A Study of the Relationship Between Certain Personality Variables and Success in Underwater Demolition Team Training.

A Thesis

Presented to

the Faculty of the Department of Psychology

University of Houston

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

Roger N. Blakeney

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ABSTRACT

This study was an attempt to differentiate successful from unsuccessful candidates in Underwater Demolition Team training according to their responses on the Interpersonal Check List. Interpersonal Check List data of 126 subjects were utilized. Eight hypotheses were generated based on impressions gained by the author from the literature and personal experiences. These hypotheses related to the candidate's perception of himself, his parents, and his own relationships with his parents.

The sample was divided into four groups on the basis of whether they passed or failed the training and whether they were officers or enlisted men. The mean, the variance, and the sample size for each hypothesis were calculated for each group and these results were presented in tabual form. The heterogeneity of the variances did not allow the use of inferential statistics based on means.

The sample was regrouped into just two groups - a pass group and a fail group. Then medians were calculated. The resulting 2 x 2 contingency tables were presented. Chi-square tests of significance were performed and the results reported.

It was concluded that since other indicators of success in Underwater Demolition Team training have been proven to be stronger predictors, none of these measures should be recommended as additional selection criteria. However, the logic developed for searching for such variables still seemed valid. It was further concluded that the areas which seemed most promising for further research were interpersonal relationships with the father during childhood, and strength of self-concept as a distinct person.

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CHAPTER I

REVIEW OF RELATED LITERATURE

A Brief History of Stress Research

Much of the psychological research on stress and performance in stress situations had its inception in World War II, when the prediction of performances in stress situations became of immediate value. One of the most elaborate screening programs for the selection of personnel to work in various stress situations was conducted by the Office of Strategic Service (OSS Assessment Staff, 1948). Stouffer, et al's, (1945, 1965) two volumes of The American Soldier is one of the most extensive reports on the adjustment to the stress of military life during WWII.

An early example of investigation into the psychological correlates of good performance under stress was Murray and Stein's (1943) use of the TAT to select combat officers. Other examples of work during and immediately after WWII on performance in stress situations included studies with pilots and crews (Grinker and Speigel, 1945, 1963) and submarine crews (National Research Council, 1949).

Stimulated by the Korean conflict, research into stress and performance in stress situations continued. The Operations Research Office of Johns Hopkins University undertook a study on the battlefield of the effects of Stress in Infantry Combat (Davis and Taylor, 1954, 1956). The studies of aircrews and pilots also continued (McFarland, 1953). Basowitz, Persky, Korchin, and Grinker (1955) studied anxiety and stress in paratroop trainees. Other work done as a result of the Korean conflict included the Human Resources Research Office's study of effective and

ineffective combat performers (Egbert, Meeland, Cline, Forgy, Spickler, and Brown, 1957, 1958; Kerle and Bialek, 1958).

A composite description of a typical stress-tolerant individual which emerges from these studies indicates that he is both competitive and emotionally stable. He displays high need achievement and a fear of failure, but he also has a history of good social relationships. There are indications that he has had a warm and supportive home life as a child, yet, was expected to meet high standards.

Studies of Personality and Familial Relationships as Related to Stress Tolerance

The focus of the present study is on the role of the personality and family relationship factors in human stress tolerance. There have not been many studies dealing directly with this relationship. Funkenstein, King and Drolette (1957) studied stress in a laboratory setting using junior and senior students at Harvard. Although the generalizations that can be drawn from their data may be limited by their choice of subjects and by their dependence on laboratory-induced stress instead of "real" stress, their data are of special interest because they deal more fully and directly than most studies do with the relationship of perceived parental characteristics to the individual's handling of stress. Indeed, as will be discussed more fully later, they have inspired some of the specific quantitative analysis used in this study.

Funkenstein, et al, divided the mastery of stress into two phases, "acute emergency reactions" and the "mastery of stress as time passed". They concluded that the personality correlates of each phase were

different. Their work with the acute phase is more relevant to this study. Table 1 summarizes the relevant data from their study.

The type of acute reaction to the experimental stress situation was determined in a post-stress interview which was focused on the emotions experienced by the subject during the stress situation. "Performance under stress' seems to have been a judgment by the experimenters on the basis of physiological response measures. There were no clear behavioral measures reported. The subject's perception of his parents, as reported by Funkenstein, et al, was obtained from a biographical questionnaire.

