .31 | .31 | .36 | .41 | .39 | .42 | .37 | .37 | .32 | .50 |
| SRD3 | 83 | .41 | .35 | .41 | .46 | .43 | .49 | .46 | .47 | .42 | .27 |
| SRD4 | 84 | .28 | .27 | .31 | .36 | .38 | .43 | .36 | .35 | .29 | .51 |
| SRD5 | 85 | .28 | .23 | .27 | .32 | .33 | .39 | .32 | .35 | .30 | .35 |
| SRD6 | 86 | .40 | .36 | .42 | .46 | .48 | .50 | .47 | .47 | .41 | .38 |
| SRD7 | 87 | .35 | .30 | .32 | .35 | .36 | .38 | .38 | .42 | .36 | .28 |
| SRD8 | 88 | .25 | .21 | .26 | .27 | .29 | .31 | .30 | .31 | .27 | .40 |
| MIN1-7 | 89 | .03 | .27 | .19 | .12 | .11 | .09 | .03 | -.05 | .02 | .06 |
| Z.S&DIF357 | 90 | .09 | -.00 | .02 | .07 | .04 | .12 | .09 | .16 | .11 | .20 |
| BL1 | 91 | -.16 | -.14 | -.14 | -.13 | -.15 | -.10 | -.13 | -.12 | -.16 | .25 |
| BL2 | 92 | -.18 | -.16 | -.15 | -.13 | -.15 | -.09 | -.14 | -.13 | -.17 | .26 |
| BL3 | 93 | -.21 | -.20 | -.19 | -.16 | -.18 | -.12 | -.18 | -.17 | -.20 | .20 |
| BL4 | 94 | -.20 | -.20 | -.18 | -.15 | -.17 | -.11 | -.17 | -.16 | -.20 | .20 |
| BL5 | 95 | -.22 | -.22 | -.23 | -.21 | -.22 | -.18 | -.20 | -.19 | -.21 | .14 |
| BL6 | 96 | -.20 | -.21 | -.20 | -.18 | -.20 | -.15 | -.18 | -.16 | -.19 | .17 |
| BL7 | 97 | -.21 | -.21 | -.23 | -.22 | -.22 | -.19 | -.20 | -.19 | -.20 | .11 |
| BL8 | 98 | -.21 | -.22 | -.22 | -.20 | -.22 | -.18 | -.20 | -.18 | -.20 | .13 |
| SRDAV | 99 | .40 | .34 | .38 | .44 | .43 | .48 | .44 | .47 | .41 | .34 |
| SRDBA | 100 | .34 | .31 | .37 | .41 | .42 | .45 | .41 | .41 | .35 | .48 |
| MAXAV | 101 | .96 | .96 | .98 | .99 | .99 | .98 | .99 | .98 | .96 | .18 |
| MAXBA | 102 | .98 | .98 | .99 | .99 | .99 | .96 | 1.00 | .98 | .98 | .13 |
| MINAV | 103 | .97 | .97 | .99 | .99 | .99 | .97 | .99 | .97 | .97 | .12 |
| MINBA | 104 | .98 | .98 | .99 | .99 | .99 | .96 | .99 | .97 | .98 | .10 |
| DIFAV | 105 | -.11 | -.18 | -.14 | -.08 | -.11 | .03 | -.08 | -.00 | -.09 | .39 |
| DIFBA | 106 | -.10 | -.14 | -.08 | -.03 | -.03 | .07 | -.01 | .03 | -.07 | .67 |
| BLAV | 107 | -.21 | -.21 | -.22 | -.20 | -.21 | -.17 | -.20 | -.18 | -.21 | .16 |
| BLBA | 108 | -.20 | -.20 | -.19 | -.17 | -.19 | -.13 | -.17 | -.16 | -.20 | .19 |
| AAV | 109 | .08 | .03 | -.01 | -.02 | -.01 | -.02 | .02 | .04 | .09 | -.11 |
| ABA | 110 | .11 | .07 | .05 | .06 | .06 | .09 | .10 | .12 | .13 | .08 |
| BAV | 111 | .21 | .16 | .23 | .28 | .23 | .27 | .24 | .27 | .20 | .19 |
| BBA | 112 | .25 | .23 | .26 | .30 | .27 | .29 | .30 | .32 | .26 | .23 |
| TRAV | 113 | .22 | .15 | .16 | .19 | .16 | .18 | .20 | .24 | .23 | .03 |
| TRBA | 114 | .28 | .22 | .23 | .26 | .24 | .28 | .30 | .33 | .29 | .21 |
| SAV | 115 | .22 | .14 | .14 | .17 | .14 | .16 | .19 | .24 | .23 | .02 |
| SBA | 116 | .27 | .22 | .23 | .26 | .24 | .28 | .30 | .33 | .29 | .23 |

CORRELATIONS

| | | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .02 | .10 | .12 | -.19 | .06 | -.00 | .18 | .14 | .19 | .13 |
| MS | 2 | .07 | .17 | .17 | -.12 | .10 | .01 | .08 | .01 | .11 | -.08 |
| RS | 3 | .05 | .14 | .12 | -.11 | .07 | -.02 | .10 | .07 | .14 | .06 |
| IF | 4 | .04 | .11 | .05 | -.16 | .05 | -.01 | .04 | .08 | .14 | .13 |
| ANXAV | 5 | -.09 | .06 | -.07 | -.17 | -.09 | -.15 | -.07 | -.06 | -.01 | -.03 |
| DEPAV | 6 | -.08 | .08 | .01 | -.17 | .02 | -.00 | -.01 | -.06 | .03 | -.03 |
| HOSAV | 7 | -.19 | -.14 | -.21 | -.15 | -.25 | -.24 | -.30 | .06 | .08 | .09 |
| ANXDF | 8 | .07 | -.08 | -.02 | .16 | -.07 | .16 | -.05 | -.07 | -.13 | -.09 |
| DEPDF | 9 | .20 | .00 | .08 | .20 | .00 | .07 | .01 | -.08 | -.15 | -.12 |
| HOSDF | 10 | .14 | -.07 | .01 | .15 | -.11 | .05 | .07 | -.10 | -.15 | -.13 |
| ANXL | 11 | -.01 | -.05 | -.11 | .03 | -.21 | .06 | -.15 | -.17 | -.21 | -.18 |
| DEPL | 12 | .19 | .10 | .11 | .08 | .02 | .10 | .01 | -.19 | -.18 | -.21 |
| HOSL | 13 | .01 | -.22 | -.18 | .06 | -.37 | -.16 | -.19 | -.08 | -.12 | -.09 |
| MIN1 | 14 | -.12 | -.02 | -.11 | -.19 | -.10 | -.18 | -.25 | .20 | .10 | .09 |
| MIN2 | 15 | -.06 | -.00 | -.06 | -.17 | -.07 | -.16 | -.25 | .18 | .10 | .05 |
| MIN3 | 16 | -.01 | -.02 | -.02 | -.14 | -.06 | -.12 | -.27 | .19 | .11 | .04 |
| MIN4 | 17 | -.03 | .08 | .01 | -.18 | -.03 | -.13 | -.22 | .18 | .10 | .05 |
| MIN5 | 18 | -.02 | .09 | .05 | -.21 | -.05 | -.14 | -.19 | .18 | .10 | .03 |
| MIN6 | 19 | -.03 | .09 | .00 | -.15 | -.00 | -.13 | -.22 | .22 | .13 | .08 |
| MIN7 | 20 | -.03 | .08 | -.01 | -.15 | .01 | -.16 | -.23 | .20 | .11 | .07 |
| MIN8 | 21 | -.10 | .04 | -.06 | -.17 | -.01 | -.06 | -.22 | .24 | .14 | .13 |
| MAX1 | 22 | -.09 | -.01 | -.09 | -.17 | -.08 | -.18 | -.23 | .20 | .10 | .08 |
| MAX2 | 23 | -.01 | .02 | -.02 | -.14 | -.05 | -.14 | -.23 | .18 | .10 | .04 |
| MAX3 | 24 | .05 | .10 | .04 | -.10 | -.00 | -.11 | -.24 | .20 | .12 | .03 |
| MAX4 | 25 | .01 | .11 | .06 | -.16 | .00 | -.11 | -.19 | .19 | .12 | .04 |
| MAX5 | 26 | .13 | .16 | .17 | .02 | .06 | -.06 | -.15 | .21 | .15 | .02 |
| MAX6 | 27 | .00 | .12 | .05 | -.12 | .05 | -.09 | -.18 | .23 | .15 | .08 |
| MAX7 | 28 | .02 | .11 | .07 | -.08 | .13 | .03 | -.16 | .24 | .17 | .11 |
| MAX8 | 29 | -.08 | .05 | -.03 | -.16 | .02 | -.04 | -.17 | .25 | .15 | .14 |
| DIF1 | 30 | .68 | .26 | .66 | .43 | .50 | .14 | .40 | .08 | .17 | -.15 |
| DIF2 | 31 | 1.00 | .54 | .81 | .64 | .58 | .27 | .30 | .01 | .14 | -.28 |
| DIF3 | 32 | .54 | 1.00 | .50 | .32 | .50 | .14 | .23 | .07 | .13 | -.06 |
| DIF4 | 33 | .81 | .50 | 1.00 | .52 | .75 | .39 | .57 | .12 | .28 | -.15 |
| DIF5 | 34 | .64 | .32 | .52 | 1.00 | .47 | .40 | .20 | .10 | .21 | -.03 |
| DIF6 | 35 | .58 | .50 | .75 | .47 | 1.00 | .64 | .61 | .17 | .33 | .07 |
| DIF7 | 36 | .27 | .14 | .39 | .40 | .64 | 1.00 | .40 | .24 | .33 | .22 |
| DIF8 | 37 | .30 | .23 | .57 | .20 | .61 | .40 | 1.00 | .10 | .23 | .11 |
| A1 | 38 | .01 | .07 | .12 | .10 | .17 | .24 | .10 | 1.00 | .92 | .70 |
| A2 | 39 | .14 | .13 | .28 | .21 | .33 | .33 | .23 | .92 | 1.00 | .64 |
| A3 | 40 | -.28 | -.06 | -.15 | -.03 | .07 | .22 | .11 | .70 | .64 | 1.00 |
| A4 | 41 | .02 | .08 | .21 | .14 | .27 | .30 | .26 | .90 | .94 | .74 |
| A5 | 42 | -.14 | .01 | -.04 | .09 | .14 | .23 | .18 | .80 | .79 | .83 |
| A6 | 43 | -.05 | .06 | .10 | .14 | .28 | .27 | .27 | .88 | .90 | .77 |
| A7 | 44 | -.16 | -.05 | -.08 | .01 | -.04 | .04 | .15 | .37 | .38 | .59 |
| A8 | 45 | -.02 | .08 | .15 | .10 | .24 | .28 | .30 | .86 | .87 | .76 |
| B1 | 46 | .33 | .12 | .34 | .17 | .25 | -.06 | .14 | .01 | -.01 | -.23 |
| B2 | 47 | .52 | .34 | .34 | .24 | .16 | -.03 | -.03 | .00 | -.08 | -.30 |
| B3 | 48 | .34 | .21 | .28 | .21 | .14 | .03 | -.15 | .08 | -.02 | -.23 |
| B4 | 49 | .42 | .30 | .41 | .18 | .25 | -.03 | .03 | .05 | -.03 | -.26 |
| B5 | 50 | .18 | .24 | .30 | .16 | .25 | .26 | .12 | .13 | .13 | -.06 |
| B6 | 51 | .35 | .47 | .37 | .20 | .40 | .12 | .08 | .08 | -.00 | -.15 |
| B7 | 52 | .30 | .22 | .17 | .28 | .15 | .12 | -.11 | .03 | .05 | -.16 |
| B8 | 53 | .12 | .12 | .12 | .24 | .22 | .00 | .10 | .01 | -.04 | -.05 |
| C1 | 54 | .02 | -.10 | .04 | .07 | .15 | -.03 | .17 | .18 | .21 | .14 |
| C2 | 55 | .27 | .05 | .16 | .17 | .03 | .02 | .17 | .06 | .10 | -.04 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | .15 | -.01 | .02 | .06 | -.05 | -.03 | -.13 | -.05 | -.10 | -.07 |
| C5 | 58 | -.20 | -.10 | -.20 | -.13 | -.00 | .16 | .08 | -.03 | -.09 | .16 |

CORRELATIONS

| | | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | -.08 | -.14 | -.03 | .08 | .09 | .00 | .12 | .11 | .13 | .10 |
| C7 | 60 | .01 | -.00 | -.02 | .03 | .04 | -.05 | -.10 | .09 | .09 | .02 |
| C8 | 61 | .03 | .00 | .09 | -.04 | .13 | -.06 | .06 | .08 | .11 | -.01 |
| TR1 | 62 | .23 | .14 | .32 | .19 | .30 | .13 | .17 | .72 | .65 | .35 |
| TR2 | 63 | .52 | .36 | .44 | .33 | .32 | .15 | .09 | .51 | .47 | .10 |
| TR3 | 64 | .05 | .14 | .11 | .12 | .19 | .15 | .02 | .64 | .54 | .68 |
| TR4 | 65 | .38 | .30 | .48 | .25 | .39 | .16 | .18 | .61 | .56 | .25 |
| TR5 | 66 | -.02 | .16 | .13 | .13 | .28 | .34 | .21 | .85 | .82 | .77 |
| TR6 | 67 | .21 | .40 | .34 | .27 | .52 | .32 | .27 | .78 | .73 | .54 |
| TR7 | 68 | .16 | .18 | .11 | .26 | .10 | .13 | .01 | .31 | .31 | .27 |
| TR8 | 69 | .05 | .15 | .21 | .25 | .36 | .27 | .32 | .78 | .75 | .66 |
| S1 | 70 | .24 | .13 | .32 | .19 | .30 | .12 | .17 | .71 | .64 | .33 |
| S2 | 71 | .54 | .37 | .45 | .32 | .32 | .15 | .09 | .50 | .47 | .08 |
| S3 | 72 | .02 | .11 | .09 | .13 | .17 | .20 | -.02 | .66 | .52 | .66 |
| S4 | 73 | .39 | .32 | .50 | .24 | .39 | .16 | .18 | .60 | .55 | .23 |
| S5 | 74 | -.05 | .12 | .10 | .15 | .26 | .37 | .24 | .81 | .79 | .76 |
| S6 | 75 | .21 | .39 | .35 | .26 | .52 | .31 | .28 | .78 | .74 | .53 |
| S7 | 76 | .17 | .18 | .10 | .27 | .12 | .13 | -.01 | .31 | .33 | .27 |
| S8 | 77 | .05 | .15 | .21 | .24 | .36 | .25 | .33 | .79 | .77 | .66 |
| PVCON | 78 | -.07 | -.11 | -.08 | .07 | .07 | .00 | -.20 | .00 | .01 | .07 |
| PVEXP | 79 | -.09 | -.19 | -.07 | .08 | .01 | -.08 | -.19 | -.11 | -.05 | -.03 |
| PVDIF | 80 | -.05 | -.14 | -.00 | .04 | -.09 | -.12 | -.03 | -.16 | -.09 | -.13 |
| SRD1 | 81 | .40 | .14 | .39 | .11 | .29 | -.06 | .25 | .03 | .08 | -.19 |
| SRD2 | 82 | .56 | .19 | .46 | .12 | .27 | -.05 | .12 | .04 | .08 | -.31 |
| SRD3 | 83 | .49 | .30 | .37 | .24 | .26 | .03 | .00 | .10 | .12 | -.23 |
| SRD4 | 84 | .55 | .35 | .56 | .14 | .34 | -.01 | .19 | .05 | .08 | -.29 |
| SRD5 | 85 | .47 | .37 | .46 | .29 | .43 | .21 | .18 | .11 | .16 | -.02 |
| SRD6 | 86 | .43 | .34 | .48 | .01 | .35 | -.00 | .14 | .13 | .13 | -.22 |
| SRD7 | 87 | .30 | .18 | .35 | .13 | .37 | .19 | .17 | .20 | .22 | .00 |
| SRD8 | 88 | .39 | .28 | .40 | .10 | .43 | .04 | .39 | .10 | .20 | -.05 |
| MIN1-7 | 89 | -.31 | -.32 | -.36 | -.14 | -.38 | -.11 | -.09 | .03 | -.02 | .08 |
| Z.S&DIF357 | 90 | .36 | .41 | .41 | .57 | .54 | .60 | .26 | .65 | .67 | .56 |
| BL1 | 91 | .15 | .00 | .18 | .22 | .19 | .24 | .13 | .23 | .22 | .11 |
| BL2 | 92 | .20 | .05 | .22 | .23 | .18 | .26 | .12 | .28 | .25 | .12 |
| BL3 | 93 | .14 | .02 | .19 | .23 | .16 | .26 | .11 | .30 | .28 | .16 |
| BL4 | 94 | .18 | .10 | .22 | .22 | .18 | .28 | .12 | .29 | .27 | .16 |
| BL5 | 95 | .05 | .01 | .12 | .17 | .15 | .26 | .14 | .37 | .37 | .30 |
| BL6 | 96 | .10 | .04 | .15 | .21 | .18 | .27 | .13 | .32 | .32 | .24 |
| BL7 | 97 | -.03 | -.03 | .04 | .11 | .09 | .21 | .13 | .39 | .39 | .36 |
| BL8 | 98 | .04 | .02 | .10 | .18 | .15 | .27 | .15 | .33 | .33 | .32 |
| SRDAV | 99 | .49 | .33 | .45 | .25 | .40 | .16 | .13 | .15 | .19 | -.10 |
| SRDBA | 100 | .52 | .32 | .52 | .10 | .37 | -.01 | .22 | .09 | .13 | -.23 |
| MAXAV | 101 | .07 | .12 | .10 | -.05 | .06 | -.05 | -.19 | .22 | .15 | .05 |
| MAXBA | 102 | -.02 | .08 | .02 | -.15 | .01 | -.10 | -.20 | .21 | .13 | .07 |
| MINAV | 103 | -.02 | .05 | .01 | -.17 | -.03 | -.14 | -.23 | .19 | .11 | .04 |
| MINBA | 104 | -.05 | .05 | -.02 | -.17 | -.03 | -.12 | -.23 | .21 | .12 | .08 |
| DIFAV | 105 | .66 | .55 | .63 | .87 | .71 | .73 | .36 | .19 | .31 | .06 |
| DIFBA | 106 | .81 | .54 | .93 | .55 | .89 | .51 | .72 | .12 | .29 | -.08 |
| BLAV | 107 | .05 | -.00 | .12 | .17 | .14 | .25 | .13 | .36 | .35 | .28 |
| BLBA | 108 | .13 | .05 | .18 | .21 | .18 | .27 | .13 | .31 | .30 | .22 |
| AAV | 109 | -.22 | -.04 | -.10 | .02 | .08 | .20 | .16 | .73 | .70 | .94 |
| ABA | 110 | .00 | .09 | .17 | .14 | .28 | .30 | .28 | .91 | .94 | .76 |
| BAV | 111 | .37 | .28 | .32 | .29 | .22 | .14 | -.10 | .10 | .05 | -.22 |
| BBA | 112 | .42 | .36 | .37 | .25 | .30 | .02 | .05 | .04 | -.05 | -.22 |
| TRAV | 113 | .07 | .20 | .14 | .20 | .23 | .25 | .10 | .74 | .69 | .72 |
| TRBA | 114 | .30 | .33 | .39 | .30 | .45 | .26 | .26 | .77 | .73 | .47 |
| SAV | 115 | .05 | .17 | .12 | .22 | .23 | .29 | .08 | .76 | .70 | .73 |
| SBA | 116 | .31 | .34 | .41 | .30 | .45 | .25 | .26 | .77 | .73 | .45 |

