

1972

# Coping with stress and locus of control.

Michael S. Weissman

*University of Massachusetts Amherst*

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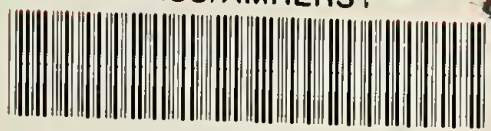
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COPING WITH STRESS AND LOCUS OF CONTROL

A Thesis Presented

By

Michael S. Weissman

Submitted to the Graduate School of the  
University of Massachusetts in  
partial fulfillment of the requirements for the degree of

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May 1972

Major Subject Psychology

COPING WITH STRESS AND LOCUS OF CONTROL

A Thesis

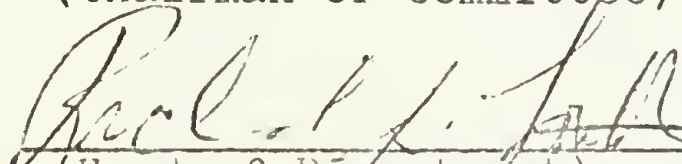
By

Michael S. Weissman

Approved as to Style and Content By:



\_\_\_\_\_  
(Chairman of Committee)



\_\_\_\_\_  
(Head of Department)



\_\_\_\_\_  
(Member)



\_\_\_\_\_  
(Member)

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May, 1972

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## CHAPTER I

### Introduction

This research is concerned with the differential ability of individuals to cope with stressful situations. It began with an effort to determine how a particular individual's outlook on life rendered him more or less able to cope with stress. Therefore, literature relating belief systems to personality factors was surveyed, in hope of gaining some insight into the important determinants of adaptive as opposed to maladaptive belief systems.

However, this literature, particularly The Authoritarian Personality (Adorno, et al., 1950) and The Open and Closed Mind (Rokeach, 1960), revealed that the specific content of a belief system was not as important as the structure of a belief system. That is, the way in which beliefs are held and integrated is more important than what one believes. As stated by Rokeach,

To study the organization of belief systems, we find it necessary to concern ourselves with the structure, rather than the content of beliefs. The relative openness or closedness of a mind cuts across specific content; that is, it is not uniquely restricted to any one particular ideology, or religion, or philosophy, or specific viewpoint. A person may adhere to communism, existentialism, Freudianism, or the "new conservatism" in a relatively open or in a relatively closed manner. (Rokeach, 1960, p. 6)

Thus, one can conclude that it does not appear fruitful to look at the relationship between a specific, isolated belief and personality factors, without considering the context of that belief and its relationship to other beliefs. Rather, it appears more promising to consider the manner in which an individual understands or categorizes significant beliefs.

In his book Psychological Stress and the Coping Process, Lazarus emphasizes the importance of how one perceives the environment:

Beliefs about one's own general helplessness imply the corresponding potency of the environment for weal or for woe. Conversely, beliefs about one's own masterfulness limit expectations that one is at the mercy of potential dangers. The environment, whether seen as powerful and manageable or readily subject to control, may be regarded as supportive, or hostile and dangerous. (Lazarus, 1966, p. 133)

In fact, the importance of the environment as perceived by the individual in understanding coping behavior and reactions to stress is well known. Pervin (1968) reviews much of the literature dealing with stress, performance, and satisfaction as a function of the individual-environment fit. His major finding is that occupational satisfaction, performance, and reactions to stress are determined more by the interaction of personality and environment variables than by either variable alone.

Given that the interaction between the individual and the environment is basic to understanding stress and coping, the task becomes one of specifying the salient aspects of that interaction. From the quotation on the previous page we recall that Lazarus talks about "beliefs about one's own general helplessness." This makes a good deal of intuitive sense, for it is common to associate an anxiety reaction to stress with a feeling of inability to control the situation. Thus, we can tentatively conclude that any explanation of differential reactions to stress would include the dimension of perceived control over events or relationships which affect the individual. A second possible dimension of the interaction between the individual and the environment which might be important to understanding coping with stress is the degree to which the stressful situation is important to the individual. Even if an individual feels that he is completely at the mercy of a particular adverse event, the event must be important to him if he is to experience stress or anxiety. In summary, then, we can assume that an understanding of stress reactions requires knowledge about how an individual conceptualizes his ability to control events and the importance of various events for the individual.

It seems to this author that a personality construct



does exist which incorporates both of these requirements. This construct is Rotter's dimension of "locus of control," or the "internal-external" dimension. As such, it promises to yield considerable insight to the problems of understanding coping with stress.

A good working definition of the I-E dimension is given by Lefcourt (1966b):

As a general principle, internal control refers to the perception of positive and/or negative events as being a consequence of one's own actions and thereby under personal control; external control refers to the perception of positive and/or negative events as being unrelated to one's behaviors in certain situations and therefore beyond personal control. (p. 207)

Thus, the I-E dimension is a construct which attempts to determine whether an individual believes that he is the "victim" of the environment or whether he is in control of what happens to him. Since Rotter's formulation of the I-E scale in 1966, research using the I-E dimension has demonstrated the importance of locus of control in such areas as self-esteem, perception of failure, and recovery from traumatic experiences. Epstein and Komorita (1970) found that, in the performance of experimental tasks, subjects tended to attribute failures to external causes rather than internal causes, and that high-self-esteem subjects tend to be more internal than low-self-esteem or moderate-self-esteem subjects. These findings imply that

belief in powerlessness, arising from membership in minority groups (Epstein and Komorita's subjects were Negro 4th-6th graders), can be cushioned by a positive self-concept. Similarly, Fitch (1970) found that subjects employ locus of control for purposes of self-enhancement, attributing successes to internal factors and failures to external factors. Smith (1970) found that "crisis patients," who were overwhelmed by external factors such as accidents or other personal tragedies, are initially more externally oriented than non-crisis patients, but showed a shift towards internality following a six-week crisis resolution period. This again implies a link between reactions to extreme stress and locus of control. This implication is extended by MacDonald (1971), who found that, with respect to three major disability classes — socially disadvantaged persons, physically handicapped persons, and emotionally disturbed patients — (1) externally oriented persons are more threatened by physical disabilities, (2) internals view emotional disorders as more debilitating than physical disabilities, and (3) minority group membership and socially disadvantaged status are conducive to the development of external orientation.

More specific studies relating locus of control to stress and anxiety have been done. Lazarus (1966) concludes that, on the basis of many studies,

...there is reason to think that when we are measuring the trait of anxiety, we may be really assessing an anxiety reaction based on the disposition to believe that the environment is usually dangerous or that one is helpless to master it. (p. 139)

Ryckman, Stone, and Elam (1971) investigated "emotional arousal as a function of personal locus of control and task requirements." While their results are not conclusive, they found that external subjects, particularly females, reacted strongly to criticism when the task was dependent on chance conditions, while internal females reacted more strongly under skill conditions. Various measures of anxiety have also been correlated with locus of control. Butterfield (1964) correlated the I-E scale with the Child and Waterhouse Frustration Reaction Inventory and the Alpert-Haber Facilitating-Debilitating Test Anxiety Questionnaire and found that external control was positively related ( $r=.57$ ) to intropunitive responses to frustration and negatively related ( $r= -.86$ ) to constructive reactions to frustration. He also found that external control correlated positively with debilitating anxiety (.61) and negatively with facilitating anxiety (-.82). Similarly, correlations of .36 between the I-E scale and the Manifest Anxiety Scale, .25 between external control and debilitating anxiety and -.08 between external control and facilitating anxiety on the Alpert-Haber scale were found by Watson (1967). Consistent



results showing higher anxiety measures on various self-report scales for externals than for internals have been reported by Hountras and Scharf (1970), Platt and Eisenman (1968), Tolor and Reznikoff (1967), Feather (1967), and Liberty, Burnstein, and Moulton (1966).