By referring to Table 1, it can be seen that in the No-emotion type the subject's primary parental relationship is reflected as having been with the father. However, this reflection does not deny meaning to the relationship with the mother. It would seem that the relationship with the father has developed as the primary relationship; an earlier and continuing satisfactory relationship with the mother apparently is not ruled out. In the Anger-out type (anger directed toward some external object), the subject again perceived his father as the chief source of authority and as his role model. But the earlier and continuing relationship with the mother, which was only presumed by this author in the No-emotion type, is reflected in the Anger-out type by the subject's perception of his mother as the chief source of affection. The subject does, however, perceive the roles of his parents as differing dramatically. In the Anger-in type, the subject does not seem to have developed the perception of the parental roles as dramatically different. The father shares his authority with the mother, and her role as the source of affection is shared with the father. In the Anxiety type, the sub-

Table 1

Reactions to Acute Stress and Their Correlates

Type of Reaction	Subject's Perception of His Parents			Performance Under Stress
	Chief Source of Authority	Role Model	Chief Source of Affection	
No-emotion	Father	Father	Father	Excellent
Anger-out	Father	Father	Mother	Excellent
Anger-in	Father	Father	Mother	Good
Anxiety	Mother	Mother	Mother	Poor

jects's primary parental relationship appears to have been with the mother. The father was absent because of death or divorce, or he was perceived as a week character. No strong relationship with the father seems to have developed.

On the basis of the data summarized in Table 1, the important perception of the parents by the subject, in regard to acute stress tolerance, seems to be that of the father as the chief source of authority and as the role model.

A second study involving personality variables was conducted by Silverman, Cohen, Zuidema, and Lazar (1957). They studied "G" tolerance which is the ability to withstand "black-out" on a centrifuge. One "G" is a force produced by acceleration (for example, in a centrifuge or aircraft) that is equal in magnitude to the accelerational force produced by free-fall in the earth's gravitational field. Silverman, et al, used a centrifuge to produce "G's". The force was exerted in a head-to-toe direction. The "G" level at which the subject experienced "black-out" was called his "G" tolerance. They defined "black-out" as the point where the subject lost his vision because of the inability of the cardiovascular system to maintain an adequate amount of blood in the head. "Black-out" is a phenomenon well-known to pilots, and the number of "G's" an individual can tolerate before "black-out" is matter of operational importance and is of prestige value.

Silverman, et al, developed a projective test which was loaded with aggressive content and symbols. Eleven cards were developed by them depicting people in various situations. The cards were presented to the subjects in TAT style. The test, designed for use with Air Force

personnel, depicts specific Air Force situations. The stories of subjects having a high "G" tolerance were compared with those of subjects having a low "G" tolerance.

The high "G" subjects tended to identify with the aggressor and to tell active stories. Their heroes were described as:

independent
persisting in goal-directed behavior
hedonistic or impulsive
comfortable about expressing aggression

The low "G" subjects were classed as identifying with the aggressed against, and as telling passive stories. Their heroes were described as dependent, easily giving up goals, reality oriented or internally inhibited, and as denying or being uncomfortable about expressing aggression.

Another study investigating psychological correlates of stress tolerance is the study conducted by Rohrer, Bagby, and Welkins (unpublished ONR report) of Marine Corps Officers Candidates. They found that items which dealt with interpersonal relations proved significant in discriminating the more successful from the less successful candidates. One of the techniques used to evaluate the candidates was a Personal History Form. Items on the form which related to the success of the candidates were grouped by Rohrer, et al, under seven classifications. Table 2 summarized the differences found between the least and most successful candidates based on an analysis of the responses on the Personal History Form.

Family mobility patterns, religious background, occupation of parents, and parental educational level may be interpreted in light of social class differences. The differing patterns of child-rearing among

social classes could be investigated as an important factor in the candidate's success. The regional background differences could also be investigated in terms of the effect of differing family interaction patterns and child-rearing practices in the regions.

Another related study is one by Ruff and Levy (1960). They reported on the "Psychiatric Evaluation of Candidates for Space Flight". All candidates had a previous record of an outstanding ability to master stressful and novel situations in their experiences as military pilots and in experimental test flights. General comments were made by Ruff and Levy about the group of 31 men from whom the seven 'Mercury Astronauts' were chosen. Ruff and Levy noted that many of the group had a pronounced identification with one parent. It was their conclusion that when it was the mother with whom such identification existed she was a "strong" and not infrequently "masculine" figure.

This review of the literature suggests that some family and interpersonal factors do emerge which seem to characterize the stress-tolerant individual. For example, one might expect such an individual to have been reared in a Protestant home by parents engaged in managerial or professional occupations. He identifies strongly with one parent, mostly like the father, whom he perceives as the source of authority within the family. Compared with those who are likely to be less tolerant of stress, the high tolerance individual was, as a youth, better educated and more athletic. As an adult, he might be characterized as an independent, persistent, and hedonistic individual who is comfortable about expressing aggression. He, himself, might say that he is "superior".