CORRELATIONS

| | | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .25 | .15 | .15 | .11 | .16 | .08 | -.09 | -.08 | -.06 | -.00 |
| MS | 2 | .13 | -.04 | -.00 | .02 | .01 | .03 | .02 | .02 | .06 | .10 |
| RS | 3 | .16 | .06 | .07 | .14 | .08 | .10 | -.06 | -.00 | .00 | .10 |
| IF | 4 | .16 | .11 | .09 | .25 | .12 | .08 | -.02 | .02 | .00 | .03 |
| ANXAV | 5 | .01 | -.09 | -.10 | .13 | -.09 | -.06 | -.12 | -.07 | -.09 | .14 |
| DEPAV | 6 | .04 | -.08 | -.08 | .07 | -.06 | -.06 | -.18 | -.09 | -.10 | .13 |
| HOSAV | 7 | .06 | -.04 | -.03 | .14 | -.07 | .01 | -.07 | -.03 | -.06 | .04 |
| ANXDF | 8 | -.14 | -.09 | -.10 | -.24 | -.09 | .01 | .13 | .05 | .04 | -.13 |
| DEPDF | 9 | -.18 | -.15 | -.13 | -.15 | -.13 | .01 | .20 | .11 | .09 | -.10 |
| HOSDF | 10 | -.16 | -.05 | -.09 | -.12 | -.06 | -.02 | .09 | .02 | -.03 | -.17 |
| ANXL | 11 | -.21 | -.25 | -.27 | -.21 | -.24 | -.06 | .05 | -.01 | -.05 | -.03 |
| DEPL | 12 | -.21 | -.31 | -.28 | -.13 | -.25 | -.06 | .06 | .05 | -.00 | .02 |
| HOSL | 13 | -.15 | -.09 | -.14 | -.04 | -.14 | -.02 | .05 | -.00 | -.10 | -.18 |
| MIN1 | 14 | .12 | .05 | .06 | -.09 | .04 | .26 | .16 | .26 | .20 | -.07 |
| MIN2 | 15 | .09 | .02 | .03 | -.12 | .02 | .25 | .20 | .29 | .24 | -.04 |
| MIN3 | 16 | .10 | .01 | .02 | -.13 | .02 | .25 | .22 | .31 | .27 | -.01 |
| MIN4 | 17 | .11 | .01 | .02 | -.13 | .03 | .22 | .20 | .29 | .26 | .00 |
| MIN5 | 18 | .12 | -.01 | .01 | -.13 | .04 | .20 | .20 | .28 | .26 | .00 |
| MIN6 | 19 | .13 | .04 | .06 | -.12 | .05 | .24 | .21 | .30 | .27 | -.01 |
| MIN7 | 20 | .10 | .03 | .06 | -.13 | .03 | .27 | .24 | .32 | .30 | -.03 |
| MIN8 | 21 | .15 | .10 | .10 | -.07 | .08 | .22 | .19 | .28 | .24 | -.02 |
| MAX1 | 22 | .12 | .05 | .06 | -.10 | .04 | .27 | .16 | .27 | .21 | -.07 |
| MAX2 | 23 | .10 | .01 | .02 | -.12 | .02 | .26 | .22 | .31 | .26 | -.03 |
| MAX3 | 24 | .11 | .01 | .02 | -.14 | .03 | .26 | .26 | .34 | .30 | .02 |
| MAX4 | 25 | .12 | .01 | .02 | -.13 | .03 | .24 | .22 | .30 | .28 | .02 |
| MAX5 | 26 | .15 | .01 | .04 | -.13 | .06 | .24 | .26 | .33 | .31 | .04 |
| MAX6 | 27 | .14 | .05 | .08 | -.12 | .06 | .26 | .22 | .31 | .28 | .01 |
| MAX7 | 28 | .16 | .07 | .11 | -.13 | .08 | .26 | .23 | .33 | .30 | .02 |
| MAX8 | 29 | .16 | .11 | .12 | -.07 | .10 | .23 | .19 | .27 | .24 | -.02 |
| DIF1 | 30 | .12 | -.05 | .05 | -.09 | .04 | .49 | .21 | .19 | .22 | .09 |
| DIF2 | 31 | .02 | -.14 | -.05 | -.16 | -.02 | .33 | .52 | .34 | .42 | .18 |
| DIF3 | 32 | .08 | .01 | .06 | -.05 | .08 | .12 | .34 | .21 | .30 | .24 |
| DIF4 | 33 | .21 | -.04 | .10 | -.08 | .15 | .34 | .34 | .28 | .41 | .30 |
| DIF5 | 34 | .14 | .09 | .14 | .01 | .10 | .17 | .24 | .21 | .18 | .16 |
| DIF6 | 35 | .27 | .14 | .28 | -.04 | .24 | .25 | .16 | .14 | .25 | .25 |
| DIF7 | 36 | .30 | .23 | .27 | .04 | .28 | -.06 | -.03 | .03 | -.03 | .26 |
| DIF8 | 37 | .26 | .18 | .27 | .15 | .30 | .14 | -.03 | -.15 | .03 | .12 |
| A1 | 38 | .90 | .80 | .88 | .37 | .86 | .01 | .00 | .08 | .05 | .13 |
| A2 | 39 | .94 | .79 | .90 | .38 | .87 | -.01 | -.08 | -.02 | -.03 | .13 |
| A3 | 40 | .74 | .83 | .77 | .59 | .76 | -.23 | -.30 | -.23 | -.26 | -.06 |
| A4 | 41 | 1.00 | .83 | .92 | .42 | .90 | -.10 | -.18 | -.18 | -.16 | .10 |
| A5 | 42 | .83 | 1.00 | .94 | .62 | .93 | -.19 | -.23 | -.26 | -.25 | -.16 |
| A6 | 43 | .92 | .94 | 1.00 | .50 | .96 | -.10 | -.21 | -.21 | -.21 | -.07 |
| A7 | 44 | .42 | .62 | .50 | 1.00 | .56 | -.17 | -.23 | -.24 | -.24 | -.29 |
| A8 | 45 | .90 | .93 | .96 | .56 | 1.00 | -.11 | -.16 | -.20 | -.17 | -.11 |
| B1 | 46 | -.10 | -.19 | -.10 | -.17 | -.11 | 1.00 | .64 | .70 | .73 | .23 |
| B2 | 47 | -.18 | -.23 | -.21 | -.23 | -.16 | .64 | 1.00 | .75 | .87 | .29 |
| B3 | 48 | -.18 | -.26 | -.21 | -.24 | -.20 | .70 | .75 | 1.00 | .87 | .37 |
| B4 | 49 | -.16 | -.25 | -.21 | -.24 | -.17 | .73 | .87 | .87 | 1.00 | .39 |
| B5 | 50 | .10 | -.16 | -.07 | -.29 | -.11 | .23 | .29 | .37 | .39 | 1.00 |
| B6 | 51 | -.11 | -.24 | -.17 | -.27 | -.19 | .63 | .66 | .79 | .84 | .58 |
| B7 | 52 | -.06 | -.16 | -.09 | -.32 | -.19 | .17 | .36 | .38 | .35 | .41 |
| B8 | 53 | -.07 | -.08 | -.03 | -.23 | -.18 | .55 | .37 | .52 | .51 | .42 |
| C1 | 54 | .30 | .05 | .18 | -.06 | .08 | .01 | -.08 | -.10 | -.09 | .29 |
| C2 | 55 | .03 | .00 | .01 | -.01 | .00 | -.07 | -.04 | -.01 | -.02 | .03 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | -.10 | -.06 | -.07 | -.06 | -.06 | -.05 | -.04 | .03 | -.04 | -.05 |
| C5 | 58 | -.01 | .01 | .02 | -.01 | .03 | -.10 | -.08 | -.10 | -.09 | -.00 |

CORRELATIONS

| | | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | .22 | .08 | .15 | -.01 | .06 | -.04 | -.11 | -.14 | -.12 | .19 |
| C7 | 60 | .10 | .03 | .09 | -.06 | .02 | -.10 | -.08 | -.10 | -.09 | -.12 |
| C8 | 61 | .10 | -.03 | .05 | -.08 | -.00 | .16 | .02 | .05 | .16 | .22 |
| TR1 | 62 | .58 | .44 | .56 | .15 | .54 | .70 | .44 | .55 | .55 | .26 |
| TR2 | 63 | .36 | .25 | .32 | .01 | .34 | .54 | .84 | .64 | .75 | .33 |
| TR3 | 64 | .52 | .56 | .53 | .35 | .55 | .32 | .37 | .49 | .44 | .19 |
| TR4 | 65 | .49 | .32 | .41 | .06 | .43 | .58 | .67 | .64 | .78 | .39 |
| TR5 | 66 | .84 | .89 | .88 | .48 | .87 | -.04 | -.03 | -.01 | .01 | .25 |
| TR6 | 67 | .68 | .62 | .72 | .24 | .67 | .35 | .30 | .38 | .43 | .34 |
| TR7 | 68 | .25 | .30 | .28 | .39 | .23 | .02 | .18 | .19 | .18 | .18 |
| TR8 | 69 | .76 | .80 | .84 | .37 | .80 | .23 | .08 | .15 | .16 | .14 |
| S1 | 70 | .57 | .43 | .54 | .14 | .53 | .71 | .45 | .55 | .55 | .26 |
| S2 | 71 | .35 | .22 | .30 | -.00 | .32 | .56 | .84 | .65 | .76 | .33 |
| S3 | 72 | .49 | .50 | .48 | .31 | .49 | .35 | .33 | .57 | .45 | .24 |
| S4 | 73 | .47 | .29 | .39 | .05 | .41 | .60 | .67 | .67 | .79 | .41 |
| S5 | 74 | .82 | .85 | .84 | .43 | .81 | -.06 | -.07 | -.06 | -.03 | .38 |
| S6 | 75 | .68 | .60 | .70 | .22 | .65 | .37 | .30 | .39 | .44 | .36 |
| S7 | 76 | .27 | .30 | .30 | .40 | .23 | .01 | .16 | .17 | .15 | .16 |
| S8 | 77 | .78 | .79 | .85 | .36 | .80 | .24 | .08 | .14 | .16 | .17 |
| PVCON | 78 | -.02 | .03 | .01 | .03 | -.03 | .16 | -.02 | .15 | .03 | -.06 |
| PVEXP | 79 | -.08 | -.04 | -.06 | -.05 | -.09 | .09 | -.03 | .11 | .02 | -.00 |
| PVDIF | 80 | -.09 | -.10 | -.10 | -.11 | -.10 | -.07 | -.03 | -.02 | -.00 | .06 |
| SRD1 | 81 | .08 | -.04 | .02 | -.07 | .06 | .43 | .18 | .10 | .17 | -.09 |
| SRD2 | 82 | .01 | -.16 | -.08 | -.19 | -.03 | .39 | .43 | .28 | .40 | .03 |
| SRD3 | 83 | .03 | -.12 | -.02 | -.19 | -.02 | .37 | .51 | .39 | .47 | .14 |
| SRD4 | 84 | .03 | -.15 | -.08 | -.22 | -.01 | .38 | .42 | .32 | .47 | .12 |
| SRD5 | 85 | .16 | -.04 | .01 | -.08 | .04 | .25 | .33 | .21 | .38 | .31 |
| SRD6 | 86 | .08 | -.12 | -.02 | -.22 | .03 | .42 | .43 | .39 | .52 | .15 |
| SRD7 | 87 | .20 | .02 | .09 | -.13 | .08 | .37 | .28 | .36 | .43 | .19 |
| SRD8 | 88 | .19 | .03 | .13 | -.08 | .16 | .28 | .21 | .13 | .24 | .07 |
| MIN1-7 | 89 | .06 | .08 | .01 | .11 | .03 | -.02 | -.24 | -.16 | -.29 | -.14 |
| Z.S&DIF357 | 90 | .62 | .59 | .62 | .35 | .59 | .13 | .23 | .30 | .25 | .39 |
| BL1 | 91 | .18 | .13 | .21 | -.02 | .19 | .14 | -.07 | .08 | -.04 | .15 |
| BL2 | 92 | .20 | .15 | .23 | -.00 | .23 | .13 | -.02 | .12 | .01 | .15 |
| BL3 | 93 | .24 | .20 | .28 | .04 | .27 | .04 | -.16 | .03 | -.10 | .12 |
| BL4 | 94 | .23 | .18 | .25 | .04 | .26 | .04 | -.09 | .06 | -.06 | .16 |
| BL5 | 95 | .36 | .34 | .41 | .15 | .38 | -.10 | -.29 | -.14 | -.27 | .09 |
| BL6 | 96 | .30 | .26 | .34 | .08 | .31 | -.02 | -.19 | -.04 | -.17 | .15 |
| BL7 | 97 | .41 | .38 | .45 | .15 | .41 | -.14 | -.34 | -.22 | -.34 | .01 |
| BL8 | 98 | .33 | .31 | .37 | .13 | .34 | -.05 | -.23 | -.10 | -.21 | .11 |
| SRDAV | 99 | .14 | -.06 | .03 | -.15 | .04 | .38 | .43 | .36 | .49 | .24 |
| SRDBA | 100 | .08 | -.11 | -.02 | -.19 | .04 | .40 | .41 | .31 | .45 | .10 |
| MAXAV | 101 | .14 | .03 | .06 | -.13 | .06 | .26 | .25 | .34 | .31 | .03 |
| MAXBA | 102 | .13 | .04 | .06 | -.11 | .05 | .25 | .22 | .30 | .27 | -.01 |
| MINAV | 103 | .11 | .01 | .03 | -.13 | .03 | .24 | .22 | .31 | .28 | -.01 |
| MINBA | 104 | .12 | .04 | .05 | -.11 | .04 | .24 | .20 | .29 | .26 | -.02 |
| DIFAV | 105 | .24 | .16 | .22 | .01 | .21 | .11 | .23 | .20 | .18 | .28 |
| DIFBA | 106 | .22 | .04 | .18 | -.05 | .19 | .32 | .31 | .20 | .34 | .26 |
| BLAV | 107 | .34 | .31 | .39 | .11 | .36 | -.07 | -.27 | -.11 | -.24 | .07 |
| BLBA | 108 | .27 | .23 | .30 | .06 | .29 | .03 | -.14 | .01 | -.11 | .15 |
| AAV | 109 | .77 | .93 | .85 | .78 | .86 | -.22 | -.29 | -.27 | -.28 | -.16 |
| ABA | 110 | .96 | .92 | .98 | .50 | .98 | -.09 | -.17 | -.17 | -.16 | -.02 |
| BAV | 111 | -.09 | -.26 | -.17 | -.36 | -.22 | .52 | .65 | .82 | .75 | .68 |
| BBA | 112 | -.15 | -.23 | -.18 | -.28 | -.20 | .75 | .85 | .86 | .94 | .49 |
| TRAV | 113 | .66 | .72 | .69 | .49 | .68 | .15 | .24 | .30 | .28 | .25 |
| TRBA | 114 | .67 | .60 | .68 | .22 | .66 | .45 | .48 | .47 | .55 | .32 |
| SAV | 115 | .67 | .69 | .68 | .47 | .65 | .16 | .19 | .33 | .27 | .33 |
| SBA | 115 | .67 | .57 | .66 | .20 | .64 | .48 | .49 | .49 | .56 | .35 |