The above studies all use self-report measures, and, as summarized by V.C. Joe (1971), they suggest that

...externals describe themselves as anxious, less able to show constructive responses in overcoming frustration, and are more concerned with fear of failure than with achievement per se. Internals, on the other hand, describe themselves as more concerned with achievement, more constructive in overcoming frustration, and less anxious. (pp. 625-626)

We are left with the impression that locus of control is useful in understanding anxiety as a trait and as a specific reaction to frustration. There are also studies which relate locus of control to threat and stress. MacDonald and Hall (1969) had nondisabled students rate four types of disabilities and found that emotional disorders were perceived as more debilitating by internals than by externals. They understood this finding in terms of a loss of inner control being associated with emotional disorders, with this loss being more threatening to internals than to externals. Similarly, Lipp, Kolstoe, James, and Randall (1968) found that in a perceptual defense experiment using physically disabled subjects and pictures of handicapped...

persons as stimuli, internals were more denying (had a higher threshold of perception) than externals. Note that these latter studies seem to contradict the findings of the studies cited earlier, in that internals are seen as more threatened and more denying than externals under these threat situations. Pahres, et al. (1968) also found inconclusive results, and Joe (1971) concludes that more work and better techniques are needed.

These studies yield strong evidence relating locus of control to anxiety and reaction to stress, but some of the results appear to be conflicting. Perhaps these conflicting results can be explained by a careful examination of the exact dimensions under consideration. Reliability and validity studies concerning the I-E scale point strongly to such a conclusion. A number of test-retest reliability measures have been made, and all yielded good correlations ranging from .48 to .84 (see Rotter, 1966; Hersch and Scheibe, 1967; Harrow and Ferrante, 1969). Discriminant validity studies have also produced confirmation that the I-E scale is measuring an independent dimension (Rotter, 1966; Hersch and Scheibe, 1967; Minton, 1967). Further, the I-E scale has been correlated with other measures of similar dimensions with significant results supporting its construct validity, such as the MMPI (Burnes, Brown, and Keating, 1971), the TAT (Dies, 1968), and a forced-choice

activity preference scale (Schneider, 1968). Thus, the I-E scale is seen to be measuring something which is a valid dimension, and measuring it well.

However, other studies point out problems with the I-E scale, but, as this research will try to demonstrate, these "problems" can help to reconcile the conflicting results found in some of the studies cited earlier. Sex differences have been found with the I-E scale (Feather, 1967, 1968) and problems of controlling for social desirability (Feather, 1967; Altrocchi, Palmer, Hellman, and Davis, 1968; Berzins, Ross, and Cohen, 1970). But other findings do not confirm the existence of these problems (Strickland, 1965; Tolor, 1967; Tolor and Jalowiec, 1968). Much more importantly, though, are the studies which question whether the I-E scale is measuring a unidimensional trait or whether there are several factors operating. Gurin, Gurin, Lao, and Beattie (1969) factor analyzed the responses of 1695 Negro students and found three independent factors to be operating: Control Ideology (how much control one believes most people in society possess), Personal Control (how much control one believes he personally has), and System Modifiability (how much one believes societal factors can be changed). Mirels (1970) found two factors operating: "a belief concerning felt mastery over the course of one's life (Factor I), and a belief concerning the extent to which the individual citizen is deemed capable



of exerting an impact on political institutions (Factor II)." These results are confirmed by Lao (1970) and Thomas (1970).

We thus note that, in addition to the conflicting results observed in the studies correlating locus of control with anxiety and stress, there is also more than one factor operating in the I-E scale. If we combine these studies, a pattern emerges. While "externals describe themselves as anxious ... and more concerned with fear of failure than with achievement," (Joe, 1971) internals are seen to feel more threatened by personal loss of control and more denying when confronted with threats to the individual. Thus, the implication of these personality studies is consistent with the results of the validity studies — there is a personal factor which is threatening to internals, and a more global, societal factor which is more threatening to externals. We are now talking about a theoretical refinement of the locus of control construct which would yield differential predictions as to whether internals or externals are better able to cope with stress, depending on the nature of the threat to the individual. If the threat is to the individual's personal sense of his ability to control, we would expect internals to feel more threatened than externals. On the other hand, if the threat is more external in origin, such as the frustration of goals, pain from an external source, or accident, then we would

expect externals to experience greater stress.

We can conclude from the above review of the literature and discussion, then, that the locus of control construct has been shown to be related to anxiety and reactions to stress, that it has proven to be a reliable and valid construct, but that certain conflicting results must be reconciled with evidence of its being a multi-dimensional trait. Further, such a reconciliation has been offered in the form of a theoretical prediction. This prediction holds that, rather than assume that locus of control is a unidimensional trait which can be used to understand coping with stress, as has been the case with most of the studies done, it should be regarded as a trait consisting of more than one factor, which can tell us under what conditions an individual will experience greater or lesser stress. In this study, because we are specifically concerned with individual reactions to personal stress, we will deal only with the personal control factor, as opposed to political or societal controls. This is factor I of the Mirels study, or the Personal Control Factor of the Gurin, et al. study. By using this factor alone, we will be able to eliminate extraneous factors which might cloud the results of our tests.

### Hypotheses

We are now in a position to state the above predictions in the form of specific hypotheses to be tested.

Hypothesis 1: When the nature of the threat or stressful situation is external, such as frustration of goals, an accident, or pain resulting from action by an external source, individuals whose locus of control is external will experience greater stress than will individuals whose locus of control is internal.

Hypothesis 2: When the nature of the threat or stressful situation is internal, such as personal failure or loss of power, individuals whose locus of control is internal will experience greater stress than will individuals whose locus of control is external.



## CHAPTER II

Method

Subjects: The external stressful situation chosen for this study (to test Hypothesis 1) was a dental appointment.<sup>1</sup> The major source of subjects was a dental clinic with several dentists, which enabled the experimenter to use subjects undergoing various kinds of dental work, ranging from check-ups to relatively major work. In addition, a small number of subjects (10) came from the office of a private dentist. There were 64 clinic patients, for a total of 74 dental subjects. There were no basic age or sex differences observed between the two groups, but the private patients seemed to fall into a higher socioeconomic class.

In general, the clinic caters to a middle to lower socioeconomic class population, with a good many Spanish speaking persons. In selecting subjects, only adults (college age and above) who could easily understand the questionnaire were used. As the data collection took place during the winter holiday season, many college students were home, and consequently the experimenter interviewed more college students than the clinic would normally see. This fact,

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<sup>1</sup> This choice was based on a desire to avoid creating a stressful situation which might have adverse effects on the subjects, and a strong desire to get "real-life" data, as opposed to somewhat artificial, laboratory data.

coupled with the selection of those patients who could easily understand the questionnaire, resulted in a clinic population of essentially middle socioeconomic class patients, which compared reasonably well with the patients in the private office.

The internal situation chosen for this study (to test Hypothesis 2) was a final examination in an undergraduate Psychology course at the University of Massachusetts. This situation seems to fit the criteria for an internal stress, in that one's own ability is the focus of attention, and presumably one has some degree of control as to the outcome. Completed questionnaires were obtained from 348 students, out of approximately 500 students attending.

Measures: A questionnaire to be completed by the subject was used in each of the experimental situations (see Appendix 1 and Appendix 2). The questionnaires were identical except for word changes to fit the situation and three additional questions on the examination questionnaire. Specifically, these questions asked if the subject considers an examination a good measure of his ability, how he feels when he fails an examination, and how important this particular test is to him. The main part of each questionnaire consisted of the five items on the Personal Control I-E scale and three questions on the subject's stress reaction. The five Personal Control items are those cited by

Gurin, et al. (1969), while the three questions asking for a rating of the subject's subjective stress experience are modelled after the rating scales used by Janis (1958). Such a self rating scale was seen to be useful and reliable by Janis. Finally, demographic data (age, sex) was supplied by the dentist for each subject, along with the dentist's rating of the subject's stress reaction, while the examination subjects supplied age and sex data at the bottom of their forms.