Table 2

Correlates of Least Successful and Most Successful

Marine Corps Officer Candidates

Variable	Candidates Performance	
	Least Successful	Most Successful
Occupation of Parents	Service or semi-skilled	Managerial or Professional
Education of Parents	Less than high school	More than high school
Family Mobility Pattern	Moved frequently or stayed in one place	Moved occasionally
Region of Origin	Northeastern or Northcentral portions of U.S.	Southern or Western portions of U.S.
Religious Background	More Catholics	More Protestants
School Sports Background	Limited	Extensive
Self-evaluation	As average	As superior
Marriage	Less Married	More Married

CHAPTER II

CONCEPTUAL AND METHODOLOGICAL ISSUES IN THE STUDY OF STRESS

In the general introduction to, Psychology: A Study of a Science, Koch, while discussing what he refers to as "presystematic" commitments of psychological science, said:

> "This theme of inquiry stressed the analysis of those links in the presupposition chains of actors, or groups of them, which genetically precede or causally condition attempts toward the systematic organization of phenomena within a given field of inquiry."

Koch's concern seems to apply in the subject of inquiry of the present study. Lazarus (1964) has pointed out, in simpler terms, that there is a lack of "well-worked out" theory in the literature on stress. The impact of Lazarus' belief becomes clearer when we consider that the concepts available for use as components of a psychological theory of stress are themselves imperfect. A case in point is the term "stress" itself.

In discussing the weaknesses of the concept of stress, Lazarus (1952) has concluded that "the use of the term stress must necessarily be a little looser than we would like it to be", partially as a result of the lack of theory. And, of course, we do find references to heat stress, noise stress, fear of failure stress, and various other kinds of stress among psychological studies.

Lazarus (1952) felt that the definitions of stress offered in terms of stimulus or response operations alone were inadequate and that stress must be treated as an intervening variable. Stress then for him became a secondary concept and he used motivation as the primary concept. He thus decided that stress is occasioned by a particular situation threatening the attainment of some goal.

Harris, Mackie, and Wilson (1956) in discussing methodological and conceptual problems of stress studies, offered a different definition. They chose to define stress situationally in terms of stimulus conditions. They noted and rejected Lazarus' (1952) definition of stress in terms of motivation, the blocking of the attainment of some goal. Harris, et al, recognized that merely describing the stimulus conditions failed to provide information on the individual's reaction to stress situations. Thus, in order to focus attention on performance, they included only those stimulus conditions of "sufficient intensity to have an eventual adverse effect upon the response of at least some of the people exposed to them."

These definitions are offered not as final solutions to the problems of the lack of theory raised above, but only to show diversity of opinion among researchers in the field. The definitions act only as guidelines toward the eventual solution, and when they are considered as such, the definitions by Lazarus and by Harris, et al, are not, then mutually exclusive.

Of course, the researcher must, in the final analysis, have freedom to use those reduction sentences and operational definition he finds necessary. He will be justified, or not, by the empirical consequences of his derivation and specification. If his version of "stress" causes performance deficits he will be justified.

There are other conceptual and methodological problems that must be faced by researchers in the study of stress. According to Lazarus (1964), the achieving of realism is the principal problem in stress experiments. This problem has been discussed by both Lazarus and Harris,

et al, in some detail. Stress can be investigated in the laboratory or in more naturalistic situations. And, Lazarus (1963, 1964) continuing his concern for realism, has held that we are interested in the laboratory stress situations only in so far as it relates to "real-life" situations. It would seem that it is an open question whether such stressors as blinking lights, placing the subject's foot in cold water, calling out falsely high norms during performance, and such, are of much value in generalizing to "real-life" situations.

Some students of stress have taken advantage of real stress situations for their studies in order to avoid the problems inherent in laboratory studies of stress. For example, Basowitz, et al, studied paratroop trainees during their jump training. Bloom, Euler, and Frankenhaeuer (1963) also used a similar setting for their work. Berkum, Bialek, and Yagi (1962) seem to have produced realistic situations with their use of "simulated emergency situations" in Army field training. The subjects were unaware that the situations, involving 'stray' artillery shells, engine trouble on aircraft in flight, and so on, were faked. And, Davis and Taylor (1954, 1956) utilized combat, which is generally considered the most stressful of situations, in their study of the stressful effects of infantry combat on the battlefield in Korea.

A further issue which cuts across the problem of examining stress in the laboratory or in "real-life" situations involves the measurment of performance under stress. The value of using artificial measures of perfonmance also seems open to question. An excellent example of the use of an artificial measure of perfonmance in a realistic setting is Davis and Taylor's study. They used 'the ultimate' of realistic stress

situations. But for their performance measures, they used a group of tests to measure intellectual faculties which were not measures of combat effectiveness.

Harris, et al, after discussing the methodological and conceptual problems of stress studies and reviewing the stress literature reported these findings and conclusions:

1. From what results are available on individual performance, it is apparent that there are wide differences in individual reactions to stress. The reasons for these different reactions have not been clearly identified.

2. Whether or not these individual differences are temporary or lasting has not been explored. In fact, reliability of performance from one stress situation to another appears not to have been investigated.