CORRELATIONS

| | | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .00 | -.21 | -.05 | .07 | .01 | .0 | -.15 | -.15 | .10 | .07 |
| MS | 2 | .08 | -.17 | -.12 | .13 | -.02 | .0 | -.10 | -.15 | .19 | .05 |
| RS | 3 | .07 | -.22 | -.06 | .15 | .05 | .0 | -.08 | -.09 | .19 | -.03 |
| IF | 4 | .04 | -.18 | -.10 | .17 | .00 | .0 | -.07 | -.07 | .18 | -.02 |
| ANXAV | 5 | .01 | -.04 | -.05 | .21 | -.08 | .0 | -.08 | -.10 | .22 | .06 |
| DEPAV | 6 | .01 | -.02 | -.08 | .09 | -.07 | .0 | -.07 | -.05 | .08 | .03 |
| HOSAV | 7 | -.05 | .09 | .00 | .19 | -.04 | .0 | -.15 | -.17 | .25 | .07 |
| ANXDF | 8 | -.05 | -.04 | -.09 | -.28 | .05 | .0 | .12 | .11 | -.24 | -.09 |
| DEPDF | 9 | .02 | -.01 | -.01 | -.19 | .25 | .0 | -.09 | .00 | -.19 | .02 |
| HOSDF | 10 | -.15 | -.07 | -.10 | -.28 | .28 | .0 | .13 | .09 | -.29 | -.02 |
| ANXL | 11 | -.06 | -.10 | -.20 | -.18 | -.03 | .0 | .08 | .05 | -.11 | -.07 |
| DEPL | 12 | .04 | -.04 | -.11 | -.15 | .26 | .0 | -.21 | -.06 | -.17 | .06 |
| HOSL | 13 | -.24 | -.01 | -.12 | -.19 | .32 | .0 | .03 | -.04 | -.16 | .03 |
| MIN1 | 14 | .19 | .08 | .20 | .07 | -.07 | .0 | -.10 | -.17 | -.08 | .04 |
| MIN2 | 15 | .21 | .13 | .17 | .05 | -.07 | .0 | -.11 | -.18 | -.10 | -.01 |
| MIN3 | 16 | .21 | .17 | .16 | .06 | -.06 | .0 | -.10 | -.19 | -.08 | .01 |
| MIN4 | 17 | .24 | .13 | .15 | .05 | -.07 | .0 | -.12 | -.19 | -.09 | -.02 |
| MIN5 | 18 | .22 | .10 | .09 | .06 | -.05 | .0 | -.11 | -.18 | -.08 | -.02 |
| MIN6 | 19 | .26 | .15 | .21 | .07 | -.06 | .0 | -.12 | -.18 | -.05 | -.01 |
| MIN7 | 20 | .28 | .17 | .25 | .07 | -.09 | .0 | -.08 | -.12 | -.05 | .02 |
| MIN8 | 21 | .23 | .14 | .20 | .06 | -.10 | .0 | -.11 | -.07 | -.03 | .01 |
| MAX1 | 22 | .20 | .09 | .20 | .08 | -.06 | .0 | -.10 | -.17 | -.07 | .04 |
| MAX2 | 23 | .23 | .14 | .18 | .05 | -.05 | .0 | -.10 | -.19 | -.10 | -.01 |
| MAX3 | 24 | .27 | .19 | .18 | .05 | -.06 | .0 | -.10 | -.20 | -.10 | .01 |
| MAX4 | 25 | .25 | .14 | .16 | .05 | -.06 | .0 | -.12 | -.20 | -.09 | -.02 |
| MAX5 | 26 | .27 | .16 | .14 | .07 | -.01 | .0 | -.10 | -.22 | -.07 | -.02 |
| MAX6 | 27 | .29 | .16 | .22 | .08 | -.06 | .0 | -.12 | -.18 | -.05 | -.01 |
| MAX7 | 28 | .30 | .20 | .25 | .07 | -.09 | .0 | -.09 | -.09 | -.05 | .01 |
| MAX8 | 29 | .24 | .14 | .21 | .07 | -.09 | .0 | -.12 | -.06 | -.03 | .00 |
| DIF1 | 30 | .21 | .12 | .15 | .20 | .29 | .0 | .09 | -.19 | .07 | -.04 |
| DIF2 | 31 | .35 | .30 | .12 | .02 | .27 | .0 | .15 | -.20 | -.08 | .01 |
| DIF3 | 32 | .47 | .22 | .12 | -.10 | .05 | .0 | -.01 | -.10 | -.14 | -.00 |
| DIF4 | 33 | .37 | .17 | .12 | .04 | .16 | .0 | .02 | -.20 | -.03 | -.02 |
| DIF5 | 34 | .20 | .28 | .24 | .07 | .17 | .0 | .06 | -.13 | .08 | .03 |
| DIF6 | 35 | .40 | .15 | .22 | .15 | .03 | .0 | -.05 | -.00 | .09 | .04 |
| DIF7 | 36 | .12 | .12 | .00 | -.03 | .02 | .0 | -.03 | .16 | .00 | -.05 |
| DIF8 | 37 | .08 | -.11 | .10 | .17 | .17 | .0 | -.13 | .08 | .12 | -.10 |
| A1 | 38 | .08 | .03 | .01 | .18 | .06 | .0 | -.05 | -.03 | .11 | .09 |
| A2 | 39 | -.00 | .05 | -.04 | .21 | .10 | .0 | -.10 | -.09 | .13 | .09 |
| A3 | 40 | -.15 | -.16 | -.05 | .14 | -.04 | .0 | -.07 | .16 | .10 | .02 |
| A4 | 41 | -.11 | -.06 | -.07 | .30 | .03 | .0 | -.10 | -.01 | .22 | .10 |
| A5 | 42 | -.24 | -.16 | -.08 | .05 | .00 | .0 | -.06 | .01 | .08 | .03 |
| A6 | 43 | -.17 | -.09 | -.03 | .18 | .01 | .0 | -.07 | .02 | .15 | .09 |
| A7 | 44 | -.27 | -.32 | -.23 | -.06 | -.01 | .0 | -.06 | -.01 | -.01 | -.06 |
| A8 | 45 | -.19 | -.19 | -.18 | .08 | .00 | .0 | -.06 | .03 | .06 | .02 |
| B1 | 46 | .63 | .17 | .55 | .01 | -.07 | .0 | -.05 | -.10 | -.04 | -.10 |
| B2 | 47 | .66 | .36 | .37 | -.08 | -.04 | .0 | -.04 | -.08 | -.11 | -.08 |
| B3 | 48 | .79 | .38 | .52 | -.10 | -.01 | .0 | .03 | -.10 | -.14 | -.10 |
| B4 | 49 | .84 | .35 | .51 | -.09 | -.02 | .0 | -.04 | -.09 | -.12 | -.09 |
| B5 | 50 | .58 | .41 | .42 | .29 | .03 | .0 | -.05 | -.00 | .19 | -.12 |
| B6 | 51 | 1.00 | .36 | .59 | .04 | -.04 | .0 | -.06 | -.01 | -.02 | -.11 |
| B7 | 52 | .36 | 1.00 | .54 | .18 | -.02 | .0 | .01 | -.08 | .09 | -.02 |
| B8 | 53 | .59 | .54 | 1.00 | .11 | .00 | .0 | -.07 | -.07 | .03 | -.11 |
| C1 | 54 | .04 | .18 | .11 | 1.00 | .01 | .0 | -.02 | -.02 | .85 | -.02 |
| C2 | 55 | -.04 | -.02 | .00 | .01 | 1.00 | .0 | -.02 | -.02 | -.02 | -.02 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | -.06 | .01 | -.07 | -.02 | -.02 | .0 | 1.00 | -.02 | -.02 | -.02 |
| C5 | 58 | -.01 | -.08 | -.07 | -.02 | -.02 | .0 | -.02 | 1.00 | -.02 | -.02 |

COPRELATIONS

| | | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | -.02 | .09 | .03 | .85 | -.02 | .0 | -.02 | -.02 | 1.00 | -.02 |
| C7 | 60 | -.11 | -.02 | -.11 | -.02 | -.02 | .0 | -.02 | -.02 | -.02 | 1.00 |
| C8 | 61 | .26 | .18 | .05 | .30 | -.02 | .0 | -.02 | .10 | .24 | -.02 |
| TR1 | 62 | .49 | .14 | .40 | .14 | -.01 | .0 | -.08 | -.09 | .05 | -.00 |
| TR2 | 63 | .57 | .33 | .31 | .05 | .02 | .0 | -.10 | -.12 | -.02 | -.02 |
| TR3 | 64 | .40 | .13 | .30 | .06 | -.07 | .0 | -.03 | .08 | -.00 | -.05 |
| TR4 | 65 | .66 | .27 | .39 | .12 | -.01 | .0 | -.09 | -.08 | .04 | -.01 |
| TR5 | 66 | .10 | .03 | .10 | .12 | .01 | .0 | -.07 | .00 | .11 | -.03 |
| TR6 | 67 | .56 | .16 | .38 | .14 | -.04 | .0 | -.10 | -.00 | .08 | .00 |
| TR7 | 68 | .14 | .72 | .33 | .13 | -.04 | .0 | -.03 | -.10 | .09 | .06 |
| TR8 | 69 | .19 | .16 | .45 | .11 | -.01 | .0 | -.09 | -.02 | .06 | -.05 |
| S1 | 70 | .49 | .14 | .39 | .15 | -.01 | .0 | -.07 | -.09 | .06 | -.01 |
| S2 | 71 | .58 | .34 | .31 | .04 | .02 | .0 | -.09 | -.12 | -.03 | -.02 |
| S3 | 72 | .48 | .15 | .36 | .04 | -.04 | .0 | -.04 | .06 | -.02 | -.06 |
| S4 | 73 | .69 | .28 | .40 | .11 | .01 | .0 | -.09 | -.09 | .03 | -.02 |
| S5 | 74 | .08 | .05 | .14 | .20 | .02 | .0 | -.08 | .11 | .17 | -.04 |
| S6 | 75 | .58 | .19 | .40 | .19 | -.02 | .0 | -.10 | .01 | .12 | -.01 |
| S7 | 76 | .13 | .71 | .32 | .12 | -.03 | .0 | -.04 | -.09 | .08 | .16 |
| S8 | 77 | .20 | .17 | .45 | .14 | .00 | .0 | -.10 | -.02 | .08 | -.05 |
| PVCON | 78 | .11 | -.07 | .14 | .07 | -.04 | .0 | -.01 | -.03 | .12 | -.14 |
| PVEXP | 79 | .04 | .16 | .18 | .09 | -.10 | .0 | -.09 | -.06 | .12 | -.18 |
| PVDIF | 80 | -.08 | .33 | .10 | .04 | -.09 | .0 | -.12 | -.05 | .02 | -.08 |
| SRD1 | 81 | .13 | -.14 | .09 | .09 | .06 | .0 | -.05 | -.16 | -.03 | -.08 |
| SRD2 | 82 | .25 | .15 | .09 | .07 | .09 | .0 | -.00 | -.22 | -.03 | .03 |
| SRD3 | 83 | .35 | .21 | .16 | -.03 | .20 | .0 | -.13 | -.08 | -.10 | .01 |
| SRD4 | 84 | .37 | .09 | .09 | .02 | .17 | .0 | -.04 | -.16 | -.06 | -.01 |
| SRD5 | 85 | .43 | .05 | .12 | .07 | .21 | .0 | -.08 | .07 | .09 | .02 |
| SRD6 | 86 | .45 | .05 | .12 | .00 | .16 | .0 | -.01 | -.04 | -.07 | -.07 |
| SRD7 | 87 | .45 | .10 | .32 | .10 | .20 | .0 | -.07 | .04 | .13 | -.02 |
| SRD8 | 88 | .25 | .04 | .16 | .16 | .16 | .0 | -.10 | .03 | .09 | -.18 |
| MIN1-7 | 89 | -.26 | -.28 | -.14 | .01 | .06 | .0 | -.07 | -.17 | -.09 | .07 |
| Z.S&DIF357 | 90 | .37 | .40 | .32 | .11 | .04 | .0 | -.04 | .02 | .07 | .01 |
| BL1 | 91 | .05 | .09 | .15 | -.00 | .10 | .0 | .08 | -.07 | .03 | -.03 |
| BL2 | 92 | .06 | .12 | .08 | -.03 | .11 | .0 | .07 | -.07 | .01 | -.06 |
| BL3 | 93 | -.02 | .07 | .03 | -.03 | .13 | .0 | .08 | -.07 | .02 | .00 |
| BL4 | 94 | .03 | .09 | .04 | -.05 | .11 | .0 | .07 | -.07 | -.00 | -.05 |
| BL5 | 95 | -.16 | .02 | -.03 | .02 | .10 | .0 | .07 | -.03 | .07 | .06 |
| BL6 | 96 | -.06 | .09 | .05 | .02 | .11 | .0 | .07 | -.02 | .07 | -.00 |
| BL7 | 97 | -.23 | -.00 | -.05 | .07 | .12 | .0 | .06 | .05 | .12 | .09 |
| BL8 | 98 | -.10 | .06 | .05 | .04 | .10 | .0 | .05 | .04 | .09 | .01 |
| SRDAV | 99 | .47 | .14 | .22 | .05 | .24 | .0 | -.11 | .01 | .04 | .01 |
| SRDBA | 100 | .36 | .09 | .12 | .07 | .16 | .0 | -.04 | -.11 | -.02 | -.06 |
| MAXAV | 101 | .28 | .19 | .19 | .06 | -.05 | .0 | -.10 | -.17 | -.07 | .00 |
| MAXBA | 102 | .25 | .15 | .19 | .06 | -.07 | .0 | -.12 | -.16 | -.07 | -.01 |
| MINAV | 103 | .24 | .15 | .17 | .06 | -.07 | .0 | -.10 | -.17 | -.07 | .00 |
| MINBA | 104 | .24 | .14 | .18 | .06 | -.08 | .0 | -.12 | -.16 | -.07 | -.01 |
| DIFAV | 105 | .31 | .28 | .18 | .00 | .12 | .0 | .02 | -.03 | .01 | -.01 |
| DIFBA | 106 | .37 | .16 | .17 | .11 | .18 | .0 | .00 | -.10 | .03 | -.01 |
| BLAV | 107 | -.14 | .03 | -.02 | .02 | .12 | .0 | .07 | -.02 | .07 | .05 |
| BLBA | 108 | -.02 | .09 | .06 | -.01 | .11 | .0 | .07 | -.03 | .04 | -.03 |
| AAV | 109 | -.23 | -.22 | -.11 | .07 | -.02 | .0 | -.07 | .08 | .08 | .00 |
| ABA | 110 | -.14 | -.10 | -.10 | .17 | .03 | .0 | -.08 | -.00 | .13 | .07 |
| BAV | 111 | .76 | .78 | .65 | .11 | -.00 | .0 | .01 | -.09 | .03 | -.09 |
| BBA | 112 | .90 | .47 | .71 | -.01 | -.03 | .0 | -.06 | -.07 | -.07 | -.11 |
| TRAV | 113 | .29 | .34 | .30 | .12 | -.05 | .0 | -.05 | .00 | .07 | -.01 |
| TRBA | 114 | .53 | .25 | .44 | .12 | -.01 | .0 | -.11 | -.06 | .05 | -.02 |
| SAV | 115 | .32 | .35 | .35 | .14 | -.02 | .0 | -.06 | .05 | .09 | .01 |
| SBA | 116 | .55 | .27 | .45 | .14 | .00 | .0 | -.11 | -.05 | .06 | -.03 |