Procedure: In the dental situation, each subject was asked by the dentist (or hygienist) if he would volunteer to participate in a research project. At that time, the experimenter was called into the office, wearing the standard clinic uniform, and handed the questionnaire to the patient. The experimenter explained to the patient that the questionnaire was part of a "research project in psychology which is investigating how individuals react to different kinds of stress." After completing the questionnaire, which took three to four minutes, the patient gave the questionnaire to the dentist, who noted the patient's sex, age, the kind of work being done, and his impression of the patient's level of stress, recorded as a number on a scale of 1 to 10. The dentist did not have time to read the responses of the patient before making his own rating, for



the patient was already in the chair and set for the dental work.<sup>2</sup> This procedure, then, yielded a measure of locus of control for each subject, along with self-ratings on stress and ratings by the dentist. If Hypothesis 1 is correct, we expect to find that externals will experience greater stress in this situation than will internals.

The procedure in the examination situation was more straightforward. The experimenter, along with several assistants, passed out the questionnaires to an entire class of students before their final examination in an undergraduate psychology course. While the forms were being distributed, the teacher in the course explained that these forms were part of a research project in psychology, and that the students are encouraged to participate on a voluntary basis. Also, they were assured that they would not lose time allotted for the final examination. After approximately four minutes, the questionnaires were collected. As in the dental situation, information on each subject's locus of control and self-ratings on stress were obtained, along with demographic data (age, sex) and information about the subject's feelings regarding examinations in general. If Hypothesis 2 is correct, then we expect to find that internals will experience greater stress in this situation than will externals.

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<sup>2</sup> In some cases the dentist either forgot or was unable to rate the patient's stress reaction, so this aspect of the data is incomplete.

## CHAPTER III

### Results

Correlation coefficients were obtained for all of the major variables within each experimental group. These data are summarized in Tables 1 and 2. In the dental situation (Table 1) there are significant correlations between locus of control and all of the stress questions, with externals reporting greater stress than internals (I-E scores range from 0 to 5, with 0 being extreme internal and 5 being extreme external). These data are consistent with Hypothesis 1, which states that in the external (dental) situation, externals will experience more stress than internals. Note also that there is a consistently strong, significant correlation between each of the individual stress questions and each of the other questions, which justifies totaling the scores on the three self-rating items. The same is true for the examination situation (Table 2). Consequently, only the total stress score will be used in the remaining data analysis. The ratings made by the dentist are not included in the correlation matrix, because, as noted in the last section, ratings were not obtained on all of the subjects. Correlations between self-ratings and dentist stress ratings when available range from .39 to .45, again justifying consideration

TABLE 1  
CORRELATION MATRIX: DENTAL SITUATION (N=74)

	Stress Questions: Self Ratings			
	Ques. 1	Ques. 2	Ques. 3	Total
I-E Score	.24 <sup>a</sup>	.31 <sup>c</sup>	.28 <sup>b</sup>	.30 <sup>c</sup>
Stress Ques. 1	1.00	.85 <sup>c</sup>	.65 <sup>c</sup>	.91 <sup>c</sup>
Stress Ques. 2		1.00	.74 <sup>c</sup>	.94 <sup>c</sup>
Stress Ques. 3			1.00	.98 <sup>c</sup>

a=  $p < .025$   
 b=  $p < .01$   
 c=  $p < .005$

TABLE 2  
CORRELATION MATRIX: EXAMINATION SITUATION (N=348)

	Stress Questions: Self Ratings			
	Ques. 1	Ques. 2	Ques. 3	Total
I-E Score	.13 <sup>a</sup>	.15 <sup>a</sup>	.13 <sup>a</sup>	.17 <sup>a</sup>
Stress Ques. 1	1.00	.64 <sup>b</sup>	.38 <sup>b</sup>	.80 <sup>b</sup>
Stress Ques. 2		1.00	.53 <sup>b</sup>	.88 <sup>b</sup>
Stress Ques. 3			1.00	.79 <sup>b</sup>

a=  $p < .05$   
 b=  $p < .001$



of only the total self-rating stress score in the following data analysis.

The correlation matrix for the examination situation (Table 2) shows considerably lower correlations between locus of control and stress, ranging from .13 to .17. While these correlation coefficients are "significant" at the .05 - .01 level, this really means very little because of the extremely large number of cases (348) and the very small percent of the variance accounted for (only 1-2%). Thus, these data are difficult to interpret. The slight positive correlation indicates that externals are reporting more stress than internals, which does not support Hypothesis 2. Yet, the correlation is so low, and the sample so large, that one can conclude that there is effectively no correlation between locus of control and stress in the examination situation. These preliminary data, then, indicate support for Hypothesis 1, and lack of support for Hypothesis 2. These findings will become clear in the following analysis of variance data.

Before moving on to that data, the significant correlation (.29 - .43) which was observed between stress scores and question B-5 on the examination questionnaire should be noted. That question asked subjects to "indicate your reaction when you find that you have failed or done poorly on an examination."

Thus, those subjects who react adversely to failing an exam reported higher stress scores than other subjects. This will be looked at more closely later.

The first analysis of variance which was done examines locus of control and each of the experimental situations, without regard to sex or any other factor. It was necessary to divide the subjects into two groups along the locus of control dimension. This was done by considering as "internals" those subjects who scored a 0 or 1 on the I-E scale, and considering as "externals" those who scored a 3, 4, or 5. This breakdown was based on the distribution of the I-E scores, which is illustrated in Figures 1 and 2 for the two experimental groups. As can be seen, those scoring 2 on the I-E scale comprise 25% of the dental group, and 30% of the examination group, and fall near the middle of the distribution. Thus, both populations are divided into two extreme groups, consisting of between 28 and 42 percent of the population. This division into internal and external groups is employed throughout the following data analysis.

Tables 3 and 4 give the cell means and analysis of variance summary for the population, and Figure 3 illustrates these data graphically. There is an overall significant difference between internals and externals ( $p < .001$ ) across situations, and similarly there is a significant difference ( $p < .001$ ) between situations, averaged over locus of control.