3. The majority of the studies have been concerned with the effects of relatively short-term stress conditions.

4. The period during which performance has been measured has also been of short duration, making temporary compensatory performance readily possible.

5. Some experimental stress stimuli employed appear to have produced artifactual effects.

6. In many of the studies the intent of the experimenter has been readily apparent to the subject or the experimental situation clearly artificial.

7. The tasks upon which performance has been measured have not included practical tasks similar to those likely to be encountered under operational conditions. Rather, they have been abstract tasks, such as intelligence tests.

8. Often, these abstract tasks have been superimposed in such a way as to represent a complete interruption in operational performance.

9. The level of performance as a function of time has never been studied systematically under either long-term or short-term stress conditions.

10. The temporal relationship between the stress conditions and the performance measure has not been systematically

studied, in spite of its obvious importance. For example, it is difficult to infer anything about performance during actual stress conditions if measurement is made only a considerable period of time after stress has been discontinued.

11. A number of experimental designs have been used in stress studies, but some which are most directly analagous to typical military operating conditions have not been used.

The recommendations of Harris, et al, for further research were based on the general conclusion that the studies available fail to provide information which was extrapolatable into satisfactory operational performance under stress conditions. They concluded that experiments to study stress should meet the following conditions.:

1. the task should be meaningful
2. the stress conditions should be realistic
3. the subjects should not be aware of the nature of the experiment

They continued by saying that if we are to make predictions about performance under operational conditions then the performance measures used and the period of measurement should reflect those conditions.

These critical comments by Harris, et al, on the methodological and conceptual issues in stress research are offered, then, not as a final solution to the current problems involved. Rather, they are offered in the belief that they help to describe a productive approach which may lead to the accumulation of the information necessary for an inductive attack on the methodological and conceptual problems now existing in stress studies.

CHAPTER III

THE UNDERWATER DEMOLITION TEAM TRAINING PROGRAM

As a Stress Laboratory

The conditions and criteria for stress experiments recommended by Harris, et al, were used by Dunham (1960) in his proposal to use Underwater Demolition Team training as a natural stress laboratory. He indicated the ways in which the training fit their criteria and conditions. Underwater Demolition Team (UDT) training provides a situation where the gap between training and operational conditions is small. The stress situation is realistic, as well as being intense and prolonged. The candidates appear to display motivation for success in the form of sensitivity to group approval, professional prestige, increased pay, and sometimes survival. The subjects, in this setting, are not aware of the intent of the experimenter so the possibility of compensatory performance is reduced to a minimum. Also, the criterion of success is easily measurable in terms of operational performance, that is pass or fail, rather than using artificial measures.

Harris, et al, divided stress into types, such as pacing stress, fear stress, physical discomfort stress, failure stress, distraction stress, confinement and isolation stress, biological stress, and so on. UDT training contains all, or nearly all, of these types of stress. And, the conditions of stress are essentially homogenous for all subjects concerned.

In using UDT training as a natural stress laboratory, the investigator takes advantage of the naturally occurring hazardous and high

stress situations inherent in this sequence of training. This fact allows him to circumvent many problems he must face in the usual psychological laboratory. These problems include:

1. The establishment of a stress situation that is real to the individual and of reasonable duration.
2. The selection of an appropriate measure to reflect operational performance.
3. The interruption of performance to take measurements.
4. Compensatory performance.

The use of the UDT training program as a stress laboratory meets the conditions and criteria proposed by Harris, et al, which have already been discussed.

The Underwater Demolition Team

A brief description of the functions of the Underwater Demolition Team (UDT), and of the selection and training of the UDT member will be given. Though the functions of the UDT have changed rapidly in the past few years, the functions of the UDT, at the time the data for this study were collected, were well described by Tuma (1957):

> "The present task of the UDT is now clearly defined. Its purpose is to aid amphibious landings. Its mission is to reconnoiter enemy beaches, to locate and remove enemy mines near and on the beaches of ingress, blow up underwater obstacles, to blast channels, remove wrecks, and to assist in surveys. UDT personnel are required to swim and dive in all conditions of sea, surf, and water temperatures. During combat, they must operate close to or inside enemy lines."

Formal requirements for admission to the basic UDT training course are as follows:

1. Must be a volunteer and possess a genuine desire for assignment to UDT duty.

2. Must be reliable with no record as a chronic disciplinary case.
3. Must be qualified physically; physical condition requirements are comparable to those for divers and pilots.
4. Must meet certain swimming and physical stamina standards.
5. Must have an educational level equivalent to at least two years of high school.
6. Must have a minimum Navy General Classification Test Score of 55.
7. Must be free of claustrophobia and excessive fear of explosives.
8. Must have demonstrated ability to maintain composure under abnormal conditions.