CORRELATIONS

| | | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .13 | .14 | .01 | .04 | .08 | .12 | .11 | -.13 | .10 | .15 |
| MS | 2 | .27 | .02 | .06 | -.03 | .11 | -.02 | .04 | -.17 | -.06 | .03 |
| RS | 3 | .13 | .11 | .01 | .03 | .08 | .05 | .09 | -.14 | .03 | .13 |
| IF | 4 | .13 | .11 | .05 | .13 | .08 | .09 | .09 | -.02 | .04 | .12 |
| ANXAV | 5 | .05 | -.09 | -.13 | -.07 | -.09 | -.08 | -.09 | .03 | -.12 | -.08 |
| DEPAV | 6 | .08 | -.10 | -.17 | -.09 | -.09 | -.06 | -.08 | -.00 | -.11 | -.09 |
| HOSAV | 7 | .07 | .03 | -.04 | .04 | -.03 | -.06 | -.09 | .14 | -.08 | .05 |
| ANXDF | 8 | -.11 | -.04 | .05 | -.07 | -.05 | -.12 | -.11 | -.19 | -.12 | -.05 |
| DEPDF | 9 | -.12 | -.04 | .10 | -.06 | -.03 | -.14 | -.08 | -.10 | -.11 | -.05 |
| HOSDF | 10 | -.13 | -.08 | .01 | -.07 | -.12 | -.09 | -.17 | -.11 | -.11 | -.09 |
| ANXL | 11 | -.11 | -.17 | -.08 | -.19 | -.18 | -.27 | -.27 | -.26 | -.33 | -.17 |
| DEPL | 12 | -.07 | -.19 | -.06 | -.20 | -.16 | -.27 | -.21 | -.15 | -.30 | -.18 |
| HOSL | 13 | -.10 | -.08 | -.03 | -.06 | -.18 | -.17 | -.29 | -.02 | -.21 | -.07 |
| MIN1 | 14 | -.08 | .32 | .21 | .25 | .26 | .05 | .19 | .03 | .15 | .32 |
| MIN2 | 15 | -.08 | .30 | .24 | .25 | .28 | .05 | .17 | .05 | .12 | .30 |
| MIN3 | 16 | -.08 | .30 | .27 | .25 | .30 | .04 | .17 | .08 | .11 | .31 |
| MIN4 | 17 | -.08 | .28 | .25 | .24 | .30 | .05 | .19 | .04 | .11 | .29 |
| MIN5 | 18 | -.07 | .27 | .24 | .22 | .30 | .04 | .17 | .02 | .08 | .27 |
| MIN6 | 19 | -.09 | .32 | .27 | .27 | .32 | .08 | .24 | .06 | .16 | .33 |
| MIN7 | 20 | -.07 | .33 | .28 | .29 | .33 | .06 | .25 | .07 | .17 | .33 |
| MIN8 | 21 | -.11 | .32 | .26 | .31 | .31 | .12 | .25 | .08 | .20 | .32 |
| MAX1 | 22 | -.08 | .33 | .21 | .25 | .26 | .05 | .19 | .03 | .15 | .33 |
| MAX2 | 23 | -.08 | .31 | .26 | .25 | .29 | .04 | .18 | .06 | .12 | .31 |
| MAX3 | 24 | -.08 | .32 | .31 | .26 | .34 | .06 | .21 | .10 | .13 | .32 |
| MAX4 | 25 | -.08 | .30 | .27 | .25 | .32 | .06 | .20 | .05 | .12 | .30 |
| MAX5 | 26 | -.08 | .32 | .32 | .25 | .36 | .07 | .23 | .08 | .14 | .32 |
| MAX6 | 27 | -.08 | .34 | .29 | .28 | .34 | .10 | .27 | .06 | .18 | .34 |
| MAX7 | 28 | -.08 | .35 | .31 | .32 | .37 | .12 | .31 | .10 | .23 | .36 |
| MAX8 | 29 | -.10 | .33 | .26 | .31 | .32 | .13 | .27 | .08 | .21 | .33 |
| DIF1 | 30 | .10 | .39 | .26 | .03 | .26 | -.01 | .17 | .06 | .11 | .40 |
| DIF2 | 31 | .03 | .23 | .52 | .05 | .38 | -.02 | .21 | .16 | .05 | .24 |
| DIF3 | 32 | .00 | .14 | .36 | .14 | .30 | .16 | .40 | .18 | .15 | .13 |
| DIF4 | 33 | .09 | .32 | .44 | .11 | .48 | .13 | .34 | .11 | .21 | .32 |
| DIF5 | 34 | -.04 | .19 | .33 | .12 | .25 | .13 | .27 | .26 | .25 | .19 |
| DIF6 | 35 | .13 | .30 | .32 | .19 | .39 | .28 | .52 | .10 | .36 | .30 |
| DIF7 | 36 | -.06 | .13 | .15 | .15 | .16 | .34 | .32 | .13 | .27 | .12 |
| DIF8 | 37 | .06 | .17 | .09 | .02 | .18 | .21 | .27 | .01 | .32 | .17 |
| A1 | 38 | .08 | .72 | .51 | .64 | .61 | .85 | .78 | .31 | .78 | .71 |
| A2 | 39 | .11 | .65 | .47 | .54 | .56 | .82 | .73 | .31 | .75 | .64 |
| A3 | 40 | -.01 | .35 | .10 | .68 | .25 | .77 | .54 | .27 | .66 | .33 |
| A4 | 41 | .10 | .58 | .36 | .52 | .49 | .84 | .68 | .25 | .76 | .57 |
| A5 | 42 | -.03 | .44 | .25 | .56 | .32 | .89 | .62 | .30 | .80 | .43 |
| A6 | 43 | .05 | .56 | .32 | .53 | .41 | .88 | .72 | .28 | .84 | .54 |
| A7 | 44 | -.08 | .15 | .01 | .35 | .06 | .48 | .24 | .39 | .37 | .14 |
| A8 | 45 | -.00 | .54 | .34 | .55 | .43 | .87 | .67 | .23 | .80 | .53 |
| B1 | 46 | .16 | .70 | .54 | .32 | .58 | -.04 | .35 | .02 | .23 | .71 |
| B2 | 47 | .02 | .44 | .84 | .37 | .67 | -.03 | .30 | .18 | .08 | .45 |
| B3 | 48 | .05 | .55 | .64 | .49 | .64 | -.01 | .38 | .19 | .15 | .55 |
| B4 | 49 | .16 | .55 | .75 | .44 | .78 | .01 | .43 | .18 | .16 | .55 |
| B5 | 50 | .22 | .26 | .33 | .19 | .39 | .25 | .34 | .18 | .14 | .26 |
| B6 | 51 | .26 | .49 | .57 | .40 | .66 | .10 | .56 | .14 | .19 | .49 |
| B7 | 52 | .18 | .14 | .33 | .13 | .27 | .03 | .16 | .72 | .16 | .14 |
| B8 | 53 | .05 | .40 | .31 | .30 | .39 | .10 | .38 | .33 | .45 | .39 |
| C1 | 54 | .30 | .14 | .05 | .06 | .12 | .12 | .14 | .13 | .11 | .15 |
| C2 | 55 | -.02 | -.01 | .02 | -.07 | -.01 | .01 | -.04 | -.04 | -.01 | -.01 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | -.02 | -.08 | -.10 | -.03 | -.09 | -.07 | -.10 | -.03 | -.09 | -.07 |
| C5 | 58 | .10 | -.09 | -.12 | .08 | -.08 | .00 | -.00 | -.10 | -.02 | -.09 |

# CORRELATIONS

| | | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | .24 | .05 | -.02 | -.00 | .04 | .11 | .08 | .09 | .06 | .06 |
| C7 | 60 | -.02 | -.00 | -.02 | -.05 | -.01 | -.03 | .00 | .06 | -.05 | -.01 |
| C8 | 61 | 1.00 | .16 | .07 | .05 | .18 | .07 | .18 | .12 | .02 | .17 |
| TR1 | 62 | .16 | 1.00 | .74 | .69 | .84 | .59 | .80 | .24 | .72 | 1.00 |
| TR2 | 63 | .07 | .74 | 1.00 | .63 | .90 | .44 | .67 | .33 | .50 | .74 |
| TR3 | 64 | .05 | .69 | .63 | 1.00 | .73 | .68 | .74 | .39 | .69 | .68 |
| TR4 | 65 | .18 | .84 | .90 | .73 | 1.00 | .55 | .81 | .32 | .63 | .84 |
| TR5 | 66 | .07 | .59 | .44 | .68 | .55 | 1.00 | .82 | .39 | .85 | .57 |
| TR6 | 67 | .18 | .80 | .67 | .74 | .81 | .82 | 1.00 | .32 | .84 | .79 |
| TR7 | 68 | .12 | .24 | .33 | .39 | .32 | .39 | .32 | 1.00 | .41 | .23 |
| TR8 | 69 | .02 | .72 | .50 | .69 | .63 | .85 | .84 | .41 | 1.00 | .71 |
| S1 | 70 | .17 | 1.00 | .74 | .68 | .84 | .57 | .79 | .23 | .71 | 1.00 |
| S2 | 71 | .08 | .74 | 1.00 | .62 | .90 | .42 | .66 | .33 | .48 | .75 |
| S3 | 72 | .03 | .72 | .58 | .95 | .70 | .64 | .75 | .37 | .67 | .70 |
| S4 | 73 | .21 | .85 | .89 | .72 | 1.00 | .53 | .81 | .32 | .62 | .84 |
| S5 | 74 | .09 | .54 | .39 | .63 | .49 | .96 | .76 | .37 | .82 | .52 |
| S6 | 75 | .23 | .81 | .67 | .73 | .81 | .80 | 1.00 | .33 | .83 | .80 |
| S7 | 76 | .11 | .23 | .32 | .37 | .30 | .38 | .32 | .98 | .41 | .23 |
| S8 | 77 | .06 | .74 | .50 | .69 | .64 | .85 | .85 | .41 | 1.00 | .72 |
| PVCON | 78 | -.09 | .11 | -.02 | .16 | .01 | .03 | .08 | -.06 | .06 | .11 |
| PVEXP | 79 | .04 | -.01 | -.07 | .06 | -.03 | -.04 | -.03 | .11 | .03 | -.01 |
| PVDIF | 80 | .17 | -.16 | -.08 | -.11 | -.06 | -.09 | -.15 | .24 | -.03 | -.16 |
| SRD1 | 81 | -.02 | .30 | .19 | -.04 | .20 | -.10 | .10 | -.19 | .08 | .32 |
| SRD2 | 82 | .09 | .28 | .41 | -.01 | .36 | -.13 | .11 | .02 | .02 | .30 |
| SRD3 | 83 | .03 | .32 | .52 | .10 | .43 | -.04 | .23 | .04 | .07 | .33 |
| SRD4 | 84 | .10 | .28 | .41 | .04 | .42 | -.07 | .19 | -.05 | .04 | .30 |
| SRD5 | 85 | .19 | .24 | .39 | .13 | .42 | .09 | .31 | -.02 | .09 | .25 |
| SRD6 | 86 | .10 | .37 | .45 | .14 | .50 | -.00 | .30 | -.12 | .09 | .38 |
| SRD7 | 87 | .12 | .39 | .36 | .24 | .49 | .12 | .38 | -.01 | .26 | .40 |
| SRD8 | 88 | .18 | .25 | .29 | .13 | .32 | .08 | .28 | -.04 | .22 | .27 |
| MIN1-7 | 89 | -.05 | .01 | -.22 | -.09 | -.22 | -.02 | -.18 | -.14 | -.07 | .01 |
| Z.SEDIF357 | 90 | .05 | .56 | .57 | .69 | .61 | .76 | .78 | .63 | .74 | .55 |
| BL1 | 91 | -.13 | .26 | .05 | .04 | .06 | .23 | .21 | .05 | .25 | .26 |
| BL2 | 92 | -.09 | .30 | .12 | .08 | .12 | .26 | .24 | .09 | .25 | .29 |
| BL3 | 93 | -.09 | .24 | .02 | .05 | .05 | .28 | .22 | .07 | .26 | .23 |
| BL4 | 94 | -.12 | .23 | .07 | .08 | .08 | .29 | .23 | .09 | .25 | .23 |
| BL5 | 95 | -.12 | .20 | -.05 | .05 | -.02 | .38 | .23 | .11 | .32 | .19 |
| BL6 | 96 | -.11 | .22 | .01 | .08 | .03 | .34 | .24 | .11 | .30 | .22 |
| BL7 | 97 | -.09 | .18 | -.09 | .06 | -.05 | .38 | .20 | .09 | .33 | .17 |
| BL8 | 98 | -.10 | .21 | -.02 | .11 | .01 | .37 | .24 | .12 | .33 | .20 |
| SRDAV | 99 | .13 | .36 | .48 | .18 | .51 | .06 | .35 | .01 | .15 | .37 |
| SRDBA | 100 | .13 | .32 | .42 | .08 | .44 | -.03 | .24 | -.05 | .10 | .34 |
| MAXAV | 101 | -.08 | .33 | .32 | .28 | .36 | .09 | .25 | .09 | .16 | .34 |
| MAXBA | 102 | -.09 | .32 | .28 | .28 | .32 | .08 | .23 | .06 | .16 | .32 |
| MINAV | 103 | -.08 | .30 | .27 | .25 | .32 | .05 | .20 | .06 | .12 | .31 |
| MINBA | 104 | -.09 | .31 | .26 | .27 | .30 | .07 | .22 | .06 | .15 | .31 |
| DIFAV | 105 | -.05 | .21 | .37 | .18 | .31 | .28 | .42 | .27 | .31 | .21 |
| DIFBA | 106 | .10 | .31 | .42 | .12 | .43 | .18 | .41 | .12 | .28 | .31 |
| BLAV | 107 | -.10 | .21 | -.04 | .06 | -.01 | .35 | .22 | .09 | .31 | .20 |
| BLBA | 108 | -.11 | .24 | .04 | .09 | .06 | .32 | .24 | .10 | .29 | .24 |
| AAV | 109 | -.04 | .37 | .15 | .62 | .25 | .83 | .55 | .35 | .71 | .35 |
| ABA | 110 | .05 | .59 | .37 | .56 | .47 | .89 | .72 | .27 | .82 | .57 |
| BAV | 111 | .17 | .43 | .59 | .38 | .59 | .08 | .38 | .49 | .19 | .44 |
| BBA | 112 | .14 | .55 | .73 | .44 | .73 | .05 | .49 | .24 | .25 | .55 |
| TRAV | 113 | .10 | .64 | .59 | .88 | .68 | .85 | .78 | .70 | .81 | .63 |
| TRBA | 114 | .12 | .87 | .83 | .79 | .92 | .77 | .94 | .40 | .87 | .86 |
| SAV | 115 | .09 | .66 | .56 | .86 | .66 | .84 | .79 | .68 | .81 | .64 |
| SBA | 115 | .16 | .88 | .83 | .78 | .92 | .76 | .94 | .40 | .85 | .87 |

CORRELATIONS

| | | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .03 | .05 | .10 | .13 | .13 | -.10 | .12 | .04 | .03 | .00 |
| MS | 2 | .07 | -.05 | .13 | .00 | .06 | -.14 | -.05 | -.05 | -.13 | -.13 |
| RS | 3 | .03 | .05 | .10 | .10 | .11 | -.11 | .04 | .06 | .01 | -.05 |
| IF | 4 | .06 | .13 | .10 | .11 | .10 | .00 | .05 | .05 | -.01 | -.09 |
| ANXAV | 5 | -.11 | -.08 | -.07 | -.02 | -.07 | .07 | -.11 | .03 | .04 | .02 |
| DEPAV | 6 | -.15 | -.10 | -.07 | -.01 | -.06 | .04 | -.09 | .03 | .10 | .11 |
| HOSAV | 7 | -.02 | .05 | -.02 | -.03 | -.06 | .20 | -.06 | .07 | .09 | .05 |
| ANXDF | 8 | .04 | -.04 | -.06 | -.14 | -.12 | -.23 | -.14 | .01 | -.05 | -.09 |
| DEPDF | 9 | .10 | -.01 | -.03 | -.19 | -.10 | -.12 | -.13 | .01 | -.11 | -.18 |
| HOSDF | 10 | -.00 | -.10 | -.13 | -.12 | -.18 | -.16 | -.12 | .06 | .02 | -.05 |
| ANXL | 11 | -.07 | -.16 | -.17 | -.25 | -.27 | -.26 | -.34 | .05 | -.03 | -.11 |
| DEPL | 12 | -.04 | -.14 | -.13 | -.29 | -.21 | -.11 | -.29 | .05 | -.04 | -.12 |
| HOSL | 13 | -.02 | -.08 | -.18 | -.18 | -.29 | -.02 | -.21 | .14 | .11 | -.01 |
| MIN1 | 14 | .19 | .27 | .25 | -.01 | .18 | .02 | .15 | .21 | -.01 | -.29 |
| MIN2 | 15 | .22 | .27 | .27 | -.02 | .17 | .03 | .12 | .21 | .00 | -.26 |
| MIN3 | 16 | .26 | .27 | .30 | -.02 | .17 | .07 | .11 | .19 | -.00 | -.24 |
| MIN4 | 17 | .24 | .26 | .30 | -.01 | .18 | .03 | .11 | .18 | -.03 | -.26 |
| MIN5 | 18 | .23 | .24 | .30 | -.03 | .16 | -.00 | .08 | .14 | -.06 | -.26 |
| MIN6 | 19 | .26 | .30 | .32 | .02 | .24 | .05 | .17 | .19 | -.04 | -.29 |
| MIN7 | 20 | .27 | .30 | .33 | .00 | .25 | .08 | .18 | .20 | -.01 | -.28 |
| MIN8 | 21 | .24 | .32 | .30 | .07 | .25 | .08 | .20 | .19 | -.06 | -.32 |
| MAX1 | 22 | .20 | .27 | .26 | -.01 | .19 | .02 | .15 | .21 | -.02 | -.29 |
| MAX2 | 23 | .25 | .27 | .29 | -.02 | .18 | .04 | .12 | .20 | -.00 | -.26 |
| MAX3 | 24 | .30 | .28 | .34 | -.00 | .21 | .09 | .13 | .18 | -.02 | -.26 |
| MAX4 | 25 | .26 | .27 | .32 | -.01 | .20 | .03 | .12 | .17 | -.03 | -.26 |
| MAX5 | 26 | .31 | .27 | .37 | .01 | .23 | .06 | .14 | .16 | -.04 | -.25 |
| MAX6 | 27 | .28 | .31 | .34 | .03 | .27 | .06 | .19 | .19 | -.04 | -.30 |
| MAX7 | 28 | .30 | .34 | .36 | .07 | .31 | .10 | .23 | .21 | -.03 | -.30 |
| MAX8 | 29 | .25 | .33 | .31 | .08 | .26 | .08 | .21 | .18 | -.07 | -.32 |
| DIF1 | 30 | .28 | .02 | .27 | -.02 | .19 | .04 | .13 | .07 | -.02 | -.12 |
| DIF2 | 31 | .54 | .02 | .39 | -.05 | .21 | .17 | .05 | -.07 | -.09 | -.05 |
| DIF3 | 32 | .37 | .11 | .32 | .12 | .39 | .18 | .15 | -.11 | -.19 | -.14 |
| DIF4 | 33 | .45 | .09 | .50 | .10 | .35 | .10 | .21 | -.08 | -.07 | -.00 |
| DIF5 | 34 | .32 | .13 | .24 | .15 | .26 | .27 | .24 | .07 | .08 | .04 |
| DIF6 | 35 | .32 | .17 | .39 | .26 | .52 | .12 | .36 | .07 | .01 | -.09 |
| DIF7 | 36 | .15 | .20 | .16 | .37 | .31 | .13 | .25 | .00 | -.08 | -.12 |
| DIF8 | 37 | .09 | -.02 | .18 | .24 | .28 | -.01 | .33 | -.20 | -.19 | -.03 |
| A1 | 38 | .50 | .66 | .60 | .81 | .78 | .31 | .79 | .00 | -.11 | -.16 |
| A2 | 39 | .47 | .52 | .55 | .79 | .74 | .33 | .77 | .01 | -.05 | -.09 |
| A3 | 40 | .08 | .66 | .23 | .76 | .53 | .27 | .66 | .07 | -.03 | -.13 |
| A4 | 41 | .35 | .49 | .47 | .82 | .68 | .27 | .78 | -.02 | -.08 | -.09 |
| A5 | 42 | .22 | .50 | .29 | .85 | .60 | .30 | .79 | .03 | -.04 | -.10 |
| A6 | 43 | .30 | .48 | .39 | .84 | .70 | .30 | .85 | .01 | -.06 | -.10 |
| A7 | 44 | -.00 | .31 | .05 | .43 | .22 | .40 | .36 | .03 | -.05 | -.11 |
| A8 | 45 | .32 | .49 | .41 | .81 | .65 | .23 | .80 | -.03 | -.09 | -.10 |
| B1 | 46 | .56 | .35 | .60 | -.06 | .37 | .01 | .24 | .16 | .09 | -.07 |
| B2 | 47 | .84 | .33 | .67 | -.07 | .30 | .16 | .08 | -.02 | -.03 | -.03 |
| B3 | 48 | .65 | .57 | .67 | -.06 | .39 | .17 | .14 | .15 | .11 | -.02 |
| B4 | 49 | .76 | .45 | .79 | -.03 | .44 | .15 | .16 | .03 | .02 | -.00 |
| B5 | 50 | .33 | .24 | .41 | .38 | .36 | .16 | .17 | -.06 | -.00 | .06 |
| B6 | 51 | .58 | .48 | .69 | .08 | .58 | .13 | .20 | .11 | .04 | -.08 |
| B7 | 52 | .34 | .15 | .28 | .05 | .19 | .71 | .17 | -.07 | .16 | .33 |
| B8 | 53 | .31 | .36 | .40 | .14 | .40 | .32 | .45 | .14 | .18 | .10 |
| C1 | 54 | .04 | .04 | .11 | .20 | .19 | .12 | .14 | .07 | .09 | .04 |
| C2 | 55 | .02 | -.04 | .01 | .02 | -.02 | -.03 | .00 | -.04 | -.10 | -.09 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | -.09 | -.04 | -.09 | -.08 | -.10 | -.04 | -.10 | -.01 | -.09 | -.12 |
| C5 | 58 | -.12 | .06 | -.09 | .11 | .01 | -.09 | -.02 | -.03 | -.06 | -.05 |