DISTRIBUTION OF I-E SCORES: EXAMINATION SITUATION

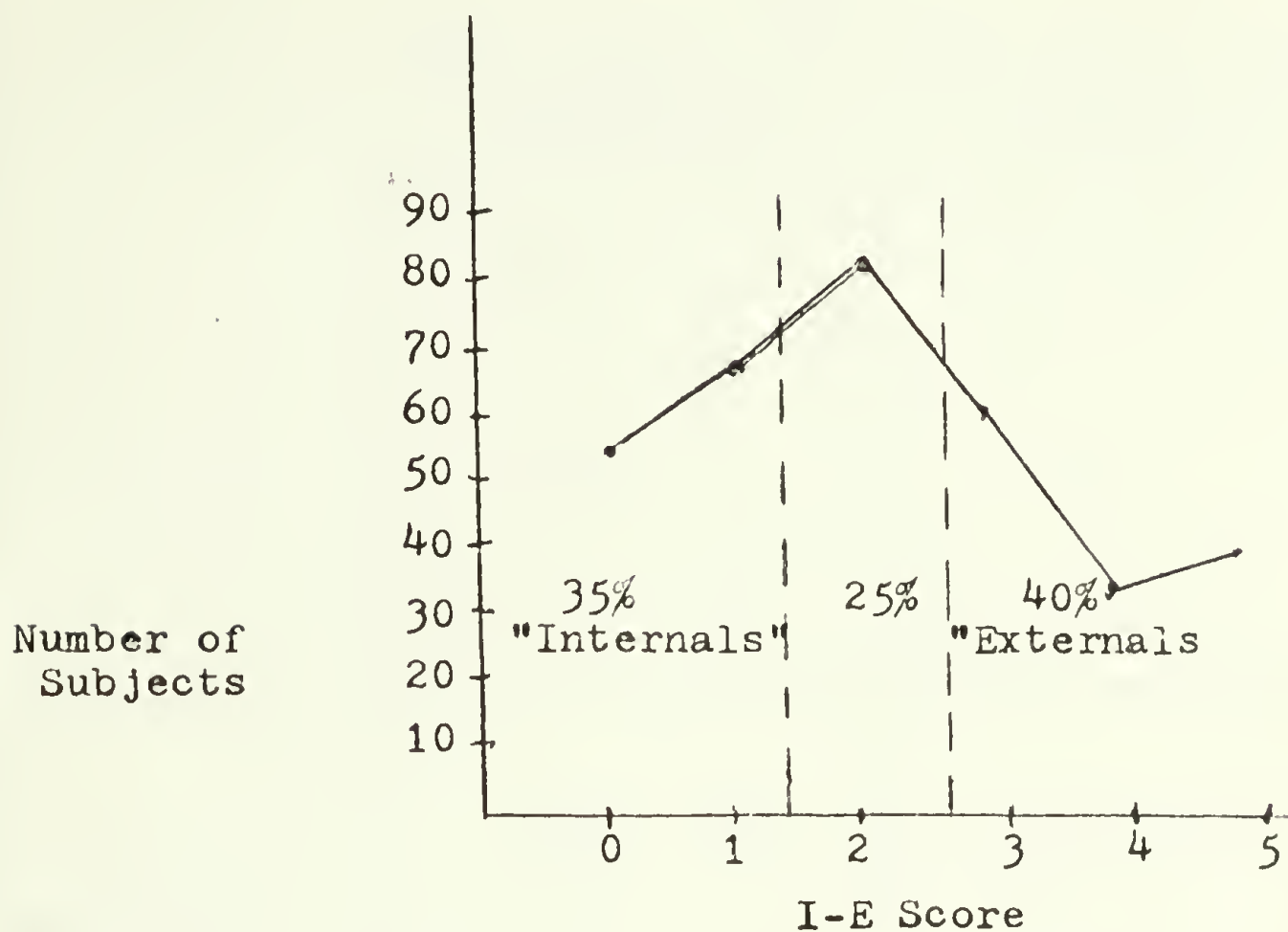


FIGURE 2

DISTRIBUTION OF I-E SCORES: DENTAL SITUATION

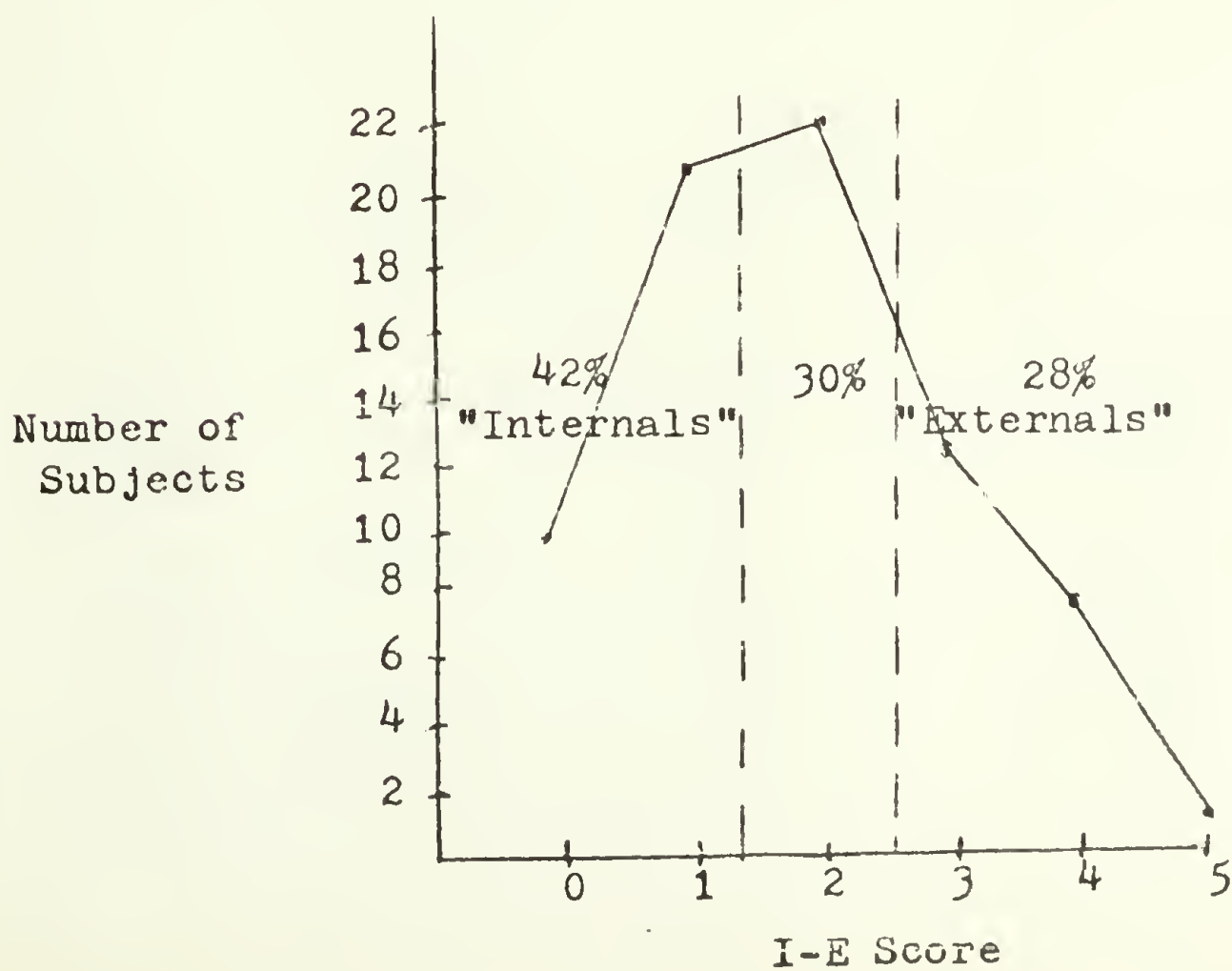




TABLE 3

## DATA SUMMARY: CELL MEANS FOR ALL SUBJECTS

	Situation 1 Examination	Situation 2 Dentist	
Internals	Mean= 9.0 N= 122	Mean= 6.2 N= 31	Mean= 7.6 N= 153
Externals	Mean= 9.8 N= 141	Mean= 8.6 N= 21	Mean= 9.2 N= 162
	Mean= 9.4 N= 263	Mean= 7.4 N= 52	Mean= 8.41 N= 315