One informal descriptive brochure used to acquaint men with UDT adds that, in addition to these qualities, "the most important assets in a potential Underwater Demolition Team member are:

A sincere desire for the work
Self-confidence
Physical stamina
Swimming ability and endurance
Pride in self and unit
Proper motivation
Willingness to extend oneself
Enthusiasm
A healthy respect for water, darkness, and explosives
Well-controlled temperament
Never quit spirit."

Basic UDT training is conducted twice a year beginning in January and July at Little Creek, Virginia, and Coronado, California. Usually about thirty officers and one-hundred enlisted men annually report for UDT training at each station. Approximately 30 percent of the officers and 60 percent of the enlisted men fail to complete training. The actual proportion of enlisted men who fail has varied between about 60% and 90% from class to class over several years.

The basic program consists of 16 weeks of intense training. There are, on the average, over 50 hours of actual instruction and scheduled time per week. Training includes calisthenics, long runs and ocean swims,

explosives ordnance instruction, obstacle courses, hydrographic reconnaissance, and demolition work. The training is conducted by a staff of experienced UDT personnel in the form of lectures and practical work with the emphasis on practical work. There are many skills to be mastered as well as information to be learned. Considerable physical stamina is required and real dangers are often present.

During "hell week", which is usually the third week of training, the physical stamina and motivation of the students are strongly tested. "Hell Week" is an arduous schedule of drill and night exercises. As many as 40 percent of the students in a class have resigned from the course during "hell week". This ordeal is, nevertheless, considered necessary to eliminate students who are probably unsuited for taxing UDT operations.

Those who pass training go on to parachute training, diving training, and finally to individual assignments to Army Special Forces classes, survival training, explosive ordnance disposal school, and various other specialized training. After many weeks of training they report for regular duty with an Underwater Demolition Team. Attrition during advanced training and the first few years of duty with an operational UDT is a minor problem.

CHAPTER IV

A REVIEW OF THE UNDERWATER DEMOLITION TEAM LITERATURE

Hertzka and Anderson (1956) conducted a study of UDT training for the purpose of developing "realistic personnel selection standards" for UDT candidates. They used three classes of measures—background variables, swimming ability and physical fitness, and measures of personality characteristics.

The following is a list of variables used in their study:

a. Background variables
   1. Pay Grade
   2. Age
   3. Education
   4. General Classification Test (GCT) score
   5. Arithmetic Test score
   6. Mechanical Test score
   7. Clerical Test score

b. Tests of swimming ability and physical fitness
   8. Elementary Backstroke
   9. Breast stroke
   10. Side stroke
   11. Underwater Swim
   12. 300-meter Swim
   13. Pull-ups
   14. Squat-jumps
   15. Push-ups
   16. Sit-ups
   17. One-mile Run

c. The Gordon Personal Inventory (GPI), the Gordon Personal Profile (GPP), and the Guilford-Zimmerman Temperant Survey (GZTS) were used to measure 18 personality traits. These traits were:
   18. Ascendence (GPP)
   19. Responsibility (GPP)
   20. Emotional Stability (GPP)
   21. Sociability (GPP)
   22. Cautiousness (GPI)
   23. Original Thinking (GPI)
   24. Personal Relations (GPI)
   25. Vigor (GPI)
   26. General Activity (GZTS)
   27. Restraint (GZTS)
   28. Ascendence (GZTS)

29. Sociability (GZTS)
30. Emotional Stability (GZTS)
31. Objectivity (GZTS)
32. Friendliness (GZTS)
33. Thoughtfulness (GZTS)
34. Personal Relations (GZTS)
35. Masculinity (GZTS)

d. Performance measure. They considered passing or failing training the best performance measure. They eliminated from their sample all candidates who left training because of family problems (emergency leave), injury or illness, or other disqualifications by the medical officer.

In general, the personality variables did not contribute substantially to the prediction of success, but they did find that a certain degree of maturity was necessary and recommended a minimum age of 19. For the officer sample, they found correlations which were suggestive of a higher relationship between personality variables and success in UDT training. The officer sample was too small to yield definite conclusions.

Approximately 15 months after graduation of the last group in Hertzka and Anderson's study, Alf and Gordon (1957) conducted a follow-up study to determine the relationship between the predictor battery and performance, after training, in a UDT operating with the fleet (fleet performance). For fifty of the original graduates, forced rankings by the men's executive officers were obtained. Alf and Gordon then calculated correlations between the original predictor battery and forced rankings for "over-all operating ability" and "swimming ability".