CORRELATIONS

| | | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | -.03 | -.02 | .03 | .17 | .12 | .08 | .08 | .12 | .12 | .02 |
| C7 | 60 | -.02 | -.06 | -.02 | -.04 | -.01 | .16 | -.05 | -.14 | -.18 | -.08 |
| C8 | 61 | .08 | .03 | .21 | .09 | .23 | .11 | .06 | -.09 | .04 | .17 |
| TR1 | 62 | .74 | .72 | .85 | .54 | .81 | .23 | .74 | .11 | -.01 | -.16 |
| TR2 | 63 | 1.00 | .58 | .89 | .39 | .67 | .32 | .50 | -.02 | -.07 | -.08 |
| TR3 | 64 | .62 | .95 | .72 | .63 | .73 | .37 | .69 | .16 | .06 | -.11 |
| TR4 | 65 | .90 | .70 | 1.00 | .49 | .81 | .30 | .64 | .01 | -.03 | -.06 |
| TR5 | 66 | .42 | .64 | .53 | .96 | .80 | .38 | .85 | .03 | -.04 | -.09 |
| TR6 | 67 | .66 | .75 | .81 | .76 | 1.00 | .32 | .85 | .08 | -.03 | -.15 |
| TR7 | 68 | .33 | .37 | .32 | .37 | .33 | .98 | .41 | -.06 | .11 | .24 |
| TR8 | 69 | .48 | .67 | .62 | .82 | .83 | .41 | 1.00 | .06 | .03 | -.03 |
| S1 | 70 | .75 | .70 | .84 | .52 | .80 | .23 | .72 | .11 | -.01 | -.16 |
| S2 | 71 | 1.00 | .57 | .89 | .37 | .66 | .32 | .48 | -.01 | -.06 | -.07 |
| S3 | 72 | .57 | 1.00 | .70 | .59 | .74 | .36 | .66 | .18 | .06 | -.13 |
| S4 | 73 | .89 | .70 | 1.00 | .48 | .81 | .30 | .63 | .01 | -.03 | -.05 |
| S5 | 74 | .37 | .59 | .48 | 1.00 | .75 | .35 | .82 | -.00 | -.04 | -.06 |
| S6 | 75 | .66 | .74 | .81 | .75 | 1.00 | .34 | .84 | .08 | -.02 | -.14 |
| S7 | 76 | .32 | .36 | .30 | .35 | .34 | 1.00 | .41 | -.08 | .08 | .22 |
| S8 | 77 | .48 | .66 | .63 | .82 | .84 | .41 | 1.00 | .05 | .03 | -.03 |
| PVCON | 78 | -.01 | .18 | .01 | -.00 | .08 | -.08 | .05 | 1.00 | .74 | -.15 |
| PVEXP | 79 | -.06 | .06 | -.03 | -.04 | -.02 | .08 | .03 | .74 | 1.00 | .55 |
| PVDIF | 80 | -.07 | -.13 | -.06 | -.06 | -.14 | .22 | -.03 | -.15 | .55 | 1.00 |
| SRD1 | 81 | .21 | -.08 | .21 | -.11 | .11 | -.21 | .10 | .25 | .03 | -.26 |
| SRD2 | 82 | .42 | -.04 | .37 | -.15 | .11 | .02 | .03 | .13 | -.00 | -.16 |
| SRD3 | 83 | .52 | .11 | .44 | -.05 | .23 | .07 | .08 | .03 | -.18 | -.29 |
| SRD4 | 84 | .42 | .01 | .44 | -.09 | .20 | -.07 | .05 | .06 | -.07 | -.18 |
| SRD5 | 85 | .38 | .14 | .43 | .13 | .32 | -.01 | .11 | .11 | -.08 | -.24 |
| SRD6 | 86 | .45 | .12 | .52 | -.04 | .31 | -.13 | .11 | .17 | -.03 | -.26 |
| SRD7 | 87 | .37 | .28 | .51 | .12 | .40 | -.00 | .28 | .22 | .04 | -.22 |
| SRD8 | 88 | .29 | .06 | .33 | .07 | .29 | -.06 | .25 | .20 | .05 | -.17 |
| MIN1-7 | 89 | -.22 | -.05 | -.22 | -.02 | -.18 | -.18 | -.07 | .05 | -.00 | -.07 |
| Z.S&DIF357 | 90 | .56 | .70 | .61 | .76 | .78 | .63 | .73 | .03 | -.01 | -.05 |
| BL1 | 91 | .05 | .15 | .07 | .19 | .21 | .07 | .26 | .18 | .14 | -.01 |
| BL2 | 92 | .12 | .19 | .13 | .21 | .23 | .10 | .26 | .09 | .08 | .01 |
| BL3 | 93 | .01 | .16 | .06 | .24 | .21 | .09 | .26 | .09 | .10 | .04 |
| BL4 | 94 | .06 | .19 | .09 | .25 | .23 | .10 | .25 | .08 | .08 | .02 |
| BL5 | 95 | -.05 | .14 | -.02 | .36 | .22 | .14 | .32 | .07 | .07 | .01 |
| BL6 | 96 | .00 | .18 | .04 | .32 | .24 | .14 | .31 | .08 | .09 | .03 |
| BL7 | 97 | -.10 | .14 | -.05 | .36 | .20 | .12 | .34 | .06 | .05 | .01 |
| BL8 | 98 | -.03 | .20 | .02 | .35 | .24 | .15 | .34 | .09 | .09 | .01 |
| SRDAV | 99 | .48 | .20 | .52 | .07 | .36 | .02 | .17 | .13 | -.09 | -.29 |
| SRDBA | 100 | .43 | .04 | .45 | -.06 | .25 | -.07 | .12 | .15 | -.02 | -.21 |
| MAXAV | 101 | .31 | .30 | .36 | .02 | .25 | .08 | .17 | .18 | -.03 | -.28 |
| MAXBA | 102 | .26 | .29 | .32 | .02 | .23 | .05 | .16 | .19 | -.03 | -.29 |
| MINAV | 103 | .25 | .27 | .32 | -.01 | .19 | .05 | .12 | .18 | -.03 | -.26 |
| MINBA | 104 | .24 | .29 | .30 | .01 | .21 | .05 | .15 | .19 | -.03 | -.28 |
| DIFAV | 105 | .37 | .20 | .31 | .29 | .41 | .27 | .30 | .01 | -.04 | -.08 |
| DIFBA | 106 | .43 | .08 | .44 | .16 | .41 | .12 | .28 | -.07 | -.09 | -.05 |
| BLAV | 107 | -.05 | .15 | -.00 | .33 | .22 | .12 | .31 | .07 | .08 | .02 |
| BLBA | 108 | .04 | .19 | .07 | .29 | .24 | .12 | .29 | .09 | .09 | .02 |
| AAV | 109 | .12 | .58 | .23 | .79 | .53 | .35 | .70 | .05 | -.04 | -.13 |
| ABA | 110 | .35 | .51 | .45 | .84 | .71 | .28 | .83 | -.01 | -.08 | -.10 |
| BAV | 111 | .61 | .45 | .61 | .10 | .40 | .47 | .20 | .03 | .14 | .16 |
| BBA | 112 | .73 | .47 | .75 | .03 | .50 | .22 | .26 | .07 | .06 | -.00 |
| TRAV | 113 | .58 | .84 | .66 | .80 | .78 | .68 | .80 | .07 | .06 | -.00 |
| TRBA | 114 | .82 | .76 | .91 | .72 | .94 | .39 | .87 | .04 | -.02 | -.09 |
| SAV | 115 | .55 | .87 | .65 | .82 | .79 | .67 | .80 | .06 | .04 | -.01 |
| SBA | 116 | .83 | .76 | .92 | .71 | .94 | .39 | .86 | .04 | -.02 | -.08 |

CORRELATIONS

| | | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .37 | .33 | .15 | .25 | .22 | .26 | .34 | .25 | .04 | -.00 |
| MS | 2 | .26 | .34 | .29 | .30 | .31 | .32 | .37 | .31 | -.18 | -.05 |
| RS | 3 | .33 | .32 | .20 | .25 | .27 | .29 | .33 | .24 | -.13 | .01 |
| IF | 4 | .34 | .35 | .25 | .26 | .29 | .29 | .37 | .28 | -.11 | .05 |
| ANXAV | 5 | .05 | .09 | -.06 | .02 | .01 | .00 | .09 | .03 | -.09 | -.08 |
| DEPAV | 6 | .04 | .07 | -.07 | .01 | .04 | .04 | .15 | .05 | -.05 | -.05 |
| HOSAV | 7 | -.10 | -.03 | -.06 | -.11 | -.03 | -.09 | .08 | -.11 | -.05 | -.07 |
| ANXDF | 8 | -.05 | -.08 | .05 | -.01 | -.04 | -.00 | -.10 | -.05 | .10 | -.05 |
| DEPDF | 9 | .07 | .08 | .22 | .13 | .06 | .05 | -.03 | .07 | .01 | -.03 |
| HOSDF | 10 | .09 | .03 | .02 | .05 | -.08 | -.02 | -.17 | .06 | .21 | -.08 |
| ANXL | 11 | -.03 | -.01 | .00 | .00 | -.06 | .00 | -.04 | -.04 | .04 | -.18 |
| DEPL | 12 | .15 | .19 | .22 | .20 | .13 | .12 | .14 | .16 | -.04 | -.10 |
| HOSL | 13 | .03 | .01 | -.03 | -.03 | -.13 | -.10 | -.14 | -.03 | .23 | -.16 |
| MIN1 | 14 | .33 | .29 | .34 | .25 | .22 | .35 | .29 | .20 | .27 | -.01 |
| MIN2 | 15 | .33 | .33 | .38 | .29 | .25 | .40 | .31 | .24 | .21 | .00 |
| MIN3 | 16 | .34 | .38 | .43 | .32 | .28 | .42 | .33 | .24 | .16 | .03 |
| MIN4 | 17 | .34 | .37 | .42 | .35 | .31 | .45 | .34 | .27 | .12 | .02 |
| MIN5 | 18 | .35 | .39 | .43 | .39 | .32 | .49 | .34 | .28 | .12 | -.01 |
| MIN6 | 19 | .34 | .36 | .45 | .34 | .30 | .45 | .36 | .28 | .05 | .06 |
| MIN7 | 20 | .34 | .37 | .45 | .34 | .30 | .47 | .38 | .30 | -.03 | .05 |
| MIN8 | 21 | .29 | .31 | .41 | .28 | .28 | .40 | .35 | .25 | .03 | .09 |
| MAX1 | 22 | .35 | .31 | .35 | .27 | .23 | .36 | .30 | .21 | .27 | -.00 |
| MAX2 | 23 | .35 | .36 | .41 | .31 | .27 | .42 | .32 | .26 | .19 | .02 |
| MAX3 | 24 | .35 | .41 | .46 | .36 | .32 | .46 | .35 | .27 | .12 | .07 |
| MAX4 | 25 | .36 | .39 | .43 | .38 | .33 | .48 | .36 | .29 | .11 | .04 |
| MAX5 | 26 | .38 | .42 | .49 | .43 | .39 | .50 | .38 | .31 | .09 | .12 |
| MAX6 | 27 | .35 | .37 | .46 | .36 | .32 | .47 | .38 | .30 | .03 | .09 |
| MAX7 | 28 | .33 | .37 | .47 | .35 | .35 | .47 | .42 | .31 | -.05 | .16 |
| MAX8 | 29 | .30 | .32 | .42 | .29 | .30 | .41 | .36 | .27 | .02 | .11 |
| DIF1 | 30 | .64 | .50 | .27 | .51 | .35 | .38 | .28 | .40 | .06 | .20 |
| DIF2 | 31 | .40 | .56 | .49 | .55 | .47 | .43 | .30 | .39 | -.31 | .36 |
| DIF3 | 32 | .14 | .19 | .30 | .35 | .37 | .34 | .18 | .28 | -.32 | .41 |
| DIF4 | 33 | .39 | .46 | .37 | .56 | .46 | .48 | .35 | .40 | -.36 | .41 |
| DIF5 | 34 | .11 | .12 | .24 | .14 | .29 | .01 | .13 | .10 | -.14 | .57 |
| DIF6 | 35 | .29 | .27 | .26 | .34 | .43 | .35 | .37 | .43 | -.38 | .54 |
| DIF7 | 36 | -.06 | -.05 | .03 | -.01 | .21 | -.00 | .19 | .04 | -.11 | .60 |
| DIF8 | 37 | .25 | .12 | .00 | .19 | .18 | .14 | .17 | .39 | -.09 | .26 |
| A1 | 38 | .03 | .04 | .10 | .05 | .11 | .13 | .20 | .10 | .03 | .65 |
| A2 | 39 | .08 | .08 | .12 | .08 | .16 | .13 | .22 | .20 | -.02 | .67 |
| A3 | 40 | -.19 | -.31 | -.23 | -.29 | -.02 | -.22 | .00 | -.05 | .08 | .56 |
| A4 | 41 | .08 | .01 | .03 | .03 | .16 | .08 | .20 | .19 | .06 | .62 |
| A5 | 42 | -.04 | -.16 | -.12 | -.15 | -.04 | -.12 | .02 | .03 | .08 | .59 |
| A6 | 43 | .02 | -.08 | -.02 | -.08 | .01 | -.02 | .09 | .13 | .01 | .62 |
| A7 | 44 | -.07 | -.19 | -.19 | -.22 | -.08 | -.22 | -.13 | -.08 | .11 | .35 |
| A8 | 45 | .06 | -.03 | -.02 | -.01 | .04 | .03 | .08 | .16 | .03 | .59 |
| B1 | 46 | .43 | .39 | .37 | .38 | .25 | .42 | .37 | .28 | -.02 | .13 |
| B2 | 47 | .18 | .43 | .51 | .42 | .33 | .43 | .28 | .21 | -.24 | .23 |
| B3 | 48 | .10 | .28 | .39 | .32 | .21 | .39 | .36 | .13 | -.16 | .30 |
| B4 | 49 | .17 | .40 | .47 | .47 | .38 | .52 | .43 | .24 | -.29 | .25 |
| B5 | 50 | -.09 | .03 | .14 | .12 | .31 | .15 | .19 | .07 | -.14 | .39 |
| B6 | 51 | .13 | .25 | .35 | .37 | .43 | .45 | .45 | .25 | -.26 | .37 |
| B7 | 52 | -.14 | .15 | .21 | .09 | .05 | .05 | .10 | .04 | -.28 | .40 |
| B8 | 53 | .09 | .09 | .16 | .09 | .12 | .12 | .32 | .16 | -.14 | .32 |
| C1 | 54 | .09 | .07 | -.03 | .02 | .07 | .00 | .10 | .16 | .01 | .11 |
| C2 | 55 | .06 | .09 | .20 | .17 | .21 | .16 | .20 | .16 | .06 | .04 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | -.05 | -.00 | -.13 | -.04 | -.08 | -.01 | -.07 | -.10 | -.07 | -.04 |
| C5 | 58 | -.16 | -.22 | -.08 | -.16 | .07 | -.04 | .04 | .03 | -.17 | .02 |