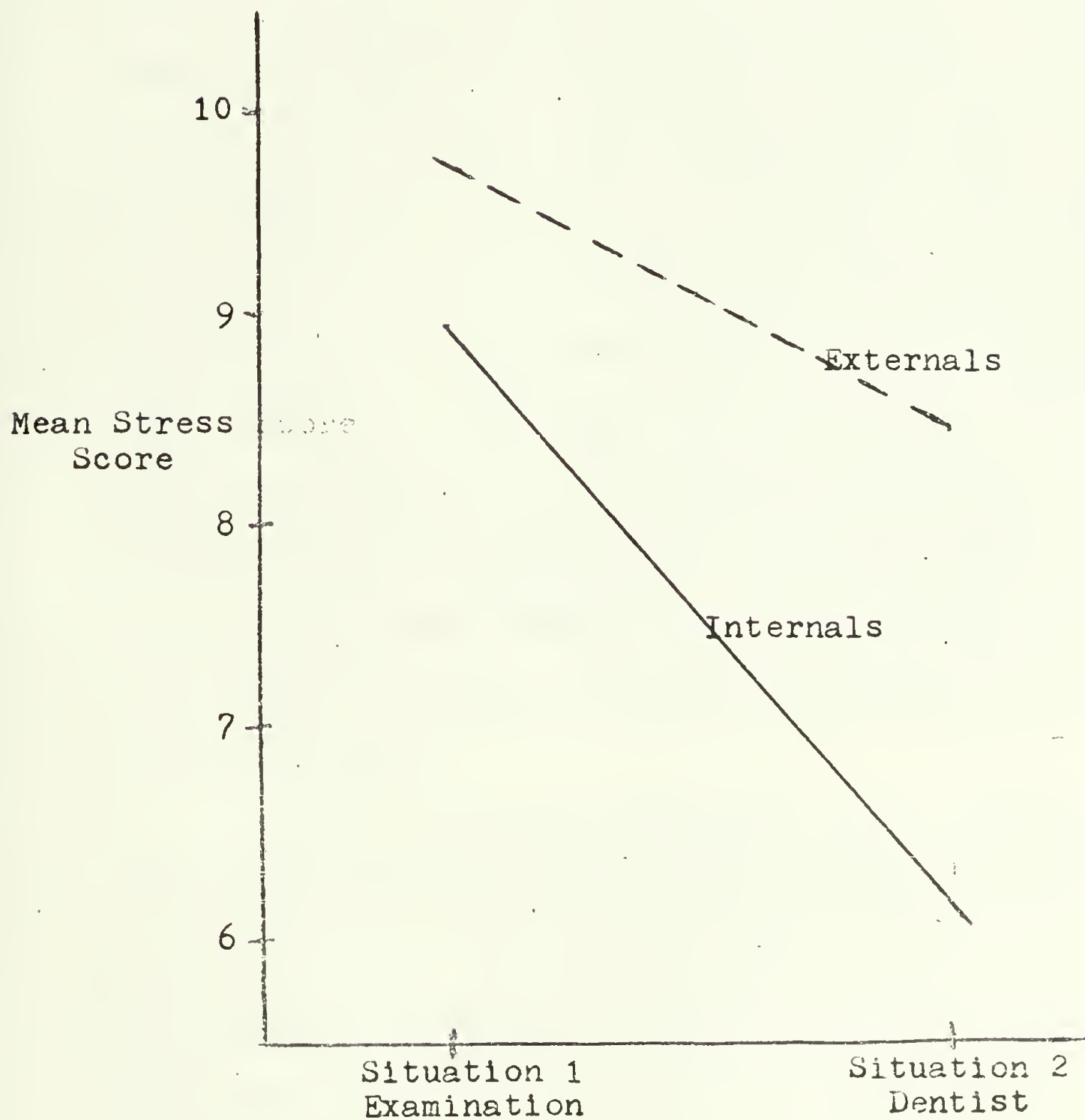
TABLE 4

## SUMMARY OF ANALYSIS OF VARIANCE: ALL SUBJECTS

Source	df	Mean Squares	F
Total	315	-	-
Locus of Control	1	105.6	12.8 (p<.001)
Situation	1	170.7	20.6 (p<.001)
Locus X Situation	1	29.7	3.6 (p<.1)
Remainder	311	8.3	-

FIGURE 3  
GRAPH OF INTERACTION BETWEEN SITUATION AND LOCUS OF CONTROL  
ALL SUBJECTS

(N= 315)



This indicates that externals, taken together, reported greater stress than internals, and that those subjects taking the examination reported greater stress than the dental patients. The presence of these very significant main effects tends to cloud the interpretation of any interaction effects, because it seems as if the two experimental groups are sufficiently different with respect to stress as to bring their comparability into question. The interaction effect which is observed only approaches significance ( $p < .1$ ), but this does indicate that internals and externals react differently to different situations. Taken together, these data tend to support Hypothesis 1, while Hypothesis 2 is not supported. That is, in the external (dental) situation, externals experience greater stress, but the difference between internals and externals in the examination situation is contrary to prediction and effectively not significant.

In order to better understand these findings, a series of analyses were performed which contained "controls." These controls attempt to identify factors which might help explain the ambiguous findings in the examination situation. The first such analysis looked at only those examination subjects who considered the test important (question B-7). The rationale behind looking at this group is that perhaps the results were



TABLE 5

DATA SUMMARY: CELL MEANS FOR SUBJECTS WHO SAID EXAMINATION  
WAS IMPORTANT TO THEM

	Situation 1 Examination	Situation 2 Dentist	
Internals	Mean= 9.3 N= 106	Mean= 6.2 N= 31	Mean= 7.7 N= 137
Externals	Mean= 10.1 N= 122	Mean= 8.6 N= 21	Mean= 9.4 N= 143
	Mean= 9.7 N= 228	Mean= 7.4 N= 52	Mean= 8.5 N= 280

TABLE 6

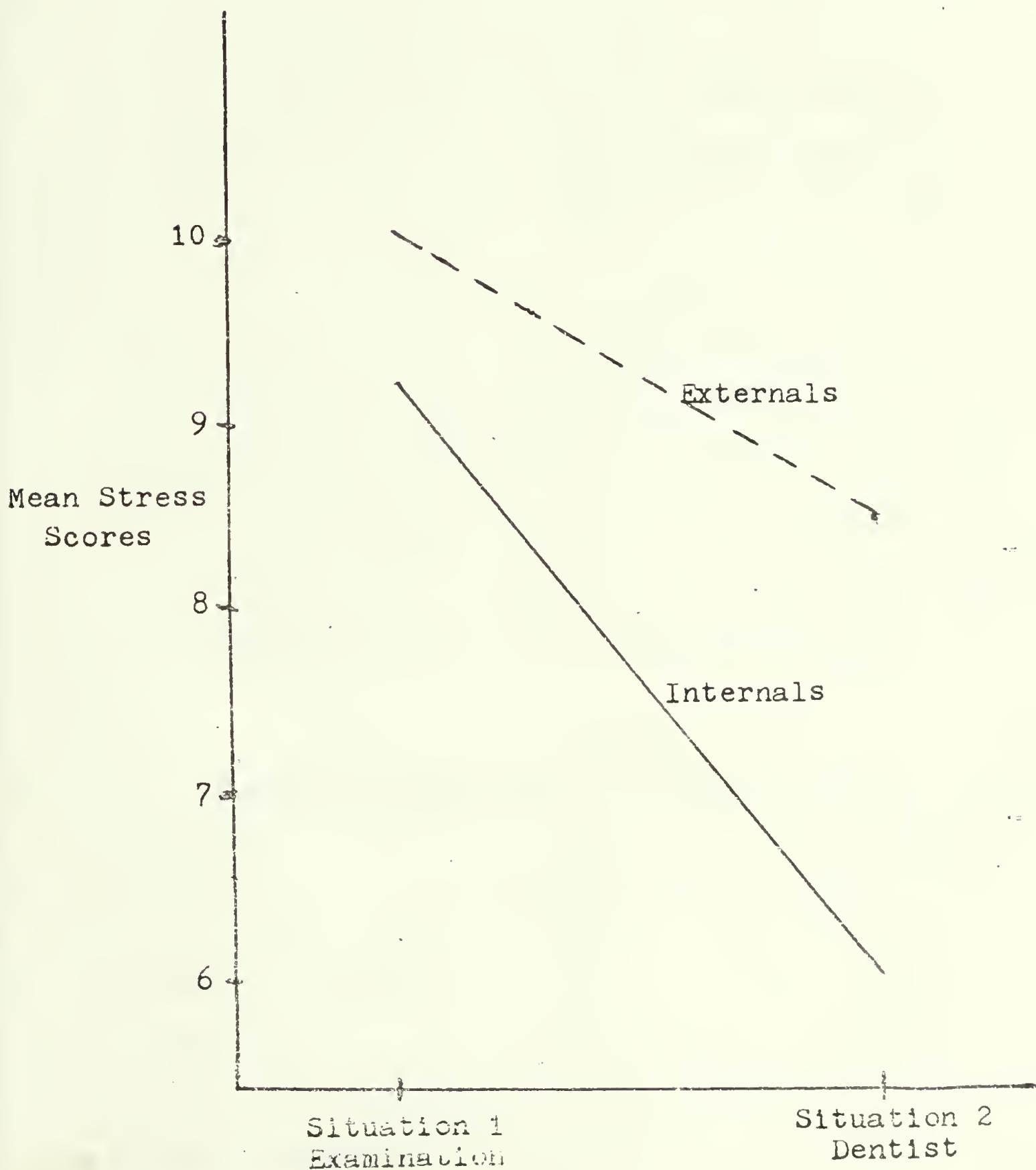
SUMMARY OF ANALYSIS OF VARIANCE: SUBJECTS WHO SAID EXAMINATION  
WAS IMPORTANT TO THEM

Source	df	Mean Squares	F
Total	280	-	-
Locus of Control	1	108.4	13.5 (p<.001)
Situation	1	211.5	26.3 (p<.001)
Locus X Situation	1	26.2	3.3 (p<.1)
Remainder	276	8.0	-

FIGURE 4

GRAPH OF INTERACTION BETWEEN SITUATION AND LOCUS OF CONTROL  
SUBJECTS WHO SAID EXAMINATION WAS IMPORTANT

(N= 280)



contaminated by subjects who did not even care about the test. As shown in Tables 5 and 6, and in Figure 4, essentially the same results were found: significant ( $p < .001$ ) main effects, and an interaction effect which approaches significance ( $p < .1$ ). Hypothesis 1 supported, and Hypothesis 2 not supported. In fact, given that only 35 subjects were excluded from this analysis for having said that the test was not important to them, these results are quite understandable. Even if these subjects differ as to their stress reaction, there are not enough of them in the population to have made a difference.