Alf and Gordon said that in the initial training program, the attrition was largely due to the candidate's lack of swimming ability and sufficient physical stamina. They reasoned that the UDT personnel involved in fleet operations all had adequate physical stamina and swimming

ability to perform the rigorous duties demanded of them. In the operational UDT, there is an emphasis on endurance swimming and a continuing program of physical conditioning—contact sports, judo training and so on. Also, the UDT personnel in an operational UDT are required to go through a continuing round of training in communication and code, reconnaissance, mapping, commando tactics, use of small arms, and other miscellaneous skills. Thus Alf and Gordon concluded that:

> "Swimming and physical fitness are important as predictors of UDT training success but not of fleet success. Cognitive measures, (BTB), while unpredictive of UDT training success, predict fleet success."

Alf and Gordon (1958) in a follow-up study of the use of the selection battery for officers found that personality variables played a more important role in the officers success in UDT training than for the enlisted men. Five scales were reported to be significantly and positively related to success in training. These were:

Emotional Stability (GPF)
Emotional Stability (GZTS)
Objectivity (GZTS)
Friendliness (GZTS)
Masculinity (GZTS)

The most elaborate study of UDT trainees was conducted as doctoral dissertation research by Tuma (1957). As part of his study, he reviewed the literature on personality traits "desirable" for success in athletics and concluded that the following traits (expressed in terms of Cattell's 16 P F) should be "desirable" for UDT candidates:

Personality Relations (A+)
Emotional Stability (C+)
Aggressiveness (E+)
Masculinity (L-)
Objectivity (M-)
Self-Assurance (Q+)

In attempt to determine if these traits were, indeed, effective, he have Cattel's 16 Factor Personality Inventory to all candidates (48) entering one training class. All candidates were also given 63 physical tests measuring areas of strength, physique, muscular endurance, and cardiovascular fitness. A correlation matrix from the scores made by the entering candidates on these 79 dependent variables was computed against an independent variable of "pass-fail".

His results indicated that fitness is probably a powerful predictor of success or failure in UDT training. In fact, he concluded that on the basis of his sample, a qualified candidate's estimated chance of survival was 73.44% if he could match the following Muscular Endurance Test scores:

Muscular Endurance Test	Raw Score
Squat Jumps	69
Push-Ups	48
Sit-Ups	36
Squat Thrusts for one (1) minute	33
Pull-Ups	10

Tuma found that none of the personality factors tested were significant as criteria for the prediction of trainee attrition.

He retested the candidates (13 men, representing only 27.1% of the class) who completed training and noted that a "marked" change had occurred in the personality assessment of these candidates on the following traits (as defined by Cattell):

aggressiveness
enthusiasm
confidence

Because the attrition rate was so great, Tuma extended his investi-

gation of personality characteristics to include veteran UDT personnel. The 16 P.F. Test "was administered through individual commands to all available UDT members within the Navy." A composite personality profile, for the approximately 70% of the Navy's UDT population tested, was compiled. He concluded that the UDT population tested differed from standard U.S. population norms and the entering candidates on the following factors:

aggressiveness (E+)
enthusiasm (F+)
social shyness (H-)
emotional egocentricity (M+)
practical realism (I-)

Dunham and Welsh, in an unpublished study, studied UDT trainees for six consecutive classes (Jan. '57, Jul. '57, Jan. '58, Jul. '58, Jan. '59, Jul. '59) at Little Creek, Virginia. A preliminary study was begun in January 1957. An attempt was made to determine what measurable or recognizable qualities and abilities men might have in common who have similar reactions to the long-term stress of the UDT training program. These characteristics would be used to establish criteria which would be predictive of success in this situation.

Beginning informally and on a limited scale with the January, 1957 class, (prior to the actual beginning of training) results of several tests of physical strength and endurance were recorded along with personnel record data for each subject. On the basis of statistical analysis of the data and examination of pass-fail frequency distribution plots for each variable, cutting lines were empirically derived.

The physical fitness test is routinely given by the UDT instructors as a basis for judging improvement. It must be emphasized that the

recorded results in no way affected the evaluation of the authorities with regard to the student's performance in training. There were several advantages to this tactic. Most important of all, the investigator was completely removed from the subjects. Operational performance was not interrupted for the purpose of completing some abstract task. In addition, no single task is critical to passing or failing. The subjects at no time were cognizant of the intent of the experimenter. In short, the reality of the situation to the individual was completely retained.

Based on the data collected from the January, 1957 and July, 1957 classes cutting lines for different variables were tentatively listed. The cutting lines were selected to maximize 'hits' and minimize 'misses'. For the January, 1958 class, these cutting lines were validated as having an accuracy of prediction of better than 75% 'hits'.