CORRFLATIONS

| | | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | -.03 | -.03 | -.10 | -.06 | .09 | -.07 | .13 | .09 | -.09 | .07 |
| C7 | 60 | -.08 | .03 | .01 | -.01 | .02 | -.07 | -.02 | -.18 | .07 | .01 |
| C8 | 61 | -.02 | .09 | .03 | .10 | .19 | .10 | .12 | .18 | -.05 | .05 |
| TR1 | 62 | .30 | .28 | .32 | .28 | .24 | .37 | .39 | .25 | .01 | .56 |
| TR2 | 63 | .19 | .41 | .52 | .41 | .39 | .45 | .36 | .29 | -.22 | .57 |
| TR3 | 64 | -.04 | -.01 | .10 | .04 | .13 | .14 | .24 | .13 | -.09 | .69 |
| TR4 | 65 | .20 | .36 | .43 | .42 | .42 | .50 | .49 | .32 | -.22 | .61 |
| TR5 | 66 | -.10 | -.13 | -.04 | -.07 | .09 | -.00 | .12 | .08 | -.02 | .76 |
| TR6 | 67 | .10 | .11 | .23 | .19 | .31 | .30 | .38 | .28 | -.18 | .78 |
| TR7 | 68 | -.19 | .02 | .04 | -.05 | -.02 | -.12 | -.01 | -.04 | -.14 | .63 |
| TR8 | 69 | .08 | .02 | .07 | .04 | .09 | .09 | .26 | .22 | -.07 | .74 |
| S1 | 70 | .32 | .30 | .33 | .30 | .25 | .38 | .40 | .27 | .01 | .55 |
| S2 | 71 | .21 | .42 | .52 | .42 | .38 | .45 | .37 | .29 | -.22 | .56 |
| S3 | 72 | -.08 | -.04 | .11 | .01 | .14 | .12 | .28 | .06 | -.05 | .70 |
| S4 | 73 | .21 | .37 | .44 | .44 | .43 | .52 | .51 | .33 | -.22 | .61 |
| S5 | 74 | -.11 | -.15 | -.05 | -.09 | .13 | -.04 | .12 | .07 | -.02 | .76 |
| S6 | 75 | .11 | .11 | .23 | .20 | .32 | .31 | .40 | .29 | -.18 | .78 |
| S7 | 76 | -.21 | .02 | .07 | -.07 | -.01 | -.13 | -.00 | -.06 | -.18 | .63 |
| S8 | 77 | .10 | .03 | .08 | .05 | .11 | .11 | .28 | .25 | -.07 | .73 |
| PVCON | 78 | .25 | .13 | .03 | .06 | .11 | .17 | .22 | .20 | .05 | .03 |
| PVEXP | 79 | .03 | -.00 | -.18 | -.07 | -.08 | -.03 | .04 | .05 | -.00 | -.01 |
| PVDIF | 80 | -.26 | -.16 | -.29 | -.18 | -.24 | -.26 | -.22 | -.17 | -.07 | -.05 |
| SRD1 | 81 | 1.00 | .82 | .52 | .76 | .49 | .69 | .53 | .70 | .02 | -.08 |
| SRD2 | 82 | .82 | 1.00 | .76 | .89 | .59 | .82 | .61 | .71 | -.24 | -.01 |
| SRD3 | 83 | .52 | .76 | 1.00 | .74 | .61 | .77 | .61 | .55 | -.34 | .16 |
| SRD4 | 84 | .76 | .89 | .74 | 1.00 | .65 | .90 | .67 | .74 | -.28 | .05 |
| SRD5 | 85 | .49 | .59 | .61 | .65 | 1.00 | .67 | .73 | .62 | -.24 | .28 |
| SRD6 | 86 | .69 | .82 | .77 | .90 | .67 | 1.00 | .77 | .75 | -.34 | .05 |
| SRD7 | 87 | .53 | .61 | .61 | .67 | .73 | .77 | 1.00 | .66 | -.26 | .23 |
| SRD8 | 88 | .70 | .71 | .55 | .74 | .62 | .75 | .66 | 1.00 | -.30 | .11 |
| MIN1-7 | 89 | .02 | -.24 | -.34 | -.28 | -.24 | -.34 | -.26 | -.30 | 1.00 | -.19 |
| Z.S&DIF357 | 90 | -.08 | -.01 | .16 | .05 | .28 | .05 | .23 | .11 | -.19 | 1.00 |
| BL1 | 91 | .07 | -.00 | -.03 | -.08 | -.04 | -.05 | -.05 | -.06 | .01 | .24 |
| BL2 | 92 | .04 | .02 | .02 | -.06 | -.03 | -.04 | -.05 | -.09 | -.01 | .29 |
| BL3 | 93 | .00 | -.03 | -.03 | -.10 | -.06 | -.07 | -.06 | -.12 | -.00 | .28 |
| BL4 | 94 | -.02 | -.04 | -.02 | -.09 | -.03 | -.06 | -.06 | -.11 | -.03 | .31 |
| BL5 | 95 | -.06 | -.13 | -.11 | -.20 | -.12 | -.16 | -.12 | -.14 | .00 | .31 |
| BL6 | 96 | -.05 | -.11 | -.07 | -.17 | -.06 | -.13 | -.08 | -.12 | -.03 | .33 |
| BL7 | 97 | -.09 | -.19 | -.18 | -.25 | -.14 | -.21 | -.16 | -.15 | .03 | .27 |
| BL8 | 98 | -.09 | -.17 | -.13 | -.22 | -.07 | -.17 | -.10 | -.13 | -.02 | .33 |
| SRDAV | 99 | .59 | .75 | .85 | .79 | .89 | .84 | .88 | .70 | -.32 | .25 |
| SRDBA | 100 | .80 | .92 | .77 | .96 | .69 | .95 | .74 | .86 | -.31 | .05 |
| MAXAV | 101 | .36 | .41 | .48 | .39 | .36 | .49 | .39 | .30 | .06 | .12 |
| MAXBA | 102 | .35 | .36 | .43 | .34 | .31 | .45 | .36 | .28 | .09 | .06 |
| MINAV | 103 | .35 | .39 | .44 | .36 | .30 | .47 | .36 | .28 | .09 | .02 |
| MINBA | 104 | .33 | .35 | .42 | .32 | .29 | .43 | .34 | .26 | .11 | .04 |
| DIFAV | 105 | .08 | .11 | .25 | .18 | .38 | .11 | .21 | .16 | -.22 | .73 |
| DIFBA | 106 | .40 | .43 | .35 | .49 | .46 | .42 | .36 | .48 | -.35 | .48 |
| BLAV | 107 | -.05 | -.12 | -.11 | -.19 | -.11 | -.15 | -.12 | -.14 | .01 | .29 |
| BLBA | 108 | -.03 | -.08 | -.05 | -.14 | -.05 | -.10 | -.07 | -.11 | -.02 | .32 |
| AAV | 109 | -.12 | -.25 | -.20 | -.25 | -.05 | -.21 | -.03 | -.03 | .10 | .58 |
| ABA | 110 | .06 | -.02 | .01 | -.01 | .07 | .04 | .13 | .17 | .02 | .63 |
| BAV | 111 | -.04 | .23 | .35 | .25 | .22 | .27 | .29 | .11 | -.26 | .45 |
| BBA | 112 | .17 | .35 | .44 | .40 | .37 | .45 | .43 | .25 | -.27 | .34 |
| TRAV | 113 | -.13 | -.05 | .05 | -.02 | .09 | .03 | .16 | .08 | -.10 | .85 |
| TRBA | 114 | .15 | .22 | .32 | .27 | .32 | .35 | .41 | .31 | -.18 | .77 |
| SAV | 115 | -.15 | -.08 | .06 | -.06 | .12 | -.00 | .19 | .04 | -.10 | .87 |
| SBA | 116 | .17 | .24 | .33 | .29 | .33 | .37 | .43 | .32 | -.18 | .77 |

CORRELATIONS

| | | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .04 | .04 | .07 | .07 | .08 | .07 | .06 | .06 | .27 | .30 |
| MS | 2 | -.23 | -.21 | -.18 | -.18 | -.20 | -.19 | -.22 | -.21 | .36 | .34 |
| RS | 3 | -.01 | -.01 | .02 | .02 | .02 | .02 | -.01 | .00 | .30 | .30 |
| IF | 4 | -.10 | -.08 | -.05 | -.05 | -.05 | -.05 | -.09 | -.06 | .34 | .32 |
| ANXAV | 5 | -.13 | -.14 | -.09 | -.09 | -.07 | -.09 | -.10 | -.10 | .01 | .04 |
| DEPAV | 6 | -.10 | -.12 | -.06 | -.07 | -.05 | -.06 | -.08 | -.08 | .04 | .05 |
| HOSAV | 7 | -.19 | -.19 | -.16 | -.17 | -.12 | -.13 | -.10 | -.12 | -.01 | -.09 |
| ANXDF | 8 | .15 | .16 | .10 | .12 | .06 | .09 | .08 | .10 | -.03 | -.04 |
| DEPDF | 9 | .10 | .12 | .05 | .07 | .03 | .04 | .01 | .02 | .10 | .09 |
| HOSDF | 10 | .14 | .12 | .07 | .07 | .04 | .05 | .05 | .04 | -.08 | .03 |
| ANXL | 11 | .07 | .08 | .05 | .07 | .00 | .03 | .01 | .03 | -.04 | -.01 |
| DEPL | 12 | .02 | .02 | -.00 | .02 | -.03 | -.03 | -.08 | -.06 | .19 | .18 |
| HOSL | 13 | .01 | -.02 | -.05 | -.06 | -.05 | -.06 | -.03 | -.06 | -.11 | -.04 |
| MIN1 | 14 | -.15 | -.17 | -.20 | -.21 | -.22 | -.21 | -.21 | -.22 | .32 | .30 |
| MIN2 | 15 | -.15 | -.16 | -.19 | -.19 | -.23 | -.21 | -.22 | -.22 | .36 | .34 |
| MIN3 | 16 | -.13 | -.13 | -.16 | -.16 | -.21 | -.18 | -.21 | -.21 | .40 | .37 |
| MIN4 | 17 | -.16 | -.16 | -.19 | -.18 | -.23 | -.21 | -.23 | -.22 | .41 | .40 |
| MIN5 | 18 | -.15 | -.15 | -.17 | -.16 | -.21 | -.19 | -.21 | -.21 | .41 | .42 |
| MIN6 | 19 | -.14 | -.15 | -.19 | -.18 | -.21 | -.19 | -.21 | -.21 | .42 | .39 |
| MIN7 | 20 | -.16 | -.18 | -.21 | -.21 | -.23 | -.21 | -.23 | -.23 | .43 | .41 |
| MIN8 | 21 | -.16 | -.18 | -.21 | -.20 | -.22 | -.20 | -.21 | -.21 | .40 | .34 |
| MAX1 | 22 | -.14 | -.16 | -.20 | -.20 | -.22 | -.21 | -.21 | -.22 | .34 | .31 |
| MAX2 | 23 | -.14 | -.15 | -.19 | -.18 | -.23 | -.20 | -.23 | -.22 | .38 | .37 |
| MAX3 | 24 | -.13 | -.13 | -.16 | -.15 | -.21 | -.18 | -.22 | -.20 | .44 | .41 |
| MAX4 | 25 | -.15 | -.15 | -.18 | -.17 | -.22 | -.20 | -.22 | -.22 | .43 | .42 |
| MAX5 | 26 | -.10 | -.09 | -.12 | -.11 | -.18 | -.15 | -.19 | -.18 | .48 | .45 |
| MAX6 | 27 | -.13 | -.14 | -.18 | -.17 | -.20 | -.18 | -.20 | -.20 | .44 | .41 |
| MAX7 | 28 | -.12 | -.13 | -.17 | -.16 | -.19 | -.16 | -.19 | -.18 | .47 | .41 |
| MAX8 | 29 | -.16 | -.17 | -.20 | -.20 | -.21 | -.19 | -.20 | -.20 | .41 | .35 |
| DIF1 | 30 | .25 | .26 | .20 | .20 | .14 | .17 | .11 | .13 | .34 | .48 |
| DIF2 | 31 | .15 | .20 | .14 | .18 | .05 | .10 | -.03 | .04 | .49 | .52 |
| DIF3 | 32 | .00 | .06 | .02 | .10 | .01 | .04 | -.03 | .02 | .33 | .32 |
| DIF4 | 33 | .18 | .22 | .19 | .22 | .12 | .15 | .04 | .10 | .45 | .52 |
| DIF5 | 34 | .22 | .23 | .23 | .22 | .17 | .21 | .11 | .18 | .25 | .10 |
| DIF6 | 35 | .19 | .18 | .16 | .18 | .15 | .18 | .09 | .15 | .40 | .37 |
| DIF7 | 36 | .24 | .26 | .26 | .28 | .26 | .27 | .21 | .27 | .16 | -.01 |
| DIF8 | 37 | .13 | .12 | .11 | .12 | .14 | .13 | .13 | .15 | .13 | .22 |
| A1 | 38 | .23 | .28 | .30 | .29 | .37 | .32 | .39 | .33 | .15 | .09 |
| A2 | 39 | .22 | .25 | .28 | .27 | .37 | .32 | .39 | .33 | .19 | .13 |
| A3 | 40 | .11 | .12 | .16 | .16 | .30 | .24 | .36 | .32 | -.10 | -.23 |
| A4 | 41 | .18 | .20 | .24 | .23 | .36 | .30 | .41 | .33 | .14 | .08 |
| A5 | 42 | .13 | .15 | .20 | .18 | .34 | .26 | .38 | .31 | -.06 | -.11 |
| A6 | 43 | .21 | .23 | .28 | .25 | .41 | .34 | .45 | .37 | .03 | -.02 |
| A7 | 44 | -.02 | -.00 | .04 | .04 | .15 | .08 | .15 | .13 | -.15 | -.19 |
| A8 | 45 | .19 | .23 | .27 | .26 | .38 | .31 | .41 | .34 | .04 | .04 |
| B1 | 46 | .14 | .13 | .04 | .04 | -.10 | -.02 | -.14 | -.05 | .38 | .40 |
| B2 | 47 | -.07 | -.02 | -.16 | -.09 | -.29 | -.19 | -.34 | -.23 | .43 | .41 |
| B3 | 48 | .08 | .12 | .03 | .06 | -.14 | -.04 | -.22 | -.10 | .36 | .31 |
| B4 | 49 | -.04 | .01 | -.10 | -.06 | -.27 | -.17 | -.34 | -.21 | .49 | .45 |
| B5 | 50 | .15 | .15 | .12 | .16 | .09 | .15 | .01 | .11 | .24 | .10 |
| B6 | 51 | .05 | .06 | -.02 | .03 | -.16 | -.06 | -.23 | -.10 | .47 | .36 |
| B7 | 52 | .09 | .12 | .07 | .09 | .02 | .09 | -.00 | .06 | .14 | .09 |
| B8 | 53 | .15 | .08 | .03 | .04 | -.03 | .05 | -.05 | .05 | .22 | .12 |
| C1 | 54 | -.00 | -.03 | -.03 | -.05 | .02 | .02 | .07 | .04 | .05 | .07 |
| C2 | 55 | .10 | .11 | .13 | .11 | .10 | .11 | .12 | .10 | .24 | .16 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | .08 | .07 | .08 | .07 | .07 | .07 | .06 | .05 | -.11 | -.04 |
| C5 | 58 | -.07 | -.07 | -.07 | -.07 | -.03 | -.02 | .05 | .04 | .01 | -.11 |

CORRELATIONS

| | | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | .03 | .01 | .02 | -.00 | .07 | .07 | .12 | .09 | .04 | -.02 |
| C7 | 60 | -.03 | -.06 | .00 | -.05 | .06 | -.00 | .09 | .01 | .01 | -.06 |
| C8 | 61 | -.13 | -.09 | -.09 | -.12 | -.12 | -.11 | -.09 | -.10 | .13 | .13 |
| TR1 | 62 | .26 | .30 | .24 | .23 | .20 | .22 | .18 | .21 | .36 | .32 |
| TR2 | 63 | .05 | .12 | .02 | .07 | -.05 | .01 | -.09 | -.02 | .48 | .42 |
| TR3 | 64 | .04 | .08 | .05 | .08 | .05 | .08 | .06 | .11 | .18 | .08 |
| TR4 | 65 | .06 | .12 | .05 | .08 | -.02 | .03 | -.05 | .01 | .51 | .44 |
| TR5 | 66 | .23 | .26 | .28 | .29 | .38 | .34 | .38 | .37 | .06 | -.03 |
| TR6 | 67 | .21 | .24 | .22 | .23 | .23 | .24 | .20 | .24 | .35 | .24 |
| TR7 | 68 | .05 | .09 | .07 | .09 | .11 | .11 | .09 | .12 | .01 | -.05 |
| TR8 | 69 | .25 | .25 | .26 | .25 | .32 | .30 | .33 | .33 | .15 | .10 |
| S1 | 70 | .26 | .29 | .23 | .23 | .19 | .22 | .17 | .20 | .37 | .34 |
| S2 | 71 | .05 | .12 | .01 | .06 | -.05 | .00 | -.10 | -.03 | .48 | .43 |
| S3 | 72 | .15 | .19 | .16 | .19 | .14 | .18 | .14 | .20 | .20 | .04 |
| S4 | 73 | .07 | .13 | .06 | .09 | -.02 | .04 | -.05 | .02 | .52 | .45 |
| S5 | 74 | .19 | .21 | .24 | .25 | .36 | .32 | .36 | .35 | .07 | -.06 |
| S6 | 75 | .21 | .23 | .21 | .23 | .22 | .24 | .20 | .24 | .36 | .25 |
| S7 | 76 | .07 | .10 | .09 | .10 | .14 | .14 | .12 | .15 | .02 | -.07 |
| S8 | 77 | .26 | .26 | .26 | .25 | .32 | .31 | .34 | .34 | .17 | .12 |
| PVCON | 78 | .18 | .09 | .09 | .08 | .07 | .08 | .06 | .09 | .13 | .15 |
| PVEXP | 79 | .14 | .08 | .10 | .08 | .07 | .09 | .05 | .09 | -.09 | -.02 |
| PVDIF | 80 | -.01 | .01 | .04 | .02 | .01 | .03 | .01 | .01 | -.29 | -.21 |
| SRD1 | 81 | .07 | .04 | .00 | -.02 | -.06 | -.05 | -.09 | -.09 | .59 | .80 |
| SRD2 | 82 | -.00 | .02 | -.03 | -.04 | -.13 | -.11 | -.19 | -.17 | .75 | .92 |
| SRD3 | 83 | -.03 | .02 | -.03 | -.02 | -.11 | -.07 | -.18 | -.13 | .85 | .77 |
| SRD4 | 84 | -.08 | -.06 | -.10 | -.09 | -.20 | -.17 | -.25 | -.22 | .79 | .96 |
| SRD5 | 85 | -.04 | -.03 | -.06 | -.03 | -.12 | -.06 | -.14 | -.07 | .89 | .69 |
| SRD6 | 86 | -.05 | -.04 | -.07 | -.06 | -.16 | -.13 | -.21 | -.17 | .84 | .95 |
| SRD7 | 87 | -.05 | -.05 | -.06 | -.06 | -.12 | -.08 | -.16 | -.10 | .88 | .74 |
| SRD8 | 88 | -.06 | -.09 | -.12 | -.11 | -.14 | -.12 | -.15 | -.13 | .70 | .86 |
| MIN1-7 | 89 | .01 | -.01 | -.00 | -.03 | .00 | -.03 | .03 | -.02 | -.32 | -.31 |
| Z.S&DIF357 | 90 | .24 | .29 | .28 | .31 | .31 | .33 | .27 | .33 | .25 | .05 |
| BL1 | 91 | 1.00 | .97 | .96 | .96 | .92 | .95 | .88 | .93 | -.04 | -.05 |
| BL2 | 92 | .97 | 1.00 | .98 | .98 | .93 | .96 | .88 | .93 | -.02 | -.05 |
| BL3 | 93 | .96 | .98 | 1.00 | .99 | .96 | .98 | .92 | .95 | -.05 | -.09 |
| BL4 | 94 | .96 | .98 | .99 | 1.00 | .95 | .98 | .91 | .96 | -.04 | -.08 |
| BL5 | 95 | .92 | .93 | .96 | .95 | 1.00 | .98 | .97 | .97 | -.13 | -.17 |
| BL6 | 96 | .95 | .96 | .98 | .98 | .98 | 1.00 | .96 | .99 | -.08 | -.14 |
| BL7 | 97 | .88 | .88 | .92 | .91 | .97 | .96 | 1.00 | .97 | -.18 | -.22 |
| BL8 | 98 | .93 | .93 | .95 | .96 | .97 | .99 | .97 | 1.00 | -.12 | -.19 |
| SRDAV | 99 | -.04 | -.02 | -.05 | -.04 | -.13 | -.08 | -.18 | -.12 | 1.00 | .83 |
| SRDBA | 100 | -.05 | -.05 | -.09 | -.08 | -.17 | -.14 | -.22 | -.19 | .83 | 1.00 |
| MAXAV | 101 | -.12 | -.12 | -.15 | -.14 | -.19 | -.17 | -.20 | -.19 | .47 | .43 |
| MAXBA | 102 | -.15 | -.16 | -.19 | -.18 | -.22 | -.20 | -.22 | -.21 | .42 | .39 |
| MINAV | 103 | -.15 | -.15 | -.18 | -.18 | -.22 | -.20 | -.22 | -.22 | .42 | .41 |
| MINBA | 104 | -.15 | -.16 | -.20 | -.19 | -.22 | -.20 | -.22 | -.22 | .40 | .37 |
| DIFAV | 105 | .24 | .27 | .25 | .28 | .22 | .26 | .15 | .23 | .32 | .15 |
| DIFBA | 106 | .19 | .22 | .18 | .21 | .14 | .17 | .07 | .13 | .45 | .49 |
| BLAV | 107 | .93 | .94 | .98 | .97 | .99 | .99 | .98 | .98 | -.12 | -.16 |
| BLBA | 108 | .96 | .98 | .99 | .99 | .97 | .99 | .94 | .98 | -.06 | -.12 |
| AAV | 109 | .09 | .11 | .16 | .16 | .31 | .23 | .35 | .30 | -.11 | -.20 |
| ABA | 110 | .20 | .24 | .28 | .26 | .40 | .33 | .43 | .36 | .08 | .05 |
| BAV | 111 | .13 | .16 | .08 | .12 | -.04 | .06 | -.11 | .01 | .33 | .24 |
| BBA | 112 | .02 | .04 | -.07 | -.02 | -.22 | -.11 | -.28 | -.15 | .47 | .40 |
| TRAV | 113 | .12 | .17 | .15 | .18 | .21 | .21 | .21 | .24 | .11 | .01 |
| TRBA | 114 | .18 | .22 | .17 | .19 | .16 | .18 | .14 | .18 | .39 | .31 |
| SAV | 115 | .17 | .21 | .21 | .23 | .26 | .26 | .26 | .29 | .14 | -.03 |
| SBA | 116 | .18 | .22 | .17 | .19 | .16 | .18 | .14 | .18 | .41 | .33 |