The next analysis of variance considers the possibility of sex as a factor. These data are summarized in Table 7, in which there is no observed main effect due to sex, and no interaction between locus of control and sex. The "situation by sex" interaction is not important here, for our interest is in the locus of control construct. Thus, sex does not play an important role in explaining the scores.

TABLE 7

## SUMMARY OF ANALYSIS OF VARIANCE: SEX AS A FACTOR

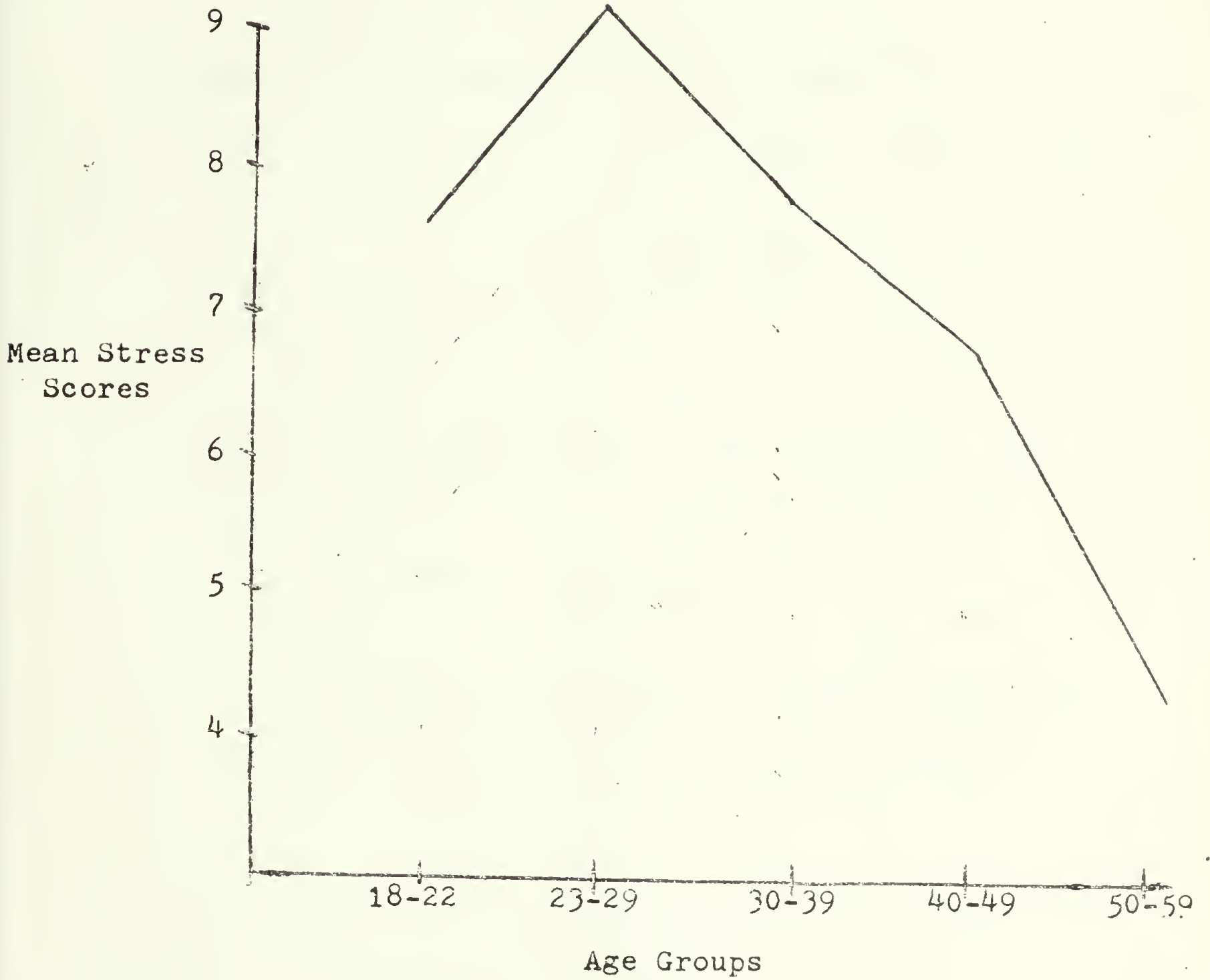
Source	df	Mean Squares	F
Total	314	-	-
Locus of Control	1	98.2	12.2 ( $p < .001$ )
Situation	1	153.8	19.2 ( $p < .001$ )
Sex	1	.2	.02 (not sig.)
Locus X Situation	1	45.6	5.7 ( $p < .025$ )
Locus X Sex	1	10.7	1.3 (not sig.)
Situation X Sex	1	37.6	4.7 ( $p < .05$ )
Remainder	307	8.0	-



Another factor which might help explain the ambiguous data in the examination situation is age. However, an examination of the distribution of the ages of the subjects in the examination situation shows that 245 (93%) of the 263 respondents are 18-22 years of age, 16 (6.3%) are 23-29, and only 2 (.7%) are above 30 years of age. Hence, there are essentially no population age differences, and thus there can be no important stress differences as a function of age. In the 52 dental situation subjects considered in our data analysis, there is also a disproportionate number of subjects in the 18-29 age category (28 or 54%) with the remainder distributed as follows: 9 (17%) 30-39 years old, 4 (7.7%) 40-49 years old, 5 (9.6%) 50-59 years old, and 6 (11.5%) whose age was not reported. The stress means for each of the known age groups is shown in Figure 5. As can be seen, there is no consistent trend in the categories which comprise the major portion of the subjects (ages 18-39, or 37 subjects, accounting for 71% of the total). Thus, age does not seem to be an important factor. An analysis of variance was not performed for age as a factor, because there are no examination subjects in the last two categories. We might note that, while age is not helpful in interpreting the results in the examination

FIGURE 5

MEAN STRESS SCORES FOR EACH AGE GROUP: DENTAL SITUATION



situation, the lower stress scores reported by the older dental subjects contributes to the overall lower stress scores observed in the dental situation.

A final factor which might help explain the examination data is that alluded to earlier: the observed correlation between high stress scores and saying that one reacts adversely to failing or doing poorly on an examination (question B-5 on the examination questionnaire). Thus, an analysis of variance was performed, excluding those subjects who did not express real concern about failing or doing poorly. Only those subjects who checked the alternative "I feel as if I have failed as a person; I feel inadequate," and "I am troubled, but I am able to get over it fairly easily" were considered. These respondents comprised 229 of the 263 examination subjects falling into our extreme groups population. These data are summarized in Tables 8 and 9, and in Figure 6. The mean stress scores for the examination group are somewhat higher than the mean stress scores for all examination subjects, but the difference between internals and externals is essentially the same as in the previous analyses. In other words, this factor does not help account for the lack of a significant difference between internals and externals in the examination situation. Thus, Hypothesis 1 is supported again, and Hypothesis 2 is not supported.