By the time the July, 1958 class convened, the work had developed to the point where the set of subject variables, characterized by the empirically derived cutting lines, had been validated and were ready to be checked by a cross-validation. The variables and their cutting lines were as follows:

Variable	Cutting Line
Age	cut less than 20 years
Performance rating	cut less than 3.0
Sit-ups	cut less than 41
Squat jumps	cut less than 46
Push-ups	cut less than 27
Pull-ups	cut less than 6
Mile-run	cut over 7:35 min.
Underwater swim	+ for more than 44 yards - for less than 25 yards
300-yard swim	cut 8:00 min. and over
T-score on Navy Physical Fitness Test	cut less than 50

For each variable on which the subject scored below the cutting line, he was assigned a minus. The total number of minuses equaled his handicap score. All subjects with handicap scores of two or less were predicted to succeed in training. With a handicap score of five or more they were predicted to fail. Handicap scores of three or four were assigned to an area of uncertainty. Finally, a subject by subject list of predictions for pass-fail was compiled, 'blind' prediction. A sealed copy was sent to the authorities at Little Creek, Virginia, with a request that upon completion of training the copy be opened and a listing of success and failure be entered on it. Accuracy of prediction was 89.7%; not including the area of uncertainty. All subjects falling in the area of uncertainty failed. Thus, had a handicap of three or more minuses been deemed as indicative of failure—eliminating the area of uncertainty—accuracy would have increased to 91.9%.

The fact that Dunham and Welsh's study continued for several classes helps to minimize the chances of type G, type R, and type S errors, as well as producing a larger N. It should also be noted that Dunham and Welsh treated all failures in their sample the same. That is, in contrast to Hertzka and Anderson, they did not eliminate humanitarian transfers, injuries or illness, or other medical disqualifications from their sample. Thus, Dunham and Welsh held that psychological factors are not ruled out by a medical drop. The accuracy of their prediction seems to support the wisdom of this tactic. It is also supported by the findings of Basowitz, et al, that failures in jump training (paratroop trainees) were distinguishable, without regard to reason for leaving or being dropped from training, from passes on the basis of the type of anxiety displayed. They con

cluded that the trainees succeeding in training displayed more shame-anxiety (fear of failure) while those failing displayed more harm-anxiety (fear of injury).

In pursuit of additional variables, Dunham and Welsh, in addition to physiological measures, administered the MMPI and ICL to the members of January, 1959 and July, 1959 classes prior to the beginning of the course and with the clear understanding that these would in no way affect their outcome in training. Dunham and Welsh felt that the addition of psychological and physiological variables to the array of already identified variables should describe the subjects reaction-to-stress configuration. The reason for different reactions to stress would be inherent in this description. They hoped that once success has been achieved in this area, that investigation can be extended to the study of level of performance as a function of time and of the effect of different stimuli upon the same individual.

CHAPTER V

STATEMENT OF THE PROBLEM

This study was an attempt to find differences between the responses on the Interpersonal Checklist (Leary, 1957) of candidates who complete UDT training and those of candidates who do not. The emphasis was on the response measures which might give indications of the role of personality and family relationship factors. It was even hoped that the results would add to that pool of information which must necessarily be collected prior to an inductive attack on the methodological and conceptual problems existing in the study of stress, and prior to the establishment of R-R relationships which may help reveal processes or structures of greater explanatory value for the understanding of stress and stress tolerance.

More modestly and the main purpose of this study, it was hoped that the results would add to the information on which predictions of success or failure in UDT training can be based.

A discussion of UDT training as a natural stress laboratory has been presented. It was shown how UDT training fits the requirements as a setting for the study of stress. A selected review of relevant studies has been presented along with a review of the UDT literature.

Hertzka and Anderson, Alf and Gordon, and Tuma also felt that there should exist isolatable personality variables which would aid in the prediction of success or failure in UDT training. Each concluded that there were indications of the importance of psychological factors, but that the measures they used did not add significantly to the predictability of success or failure. And, it has already been shown that the

work of Rohrer, et al, Funkenstein, et al, and Ruff and Levy lead to the conclusion that interpersonal and family relationship factors are important in stress tolerance.

In reviewing the UDT literature, it was shown that fitness, as measured by Dunham and Welsh, and by Tuma, is a powerful predictor of success in UDT training. Even so, this does not preclude the existence of a relationship between fitness and psychological variables. It may be that psychological variables are not the main effect, but that they may be involved in an interaction which accounts for the variability. Some psychological variables have already been shown to correlate significantly with success in UDT training and seem to indicate that personality and interpersonal relationship factors play an important role. These variables are:

Personal Relations
Emotional Stability
Age (maturity)
Objectivity
Friendliness
Masculinity
Performance Ratings

In Dunham and Welsh's study and in Tuma's study, there were indications that physiological measures, especially blood pressure measures, were also related to success or failure in UDT training. This fact considered with the findings of Silverman, et al, of a relationship between a measurable interpersonal variable (aggression) and the results ('blackout') of the inability of a physiological mechanism (the cardiovascular system) to compensate for an external change ("G's") gives further support to the belief that there should exist isolatable personality variables which would aid in the prediction of stress tolerance and,

more specifically, success or failure in UDT training.