CORRELATIONS

| | | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DS | 1 | .03 | .04 | .04 | .03 | -.08 | .10 | .07 | .06 | .15 | .18 |
| MS | 2 | .01 | -.00 | .01 | -.01 | -.01 | .13 | -.20 | -.20 | -.04 | .05 |
| RS | 3 | -.07 | -.07 | -.06 | -.07 | -.03 | .10 | .01 | .01 | .09 | .11 |
| IF | 4 | .03 | .03 | .04 | .03 | -.07 | .05 | -.07 | -.06 | .17 | .12 |
| ANXAV | 5 | -.18 | -.17 | -.16 | -.17 | -.15 | -.09 | -.09 | -.11 | -.01 | -.06 |
| DEPAV | 6 | -.14 | -.14 | -.13 | -.14 | -.08 | -.02 | -.07 | -.08 | -.03 | -.03 |
| HOSAV | 7 | -.11 | -.09 | -.08 | -.08 | -.24 | -.28 | -.13 | -.16 | .06 | -.01 |
| ANXDF | 8 | -.04 | -.05 | -.06 | -.05 | .14 | -.02 | .08 | .12 | -.14 | -.11 |
| DEPDF | 9 | .03 | .02 | .01 | .01 | .15 | .09 | .03 | .06 | -.15 | -.15 |
| HOSDF | 10 | -.06 | -.06 | -.07 | -.06 | .08 | .03 | .05 | .07 | -.11 | -.10 |
| ANXL | 11 | -.27 | -.29 | -.27 | -.28 | .03 | -.14 | .02 | .05 | -.23 | -.24 |
| DEPL | 12 | -.13 | -.15 | -.14 | -.15 | .12 | .10 | -.04 | -.01 | -.25 | -.25 |
| HOSL | 13 | -.17 | -.16 | -.16 | -.15 | -.10 | -.22 | -.05 | -.05 | -.09 | -.15 |
| MIN1 | 14 | .96 | .98 | .97 | .98 | -.20 | -.16 | -.22 | -.21 | .04 | .07 |
| MIN2 | 15 | .97 | .99 | .99 | .99 | -.17 | -.12 | -.22 | -.20 | .00 | .05 |
| MIN3 | 16 | .98 | .98 | .99 | .98 | -.14 | -.10 | -.20 | -.17 | -.01 | .05 |
| MIN4 | 17 | .99 | .99 | 1.00 | .99 | -.14 | -.07 | -.22 | -.20 | -.01 | .05 |
| MIN5 | 18 | .98 | .98 | .99 | .98 | -.16 | -.06 | -.20 | -.18 | -.02 | .05 |
| MIN6 | 19 | .99 | 1.00 | .99 | 1.00 | -.12 | -.06 | -.21 | -.18 | .02 | .08 |
| MIN7 | 20 | .97 | .98 | .98 | .98 | -.13 | -.06 | -.23 | -.21 | .01 | .06 |
| MIN8 | 21 | .96 | .98 | .97 | .98 | -.11 | -.10 | -.21 | -.20 | .08 | .11 |
| MAX1 | 22 | .96 | .98 | .97 | .98 | -.18 | -.14 | -.21 | -.20 | .03 | .07 |
| MAX2 | 23 | .98 | .99 | .99 | .99 | -.14 | -.08 | -.22 | -.19 | -.01 | .05 |
| MAX3 | 24 | .99 | .99 | .99 | .99 | -.08 | -.03 | -.20 | -.17 | -.02 | .06 |
| MAX4 | 25 | .99 | .99 | .99 | .99 | -.11 | -.03 | -.21 | -.19 | -.01 | .06 |
| MAX5 | 26 | .98 | .96 | .97 | .96 | .03 | .07 | -.17 | -.13 | -.02 | .09 |
| MAX6 | 27 | .99 | 1.00 | .99 | .99 | -.08 | -.01 | -.20 | -.17 | .02 | .10 |
| MAX7 | 28 | .98 | .98 | .97 | .97 | -.00 | .03 | -.18 | -.16 | .04 | .12 |
| MAX8 | 29 | .96 | .98 | .97 | .98 | -.09 | -.07 | -.21 | -.20 | .09 | .13 |
| DIF1 | 30 | .18 | .13 | .12 | .10 | .39 | .67 | .16 | .19 | -.11 | .08 |
| DIF2 | 31 | .07 | -.02 | -.02 | -.05 | .66 | .81 | .05 | .13 | -.22 | .00 |
| DIF3 | 32 | .12 | .08 | .05 | .05 | .55 | .54 | -.00 | .05 | -.04 | .09 |
| DIF4 | 33 | .10 | .02 | .01 | -.02 | .63 | .93 | .12 | .18 | -.10 | .17 |
| DIF5 | 34 | -.05 | -.15 | -.17 | -.17 | .87 | .55 | .17 | .21 | .02 | .14 |
| DIF6 | 35 | .06 | .01 | -.03 | -.03 | .71 | .89 | .14 | .18 | .08 | .28 |
| DIF7 | 36 | -.05 | -.10 | -.14 | -.12 | .73 | .51 | .25 | .27 | .20 | .30 |
| DIF8 | 37 | -.19 | -.20 | -.23 | -.23 | .36 | .72 | .13 | .13 | .16 | .28 |
| A1 | 38 | .22 | .21 | .19 | .21 | .19 | .12 | .36 | .31 | .73 | .91 |
| A2 | 39 | .15 | .13 | .11 | .12 | .31 | .29 | .35 | .30 | .70 | .94 |
| A3 | 40 | .05 | .07 | .04 | .08 | .06 | -.08 | .28 | .22 | .94 | .76 |
| A4 | 41 | .14 | .13 | .11 | .12 | .24 | .22 | .34 | .27 | .77 | .96 |
| A5 | 42 | .03 | .04 | .01 | .04 | .16 | .04 | .31 | .23 | .93 | .92 |
| A6 | 43 | .06 | .06 | .03 | .05 | .22 | .18 | .39 | .30 | .85 | .98 |
| A7 | 44 | -.13 | -.11 | -.13 | -.11 | .01 | -.05 | .11 | .06 | .78 | .50 |
| A8 | 45 | .06 | .05 | .03 | .04 | .21 | .19 | .36 | .29 | .86 | .98 |
| B1 | 46 | .26 | .25 | .24 | .24 | .11 | .32 | -.07 | .03 | -.22 | -.09 |
| B2 | 47 | .25 | .22 | .22 | .20 | .23 | .31 | -.27 | -.14 | -.29 | -.17 |
| B3 | 48 | .34 | .30 | .31 | .29 | .20 | .20 | -.11 | .01 | -.27 | -.17 |
| B4 | 49 | .31 | .27 | .28 | .26 | .18 | .34 | -.24 | -.11 | -.28 | -.15 |
| B5 | 50 | .03 | -.01 | -.01 | -.02 | .28 | .26 | .07 | .15 | -.16 | -.02 |
| B6 | 51 | .28 | .25 | .24 | .24 | .31 | .37 | -.14 | -.02 | -.23 | -.14 |
| B7 | 52 | .19 | .15 | .15 | .14 | .28 | .16 | .03 | .09 | -.22 | -.10 |
| B8 | 53 | .19 | .19 | .17 | .18 | .18 | .17 | -.02 | .06 | -.11 | -.10 |
| C1 | 54 | .06 | .06 | .06 | .06 | .00 | .11 | .02 | -.01 | .07 | .17 |
| C2 | 55 | -.05 | -.07 | -.07 | -.08 | .12 | .18 | .12 | .11 | -.02 | .03 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | -.10 | -.12 | -.10 | -.12 | .02 | .00 | .07 | .07 | -.07 | -.08 |
| C5 | 58 | -.17 | -.16 | -.17 | -.16 | -.03 | -.10 | -.02 | -.03 | .08 | -.00 |

CORRELATIONS

| | | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C6 | 59 | -.07 | -.07 | -.07 | -.07 | .01 | .03 | .07 | .04 | .08 | .13 |
| C7 | 60 | .00 | -.01 | .00 | -.01 | -.01 | -.01 | .05 | -.03 | .00 | .07 |
| C8 | 61 | -.08 | -.09 | -.08 | -.09 | -.05 | .10 | -.10 | -.11 | -.04 | .05 |
| TR1 | 62 | .33 | .32 | .30 | .31 | .21 | .31 | .21 | .24 | .37 | .59 |
| TR2 | 63 | .32 | .28 | .27 | .26 | .37 | .42 | -.04 | .04 | .15 | .37 |
| TR3 | 64 | .28 | .28 | .25 | .27 | .18 | .12 | .06 | .09 | .62 | .56 |
| TR4 | 65 | .36 | .32 | .32 | .30 | .31 | .43 | -.01 | .06 | .25 | .47 |
| TR5 | 66 | .09 | .08 | .05 | .07 | .28 | .18 | .35 | .32 | .83 | .89 |
| TR6 | 67 | .25 | .23 | .20 | .22 | .42 | .41 | .22 | .24 | .55 | .72 |
| TR7 | 68 | .09 | .06 | .06 | .06 | .27 | .12 | .09 | .10 | .35 | .27 |
| TR8 | 69 | .16 | .16 | .12 | .15 | .31 | .28 | .31 | .29 | .71 | .82 |
| S1 | 70 | .34 | .32 | .31 | .31 | .21 | .31 | .20 | .24 | .35 | .57 |
| S2 | 71 | .31 | .26 | .25 | .24 | .37 | .43 | -.05 | .04 | .12 | .35 |
| S3 | 72 | .30 | .29 | .27 | .29 | .20 | .08 | .15 | .19 | .58 | .51 |
| S4 | 73 | .36 | .32 | .32 | .30 | .31 | .44 | -.00 | .07 | .23 | .45 |
| S5 | 74 | .02 | .02 | -.01 | .01 | .29 | .16 | .33 | .29 | .79 | .84 |
| S6 | 75 | .25 | .23 | .19 | .21 | .41 | .41 | .22 | .24 | .53 | .71 |
| S7 | 76 | .08 | .05 | .05 | .05 | .27 | .12 | .12 | .12 | .35 | .28 |
| S8 | 77 | .17 | .16 | .12 | .15 | .30 | .28 | .31 | .29 | .70 | .83 |
| PVCON | 78 | .18 | .19 | .18 | .19 | .01 | -.07 | .07 | .09 | .05 | -.01 |
| PVEXP | 79 | -.03 | -.03 | -.03 | -.03 | -.04 | -.09 | .08 | .09 | -.04 | -.08 |
| PVDIF | 80 | -.28 | -.29 | -.26 | -.28 | -.08 | -.05 | .02 | .02 | -.13 | -.10 |
| SRD1 | 81 | .36 | .35 | .35 | .33 | .08 | .40 | -.05 | -.03 | -.12 | .06 |
| SRD2 | 82 | .41 | .36 | .39 | .35 | .11 | .43 | -.12 | -.08 | -.25 | -.02 |
| SRD3 | 83 | .48 | .43 | .44 | .42 | .25 | .35 | -.11 | -.05 | -.20 | .01 |
| SRD4 | 84 | .39 | .34 | .36 | .32 | .18 | .49 | -.19 | -.14 | -.25 | -.01 |
| SRD5 | 85 | .36 | .31 | .30 | .29 | .38 | .46 | -.11 | -.05 | -.05 | .07 |
| SRD6 | 86 | .49 | .45 | .47 | .43 | .11 | .42 | -.15 | -.10 | -.21 | .04 |
| SRD7 | 87 | .39 | .36 | .36 | .34 | .21 | .36 | -.12 | -.07 | -.03 | .13 |
| SRD8 | 88 | .30 | .28 | .28 | .26 | .16 | .48 | -.14 | -.11 | -.03 | .17 |
| MIN1-7 | 89 | .06 | .09 | .09 | .11 | -.22 | -.35 | .01 | -.02 | .10 | .02 |
| Z.S&DIF357 | 90 | .12 | .06 | .02 | .04 | .73 | .48 | .29 | .32 | .58 | .63 |
| BL1 | 91 | -.12 | -.15 | -.15 | -.15 | .24 | .19 | .93 | .96 | .09 | .20 |
| BL2 | 92 | -.12 | -.16 | -.15 | -.16 | .27 | .22 | .94 | .98 | .11 | .24 |
| BL3 | 93 | -.15 | -.19 | -.18 | -.20 | .25 | .18 | .98 | .99 | .16 | .28 |
| BL4 | 94 | -.14 | -.18 | -.18 | -.19 | .28 | .21 | .97 | .99 | .16 | .26 |
| BL5 | 95 | -.19 | -.22 | -.22 | -.22 | .22 | .14 | .99 | .97 | .31 | .40 |
| BL6 | 96 | -.17 | -.20 | -.20 | -.20 | .26 | .17 | .99 | .99 | .23 | .33 |
| BL7 | 97 | -.20 | -.22 | -.22 | -.22 | .15 | .07 | .98 | .94 | .35 | .43 |
| BL8 | 98 | -.19 | -.21 | -.22 | -.22 | .23 | .13 | .98 | .98 | .30 | .36 |
| SRDAV | 99 | .47 | .42 | .42 | .40 | .32 | .45 | -.12 | -.06 | -.11 | .08 |
| SRDBA | 100 | .43 | .39 | .41 | .37 | .15 | .49 | -.16 | -.12 | -.20 | .05 |
| MAXAV | 101 | 1.00 | .99 | .99 | .99 | -.01 | .02 | -.19 | -.16 | .00 | .09 |
| MAXBA | 102 | .99 | 1.00 | 1.00 | 1.00 | -.11 | -.05 | -.21 | -.19 | .02 | .08 |
| MINAV | 103 | .99 | 1.00 | 1.00 | 1.00 | -.15 | -.07 | -.21 | -.19 | -.01 | .06 |
| MINBA | 104 | .99 | 1.00 | 1.00 | 1.00 | -.14 | -.09 | -.22 | -.20 | .02 | .07 |
| DIFAV | 105 | -.01 | -.11 | -.15 | -.14 | 1.00 | .72 | .21 | .26 | .09 | .24 |
| DIFBA | 106 | .02 | -.05 | -.07 | -.09 | .72 | 1.00 | .13 | .18 | -.03 | .22 |
| BLAV | 107 | -.19 | -.21 | -.21 | -.22 | .21 | .13 | 1.00 | .98 | .28 | .38 |
| BLBA | 108 | -.16 | -.19 | -.19 | -.20 | .26 | .18 | .98 | 1.00 | .20 | .30 |
| AAV | 109 | .00 | .02 | -.01 | .02 | .09 | -.03 | .28 | .20 | 1.00 | .84 |
| ABA | 110 | .09 | .08 | .06 | .07 | .24 | .22 | .38 | .30 | .84 | 1.00 |
| BAV | 111 | .28 | .23 | .23 | .22 | .32 | .26 | -.03 | .09 | -.30 | -.15 |
| BBA | 112 | .30 | .27 | .27 | .26 | .26 | .35 | -.20 | -.06 | -.27 | -.17 |
| TRAV | 113 | .20 | .19 | .16 | .18 | .29 | .17 | .19 | .20 | .74 | .70 |
| TRBA | 114 | .30 | .27 | .24 | .25 | .40 | .42 | .16 | .20 | .51 | .70 |
| SAV | 115 | .19 | .18 | .15 | .17 | .31 | .15 | .25 | .25 | .73 | .69 |
| SBA | 116 | .29 | .27 | .24 | .25 | .39 | .43 | .16 | .20 | .48 | .69 |