TABLE 8

DATA SUMMARY: CELL MEANS FOR SUBJECTS WHO REACT ADVERSELY  
TO FAILING AN EXAMINATION

	Situation 1 Examination	Situation 2 Dentist	
Internals	Mean= 9.2 N= 102	Mean= 6.2 N= 31	Mean= 7.7 N= 133
Externals	Mean= 10.1 N= 127	Mean= 8.6 N= 21	Mean= 9.4 N= 148
	Mean= 9.7 N= 229	Mean= 7.4 N= 52	Mean= 8.6 N= 281

TABLE 9

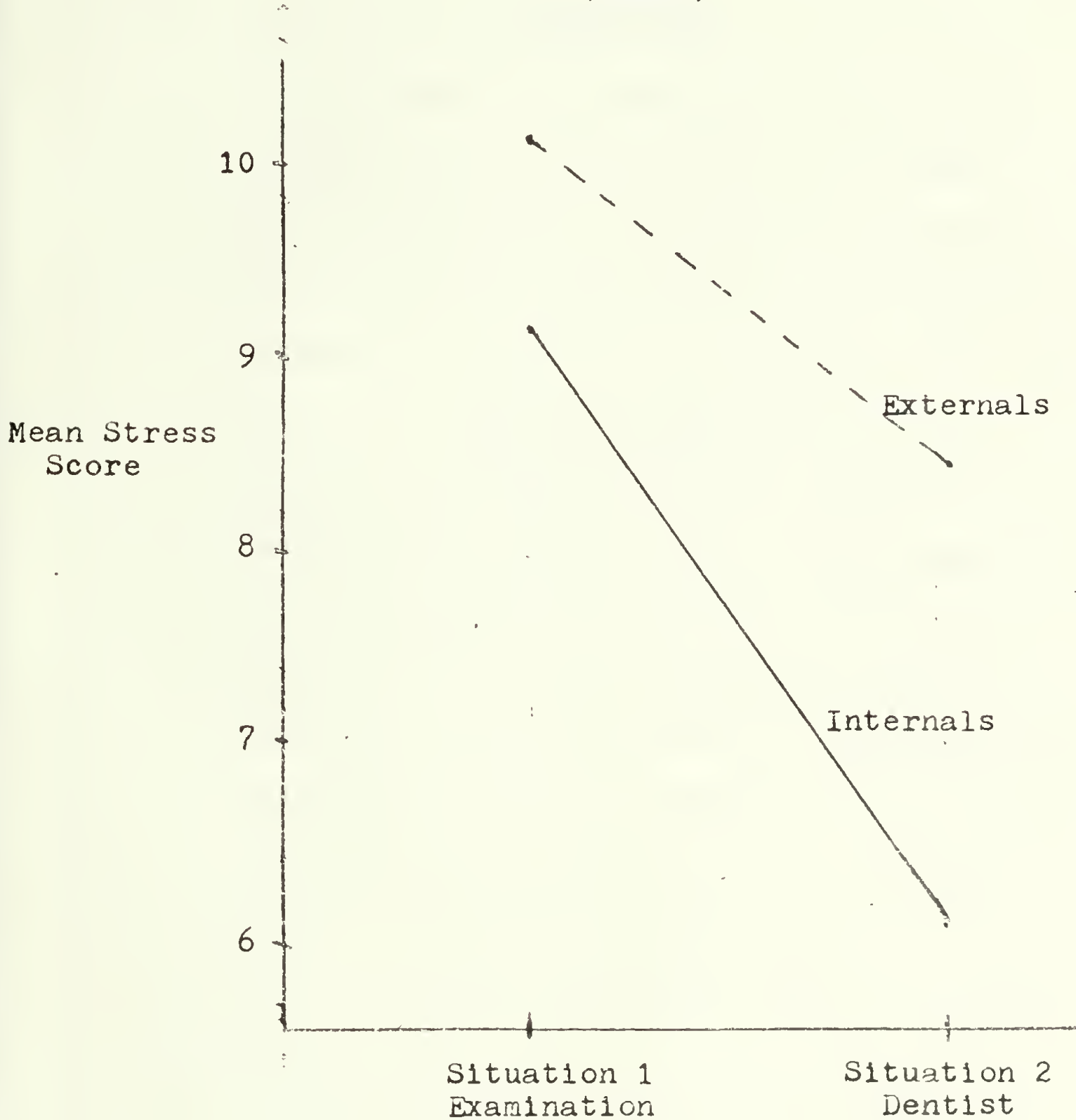
SUMMARY OF ANALYSIS OF VARIANCE: SUBJECTS WHO REACT ADVERSELY  
TO FAILING AN EXAMINATION

Source	df	Mean Squares	F
Total	281	-	-
Locus of Control	1	111.0	14.0 (p<.001)
Situation	1	218.9	27.7 (p<.001)
Locus X Situation	1	25.0	3.2 (p<.1)
Remainder	277	7.9	-

FIGURE 6

GRAPH OF INTERACTION BETWEEN SITUATION AND LOCUS OF CONTROL  
SUBJECTS WHO REACT ADVERSELY TO FAILING AN EXAMINATION

(N=281)



## CHAPTER IV

### Discussion

One consistent, clear observation emerges from the above data analysis. In all of the correlations and analyses of variance, a significant difference in the predicted direction was observed between the stress responses of internals and externals in the dental situation, thus supporting Hypothesis 1. However, in none of the data analysis did internals experience more stress than externals when about to take a final examination, thus not supporting Hypothesis 2. If one considers the overall implication of the two hypotheses, namely, that internals and externals react differently in dissimilar situations, the marginal interaction effect which was observed lends support to this implication. But the meaning of this interaction is unclear, and needs further discussion, along with the possible reasons for the lack of support for Hypothesis 2.

The interaction effect is essentially an artifact of the significant difference observed in the dental situation. The difference in the examination was effectively not significant, and in a direction opposite to the predicted one. Thus, in saying that externals and internals react



differently in dissimilar situations, one could more accurately say that in one situation (external), internals and externals react quite differently, while in the other (internal) situation, the difference is not great enough to really matter. Hence, the question again reduces to explaining the lack of an observed difference in the examination situation.

One possible explanation, which is not preferred by this writer for it implies the rejection of the theoretical basis of this research, is that in fact we have demonstrated that internals and externals react differently in one situation but not in another. In other words, one might conclude that locus of control is a meaningful distinguishing characteristic in understanding reactions to stress in some (external) situations, but not in others (internal). However, this explanation is not acceptable because (1) other investigators (for example, Lipp, Kolstoe, James and Randall, 1968) did observe higher stress scores for internals than for externals in some situations, and (2) there are too many possible problems in the experimental design which might account for these data, without "proving" that there are no differences between internals and externals in the internal situation.

One possible problem in the experimental design is that the examination situation is not, in fact, a good "internal"

situation. That is, one can only assume that taking a test is an internal source of stress, affecting one's personal sense of power, accomplishment, etc. Actually, it might be different things to different persons. Some students might consider a test an external kind of stress: for example, one might reason that one is being subjected to this pain and discomfort by others, and that tests are not really an important factor in determining one's self image. The three questions aimed at examining this possibility asked if the subject thinks that tests are (1) a good measure of his ability, (2) disturbing to fail, and (3) important in this particular case. Yet, it is possible that even if a subject considers a test a good measure of his ability and that he is troubled by failing a test, that this might still constitute an "external" source of stress, in that he might feel helpless to change things, or his self image might be independent of a grade on an exam. In other words, the test situation might mean too many different things to different individuals to be able to be classified as an "internal" or an "external" situation.