CORRELATIONS

| | | 111 | 112 | 113 | 114 | 115 | 116 |
|---|---|---|---|---|---|---|---|
| DS | 1 | -.14 | -.06 | .02 | .09 | .04 | .11 |
| MS | 2 | -.04 | .01 | -.08 | .03 | -.07 | .05 |
| RS | 3 | -.07 | -.01 | -.01 | .06 | .03 | .08 |
| IF | 4 | -.06 | -.02 | .09 | .07 | .11 | .09 |
| ANXAV | 5 | -.02 | -.07 | -.05 | -.12 | -.02 | -.10 |
| DEPAV | 6 | -.02 | -.10 | -.07 | -.13 | -.04 | -.10 |
| HOSAV | 7 | .03 | -.05 | .05 | -.07 | .08 | -.04 |
| ANXDF | 8 | -.03 | .01 | -.15 | -.07 | -.16 | -.09 |
| DEPDF | 9 | .03 | .09 | -.12 | -.05 | -.12 | -.05 |
| HOSDF | 10 | -.07 | -.05 | -.11 | -.11 | -.15 | -.13 |
| ANXL | 11 | -.06 | -.08 | -.29 | -.26 | -.27 | -.25 |
| DEPL | 12 | .01 | .00 | -.25 | -.22 | -.22 | -.20 |
| HOSL | 13 | -.06 | -.12 | -.10 | -.21 | -.12 | -.20 |
| MIN1 | 14 | .16 | .22 | .15 | .22 | .14 | .21 |
| MIN2 | 15 | .21 | .24 | .16 | .22 | .14 | .21 |
| MIN3 | 16 | .24 | .25 | .16 | .22 | .16 | .22 |
| MIN4 | 17 | .22 | .25 | .15 | .23 | .14 | .22 |
| MIN5 | 18 | .20 | .22 | .13 | .21 | .11 | .21 |
| MIN6 | 19 | .23 | .28 | .18 | .27 | .18 | .27 |
| MIN7 | 20 | .24 | .31 | .19 | .28 | .18 | .28 |
| MIN8 | 21 | .21 | .25 | .22 | .28 | .22 | .27 |
| MAX1 | 22 | .16 | .23 | .15 | .22 | .14 | .22 |
| MAX2 | 23 | .23 | .26 | .16 | .23 | .14 | .23 |
| MAX3 | 24 | .28 | .30 | .19 | .26 | .17 | .26 |
| MAX4 | 25 | .23 | .27 | .16 | .24 | .14 | .24 |
| MAX5 | 26 | .27 | .29 | .18 | .28 | .16 | .28 |
| MAX6 | 27 | .24 | .30 | .20 | .30 | .19 | .30 |
| MAX7 | 28 | .27 | .32 | .24 | .33 | .24 | .33 |
| MAX8 | 29 | .20 | .26 | .23 | .29 | .23 | .29 |
| DIF1 | 30 | .19 | .23 | .03 | .21 | .02 | .23 |
| DIF2 | 31 | .37 | .42 | .07 | .30 | .05 | .31 |
| DIF3 | 32 | .28 | .36 | .20 | .33 | .17 | .34 |
| DIF4 | 33 | .32 | .37 | .14 | .39 | .12 | .41 |
| DIF5 | 34 | .29 | .25 | .20 | .30 | .22 | .30 |
| DIF6 | 35 | .22 | .30 | .23 | .45 | .23 | .45 |
| DIF7 | 36 | .14 | .02 | .25 | .26 | .29 | .25 |
| DIF8 | 37 | -.10 | .05 | .10 | .26 | .08 | .26 |
| A1 | 38 | .10 | .04 | .74 | .77 | .76 | .77 |
| A2 | 39 | .05 | -.05 | .69 | .73 | .70 | .73 |
| A3 | 40 | -.22 | -.22 | .72 | .47 | .73 | .45 |
| A4 | 41 | -.09 | -.15 | .66 | .67 | .67 | .67 |
| A5 | 42 | -.26 | -.23 | .72 | .60 | .69 | .57 |
| A6 | 43 | -.17 | -.18 | .69 | .68 | .68 | .66 |
| A7 | 44 | -.36 | -.28 | .49 | .22 | .47 | .20 |
| A8 | 45 | -.22 | -.20 | .68 | .66 | .65 | .64 |
| B1 | 46 | .52 | .75 | .15 | .45 | .16 | .48 |
| B2 | 47 | .65 | .85 | .24 | .48 | .19 | .49 |
| B3 | 48 | .82 | .86 | .30 | .47 | .33 | .49 |
| B4 | 49 | .75 | .94 | .28 | .55 | .27 | .56 |
| B5 | 50 | .68 | .49 | .25 | .32 | .33 | .35 |
| B6 | 51 | .76 | .90 | .29 | .53 | .32 | .55 |
| B7 | 52 | .78 | .47 | .34 | .25 | .35 | .27 |
| B8 | 53 | .65 | .71 | .30 | .44 | .35 | .45 |
| C1 | 54 | .11 | -.01 | .12 | .12 | .14 | .14 |
| C2 | 55 | -.00 | -.03 | -.05 | -.01 | -.02 | .00 |
| C3 | 56 | .0 | .0 | .0 | .0 | .0 | .0 |
| C4 | 57 | .01 | -.06 | -.05 | -.11 | -.06 | -.11 |
| C5 | 58 | -.09 | -.07 | .00 | -.06 | .05 | -.05 |

CORRELATIONS

| | | 111 | 112 | 113 | 114 | 115 | 116 |
|---|---|---|---|---|---|---|---|
| C6 | 59 | .03 | -.07 | .07 | .05 | .09 | .06 |
| C7 | 60 | -.09 | -.11 | -.01 | -.02 | .01 | -.03 |
| C8 | 61 | .17 | .14 | .10 | .12 | .09 | .16 |
| TR1 | 62 | .43 | .55 | .64 | .87 | .66 | .88 |
| TR2 | 63 | .59 | .73 | .59 | .83 | .56 | .83 |
| TR3 | 64 | .38 | .44 | .88 | .79 | .86 | .78 |
| TR4 | 65 | .59 | .73 | .68 | .92 | .66 | .92 |
| TR5 | 66 | .08 | .05 | .85 | .77 | .84 | .76 |
| TR6 | 67 | .38 | .49 | .78 | .94 | .79 | .94 |
| TR7 | 68 | .49 | .24 | .70 | .40 | .68 | .40 |
| TR8 | 69 | .19 | .25 | .81 | .87 | .81 | .85 |
| S1 | 70 | .44 | .55 | .63 | .86 | .64 | .87 |
| S2 | 71 | .61 | .73 | .58 | .82 | .55 | .83 |
| S3 | 72 | .45 | .47 | .84 | .76 | .87 | .76 |
| S4 | 73 | .61 | .75 | .66 | .91 | .65 | .92 |
| S5 | 74 | .10 | .03 | .80 | .72 | .82 | .71 |
| S6 | 75 | .40 | .50 | .78 | .94 | .79 | .94 |
| S7 | 76 | .47 | .22 | .68 | .39 | .67 | .39 |
| S8 | 77 | .20 | .26 | .80 | .87 | .80 | .86 |
| PVCON | 78 | .03 | .07 | .07 | .04 | .06 | .04 |
| PVEXP | 79 | .14 | .06 | .06 | -.02 | .04 | -.02 |
| PVDIF | 80 | .16 | -.00 | -.00 | -.09 | -.01 | -.08 |
| SRD1 | 81 | -.04 | .17 | -.13 | .15 | -.15 | .17 |
| SRD2 | 82 | .23 | .35 | -.05 | .22 | -.08 | .24 |
| SRD3 | 83 | .35 | .44 | .05 | .32 | .06 | .33 |
| SRD4 | 84 | .25 | .40 | -.02 | .27 | -.06 | .29 |
| SRD5 | 85 | .22 | .37 | .09 | .32 | .12 | .33 |
| SRD6 | 86 | .27 | .45 | .03 | .35 | -.00 | .37 |
| SRD7 | 87 | .29 | .43 | .16 | .41 | .19 | .43 |
| SRD8 | 88 | .11 | .25 | .08 | .31 | .04 | .32 |
| MIN1-7 | 89 | -.26 | -.27 | -.10 | -.18 | -.10 | -.18 |
| Z.S&DIF357 | 90 | .45 | .34 | .85 | .77 | .87 | .77 |
| BL1 | 91 | .13 | .02 | .12 | .18 | .17 | .18 |
| BL2 | 92 | .16 | .04 | .17 | .22 | .21 | .22 |
| BL3 | 93 | .08 | -.07 | .15 | .17 | .21 | .17 |
| BL4 | 94 | .12 | -.02 | .18 | .19 | .23 | .19 |
| BL5 | 95 | -.04 | -.22 | .21 | .16 | .26 | .16 |
| BL6 | 96 | .06 | -.11 | .21 | .18 | .26 | .18 |
| BL7 | 97 | -.11 | -.28 | .21 | .14 | .26 | .14 |
| BL8 | 98 | .01 | -.15 | .24 | .18 | .29 | .18 |
| SRDAV | 99 | .33 | .47 | .11 | .39 | .14 | .41 |
| SRDBA | 100 | .24 | .40 | .01 | .31 | -.03 | .33 |
| MAXAV | 101 | .28 | .30 | .20 | .30 | .19 | .29 |
| MAXBA | 102 | .23 | .27 | .19 | .27 | .18 | .27 |
| MINAV | 103 | .23 | .27 | .16 | .24 | .15 | .24 |
| MINBA | 104 | .22 | .26 | .18 | .25 | .17 | .25 |
| DIFAV | 105 | .32 | .26 | .29 | .40 | .31 | .39 |
| DIFBA | 106 | .26 | .35 | .17 | .42 | .15 | .43 |
| BLAV | 107 | -.03 | -.20 | .19 | .16 | .25 | .16 |
| BLBA | 108 | .09 | -.06 | .20 | .20 | .25 | .20 |
| AAV | 109 | -.30 | -.27 | .74 | .51 | .73 | .48 |
| ABA | 110 | -.15 | -.17 | .70 | .70 | .69 | .69 |
| BAV | 111 | 1.00 | .82 | .39 | .46 | .43 | .49 |
| BBA | 112 | .82 | 1.00 | .32 | .58 | .33 | .60 |
| TRAV | 113 | .39 | .32 | 1.00 | .82 | .98 | .81 |
| TRBA | 114 | .46 | .58 | .82 | 1.00 | .81 | 1.00 |
| SAV | 115 | .43 | .33 | .98 | .81 | 1.00 | .80 |
| SBA | 116 | .49 | .60 | .81 | 1.00 | .80 | 1.00 |

| | | MEAN | S.D. | | | MEAN | S.D. |
|---|---|---|---|---|---|---|---|
| DS | 1 | 16.7119 | 4.1663 | C6 | 59 | .0026 | .0142 |
| MS | 2 | 22.8305 | 6.1068 | C7 | 60 | .0508 | .3872 |
| RS | 3 | 57.9831 | 15.3408 | C8 | 61 | .0055 | .0302 |
| IF | 4 | 15.9153 | 7.5718 | TR1 | 62 | .5901 | .5712 |
| ANXAV | 5 | 7.6949 | 4.2347 | TR2 | 63 | .7478 | .7288 |
| DEPAV | 6 | 14.0085 | 6.4048 | TR3 | 64 | 2.5270 | 2.3872 |
| HOSAV | 7 | 8.1102 | 3.6547 | TR4 | 65 | .7291 | .6740 |
| ANXDF | 8 | 3.0508 | 5.3715 | TR5 | 66 | 1.5813 | 1.8573 |
| DEPDF | 9 | 3.4831 | 7.4986 | TR6 | 67 | .9190 | .8643 |
| HOSDF | 10 | 2.9915 | 5.2266 | TR7 | 68 | 2.0357 | 1.8018 |
| ANXL | 11 | 10.7458 | 3.5107 | TR8 | 69 | .9072 | 1.0032 |
| DEPL | 12 | 17.4915 | 5.2895 | S1 | 70 | .6124 | .5852 |
| HOSL | 13 | 11.1017 | 4.0241 | S2 | 71 | .7793 | .7652 |
| MIN1 | 14 | -11.0936 | .6292 | S3 | 72 | 2.7633 | 2.6109 |
| MIN2 | 15 | -11.0338 | .6561 | S4 | 73 | .7701 | .6951 |
| MIN3 | 16 | -11.0098 | .6380 | S5 | 74 | 1.7955 | 2.0266 |
| MIN4 | 17 | -11.0009 | .6380 | S6 | 75 | .9752 | .8929 |
| MIN5 | 18 | -11.0035 | .6646 | S7 | 76 | 2.1724 | 1.8076 |
| MIN6 | 19 | -10.8936 | .6126 | S8 | 77 | .9592 | 1.0099 |
| MIN7 | 20 | -10.8396 | .6066 | PVCON | 78 | 2.4809 | .3528 |
| MIN8 | 21 | -10.8307 | .5532 | PVEXP | 79 | 2.7473 | .4166 |
| MAX1 | 22 | -11.0586 | .6323 | PVDIF | 80 | .2663 | .2819 |
| MAX2 | 23 | -10.9846 | .6549 | SRD1 | 81 | 1.2339 | .6984 |
| MAX3 | 24 | -10.9486 | .6411 | SRD2 | 82 | 1.3494 | .6456 |
| MAX4 | 25 | -10.9504 | .6392 | SRD3 | 83 | 1.9209 | .9193 |
| MAX5 | 26 | -10.7915 | .6505 | SRD4 | 84 | 1.3564 | .6687 |
| MAX6 | 27 | -10.8305 | .6135 | SRD5 | 85 | 2.1977 | .8980 |
| MAX7 | 28 | -10.7204 | .5994 | SRD6 | 86 | 1.5805 | .7600 |
| MAX8 | 29 | -10.7854 | .5481 | SRD7 | 87 | 2.0961 | .7932 |
| DIF1 | 30 | .0350 | .0231 | SRD8 | 88 | 1.4936 | .6405 |
| DIF2 | 31 | .0492 | .0315 | MIN1-7 | 89 | -.2540 | .1859 |
| DIF3 | 32 | .0612 | .0757 | Z.S&DIF357 | 90 | .0000 | 2.3126 |
| DIF4 | 33 | .0505 | .0307 | BL1 | 91 | 18.8672 | 20.4591 |
| DIF5 | 34 | .2119 | .1485 | BL2 | 92 | 15.5970 | 20.3317 |
| DIF6 | 35 | .0631 | .0349 | BL3 | 93 | 14.6804 | 20.0521 |
| DIF7 | 36 | .1192 | .1119 | BL4 | 94 | 14.9508 | 20.2896 |
| DIF8 | 37 | .0453 | .0262 | BL5 | 95 | 13.3416 | 20.0422 |
| A1 | 38 | .2941 | .4091 | BL6 | 96 | 15.0265 | 20.2439 |
| A2 | 39 | .3704 | .4122 | BL7 | 97 | 13.4929 | 20.4122 |
| A3 | 40 | 1.2677 | 2.2008 | BL8 | 98 | 16.5062 | 20.2888 |
| A4 | 41 | .3619 | .4319 | SRDAV | 99 | 2.0716 | .7618 |
| A5 | 42 | .8024 | 1.8849 | SRDBA | 100 | 1.4450 | .6270 |
| A6 | 43 | .4163 | .7345 | MAXAV | 101 | -10.8202 | .6203 |
| A7 | 44 | .5880 | 1.3001 | MAXBA | 102 | -10.8877 | .6071 |
| A8 | 45 | .4184 | .9130 | MINAV | 103 | -10.9509 | .6271 |
| B1 | 46 | .3170 | .4108 | MINBA | 104 | -10.9397 | .6090 |
| B2 | 47 | .4086 | .6786 | DIFAV | 105 | .1307 | .0838 |
| B3 | 48 | 1.4957 | 2.0067 | DIFBA | 106 | .0520 | .0260 |
| B4 | 49 | .4074 | .6206 | BLAV | 107 | 13.8383 | 19.8286 |
| B5 | 50 | .9659 | 1.0604 | BLBA | 108 | 15.5201 | 20.0225 |
| B6 | 51 | .5564 | .6429 | AAV | 109 | .8860 | 1.6112 |
| B7 | 52 | 1.5336 | 1.7165 | ABA | 110 | .3917 | .6044 |
| B8 | 53 | .5353 | .6189 | BAV | 111 | 1.3317 | 1.2372 |
| C1 | 54 | .0013 | .0098 | BBA | 112 | .4769 | .5474 |
| C2 | 55 | .0002 | .0018 | TRAV | 113 | 2.0480 | 1.6448 |
| C3 | 56 | .0 | .0 | TRBA | 114 | .8258 | .7270 |
| C4 | 57 | .0008 | .0062 | SAV | 115 | 2.2437 | 1.7137 |
| C5 | 58 | .0271 | .2065 | SBA | 116 | .8710 | .7454 |