Another possible problem in the experimental design could be the rating scales which were used for both the locus of control dimension and stress. While it was necessary

to limit the number of items in order to realistically expect subjects to cooperate in filling out the questionnaire during stressful situations, perhaps there were simply too few items to yield any real group or stress differences. Further, there is always a danger involved in obtaining self-ratings on something like stress, especially when the subject's own ratings might influence his self-perception of his response to, and his performance in, the stressful situation. Thus, the stress scores in the examination situation might be biased by the subjects' desire to convince themselves that they are not very anxious. This would not be the case as much in the dental situation, where one's self-perception of stress does not affect the outcome of the situation. If this effect is in fact operating, then the tendency would be to equalize scores, for the more anxious students would need to convince themselves of their lack of anxiety more than would the less anxious students.

Perhaps most important in interpreting the data is the possibility that the experimental groups are simply not comparable on the dimension of "external stress-internal stress." For example, there could be many extraneous factors which interfere with classifying the situations as one of the other kind of situation. In the examination situation, for instance, the questionnaires were administered to the entire



group, with obvious anonymity, with the option to easily not complete the form, and the lack of direct supervision by an "authority figure." In the dental situation, the opposite conditions prevailed: individual administration, direct presence of an authority figure, and more difficulty in assuring anonymity and freedom to refuse to participate. Thus, these factors could interact with whatever intrinsic "internality" or "externality" the situation might possess. Further, different subjects from somewhat different populations were used in each situation. Clearly, more precise results could have been obtained had each subject been put through both situations.

It is obvious, then, that there are many possible factors which might be responsible for our ambiguous results. The fact that significant differences consistently were observed in the predicted direction for the dental situation is encouraging, and this writer believes that there is sufficient support for the theoretical basis of this research to continue with further research. Specifically, it would seem that if a better design is used, incorporating repeated measures on the same subjects, more stress data (especially objective measures in addition to self ratings), and controlled administration without sacrificing the "real-life" aspect of the situations, for example by questioning

hospital patients about a forthcoming operation (external stress) and also administering a task which clearly taps internal ability (e.g., an I.Q. test), better results would be obtained.

At this point, however, one can conclude that the support of Hypothesis 1 and the marginal interaction between the two experimental situations is consistent with the theoretical position that locus of control is useful in understanding coping with stress, when the nature of the stress is classified on an internal-external dimension. Just as important, though, is the demonstrated need for more precise classifications of kinds of stress and factors which determine response to stress in an experimental situation.

## CHAPTER V

Summary

The literature related to coping with stress as a function of belief systems suggests that the structure in conjunction with the content of belief systems is important. Key aspects of the structure of belief systems include feelings about helplessness and the relative importance of various situations for particular individuals. A personality construct which incorporates these two factors is Rotter's Locus of Control dimension.

On the basis of many studies which related locus of control to stress, it was seen that under certain conditions, externals experience more stress than internals, while the opposite is seen under other conditions. These conflicting findings were integrated into two hypotheses. Hypothesis 1 stated that when the nature of the stressful situation is external, externals will experience more stress than will internals. Hypothesis 2 stated that when the stress is internal, internals will experience greater stress than will externals.

A research design was set up to test these hypotheses. Under two experimental situations, a final examination (internal situation) and a dental appointment (external situation), subjects were given five items of the Personal



Locus of Control Scale and a series of stress questions. Thus, a comparison of stress responses for internals and externals under two different situations was obtained. Results indicate support for Hypothesis 1, and nonsupport for Hypothesis 2. These findings are discussed in terms of possible problems in the experimental design, and recommendations for elimination of these problems are made.

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## APPENDIX 1

Examination Questionnaire

This short questionnaire is part of a research project in Psychology which is examining stress in relation to personal beliefs and examinations. Please answer the questions as frankly and honestly as possible. Note that there are two categories of questions: (A) general questions about personal beliefs, and (B) more specific questions about tests and how you react to them. Thank you very much.

Michael S. Weissman

A. Below are 5 pairs of statements. For each pair, choose the ONE statement (and only one) which you more strongly believe to be true as far as you are concerned. In some cases, you might believe both of them or neither of them, but try to choose the one which you believe more than the other. There are no right or wrong answers. Simply circle the letter (a or b) corresponding to the statement you choose for each pair.

1. a I have often found that what is going to happen will happen.  
b Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
2. a What happens to me is my own doing.  
b Sometimes I feel that I don't have enough control over the direction my life is taking.
3. a When I make plans, I am almost certain that I can make them work.  
b It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
4. a In my case, getting what I want has little or nothing to do with luck.  
b Many times we might just as well decide what to do by flipping a coin.
5. a Many times I feel that I have little influence over the things that happen to me.  
b It is impossible for me to believe that chance or luck play an important role in my life.

B. Now answer these questions, which are concerned with how you feel about examinations. Place a check mark next to your answer.

1. How much time did you spend worrying or thinking about this test YESTERDAY?  
 Most of all of the time  
 A good deal of the time  
 Occasionally  
 Just a little  
 Not at all
2. How intense was the most severe fear or anxiety you felt when thinking about this test YESTERDAY?  
 Extremely intense  
 Fairly intense  
 Moderately intense  
 Only slight fear or anxiety  
 No fear or anxiety at all
3. How intense is your fear or anxiety RIGHT AT THIS MOMENT?  
 Extremely intense  
 Fairly intense  
 Moderately intense  
 Only slight fear or anxiety  
 No fear or anxiety at all
4. Students vary as to how useful they think a test is in measuring their mastery of a subject. Do you believe that tests are generally:  
 a good measure of your ability  
 a fair measure of your ability  
 neither good nor bad measure of your ability  
 a poor measure of your ability  
 a misleading and wrong indication of your ability
5. Please indicate your reaction when you find that you have failed or done poorly on an examination.  
 I feel as if I have failed as a person; I feel inadequate  
 I am troubled, but am able to get over it fairly easily  
 It does not really bother me too much  
 It doesn't bother me at all  
 I laugh it off, for tests don't matter anyway
6. Please indicate your sex: Male      Female      Age? \_\_\_\_\_
7. Is doing well on this test IMPORTANT or NOT IMPORTANT to you? (circle one)

## APPENDIX 2

Dental Questionnaire



This short questionnaire is part of a research project in psychology which is investigating how individuals react to different kinds of stress. There are two kinds of questions: (A) general questions about personal beliefs, and (B) specific questions about how you feel about your dental appointment. Your name will not appear on this or any other form. Please simply answer the questions as honestly as possible, and bring the form with you when the dentist calls for you. He will make a small note as to the nature of the dental work to be done. After the appointment, please bring the form to me in the waiting room. If convenient, I will ask you a few questions about the research. Thank you very much.

Michael S. Weissman

- A. Below are 5 pairs of statements. For each pair, choose the ONE statement (and only one) which you more strongly believe to be true as far as you are concerned. In some cases, you might believe both of them or neither of them, but try to choose the one which you believe more than the other. There are no right or wrong answers. Simply circle the letter (a or b) corresponding to the statement you choose for each pair.
1. a I have often found that what is going to happen will happen.  
b Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
  2. a What happens to me is my own doing.  
b Sometimes I feel that I don't have enough control over the direction my life is taking.
  3. a When I make plans, I am almost certain that I can make them work.  
b It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
  4. a In my case, getting what I want has little or nothing to do with luck.  
b Many times we might just as well decide what to do by flipping a coin.
  5. a Many times I feel that I have little influence over the things that happen to me.  
b It is impossible for me to believe that chance or luck play an important role in my life.
- B. Now answer these questions, which are concerned with how you feel about your dental appointment. Place a check mark next to the right answer.
1. How much time did you spend worrying or thinking about going to the dentist THIS MORNING, that is, before actually coming to the dentist's office?  
 Most or all of the time  
 A good deal of the time  
 Occasionally  
 Just a little  
 Not at all
  2. How intense was the MOST SEVERE fear or anxiety you felt this morning, while thinking about going to the dentist?  
 Extremely intense  
 Fairly intense  
 Moderately intense  
 Only slight fear or anxiety  
 No fear or anxiety at all
  3. How intense is your fear or anxiety RIGHT AT THIS MOMENT?  
 Extremely intense  
 Fairly intense  
 Moderately intense  
 Only slight fear or anxiety  
 No fear or anxiety at all