The Interpersonal Checklist (ICL) responses of candidates in two classes of UDT training were available along with a record of those candidates completing training and those who did not. The data were part of a larger collection of data being used in a continuing series of studies by Dunham and Welch. These ICL data seemed to offer an opportunity to search for interpersonal and family relationship factors in the background of stress tolerant individuals. It seemed advantageous to seize this opportunity in spite of admitted difficulties such as sample size and the use of verbal report as an indirect measure of the candidate's perception of his parents. This opportunity presented by the availability of appropriate data seemed to offer a promising start for the investigation of an important problem. Therefore, the ICL data was analyzed, in terms of selected measures, in an attempt to determine whether information helpful in making discrimination of those candidates passing and those failing could be extrapolated from it.

The measures to be used and the hypotheses to be tested were chosen on the following basis: information gleamed from readings in the areas of stress tolerance, UDT training, psychological variables in human factors, and parental identification and ego development; impression gained by the author from the literature and personal experiences; and on the basis of a preliminary analysis of the ICL data. The hypotheses do not represent an organized position, but rather in keeping with exploratory nature of this study, are only hypotheses that seemed to have some basis in the sources listed previously in this paragraph.

CHAPTER VI

DESIGN

Subjects

The subjects on which ICL data was originally to have been collected, was a group of 166 UDT candidates at the UDT training school at Little Creek, Virginia. The group was composed of the entire training classes of January 1959 and July 1959. All these candidates had met the Navy's selection criteria for UDT training. ICL data were collected on 150 of these candidates. The other 16 candidates either failed to report or left Little Creek before training began.

This group of men cannot be considered a random sample of young men nor of men in the Navy, but must be considered a "select" group (Tuma, 1957). The candidates constitute a rather homogeneous group in regard to sex, age and physical stamina as did the paratroop trainees used by Basowitz, et al, and Bloom, et al. In both studies, it was pointed out that the use of such a select sample limits sources of variability and also limits the generality of findings. But as Tuma, in explaining his small sample of UDT candidates, said:

> "The truth, however, remains: that to investigate a specialized group performing a specialized function—that and that group alone contribute most significance to the study undertaken."

The ICL records of the 150 candidates were screened for this study to eliminate:

1. Those candidates who failed to describe both parents; parent substitutes were not accepted.
2. Those candidates who indicated that either parent was separated from them during childhood due to death, divorce, and so on.
3. Those candidates who were not members of the U. S. Armed Forces.

This left 126 candidates as subjects for this study. There were 101 enlisted men and 25 officers.

Testing

Standard administration of the ICL was used. The subjects were asked to describe themselves, their mother and their father. The subjects were also told that the responses would be completely confidential and that the ICL results would in no way influence their status in training nor their future. They were asked to be as accurate in their descriptions as possible, because the responses would be of scientific value and their cooperation would be helpful.

Instrument

The Interpersonal Check List was developed by Suczek and LaForge (1955). It is an adjective checklist containing 128 adjectives and adjective phrases, which the individual used to describe himself and others. There are 16 items for each of the eight different kinds of interpersonal behavior represented on the instrument. The subject is instructed that if he feels the item describes the person being rated he is to check it, and if he feels that it does not, to leave it blank. Dominance (Dom) and Loving (lov) scores may be calculated for the ICL using arithmetical formulae devised by Leary (1957).

Measures

1. Dom score for Self
2. Dom score minus Lov score for Self
3. Dom score for Father plus Dom score for Mother

4. Dom score minus Lov score for Father
5. Dom score plus Lov score for Father
6. Dom score plus Lov score for Father, plus Dom score plus Lov score for Mother
7. Number of adjectives used to describe Self only divided by the number of adjectives used to describe all three
8. Identification Index (I.X.)
   I.X. = F.I. - M.I.
   Father Identification = F.I.
   Mother Identification = M.I.
   F.I. = a/b
      a = number of adjectives used to describe both Self and Father, but not Mother
      b = total number of adjectives to describe Self plus total number used to describe Father
   M.I. = c/d
      c = total number of adjectives used to describe both Self and Mother, but not Father
      d = total number of adjectives used to describe Self plus total number of adjectives used to describe Mother

Hypotheses

1. The candidates completing UDT training will have high Dom scores for Shlf than those failing to complete training.
2. The values obtained by subtracting the Lov score for Self from the Dom score for Self will be higher for candidates completing UDT training than for those failing to complete training.
3. The values obtained by adding the Dom score for Father plus the Dom score for Mother will be higher for candidates completing UDT training than for those failing to complete training.
4. The values obtained by subtracting the Lov score for Father from the Dom score for Father will be higher for candidates completing UDT training than those not completing training.
5. The values obtained by adding the Dom score for Father plus Lov score for Father will be higher for candidates completing

UDT training than for those who do not complete training.

6. The values obtained by adding the Dom score for Father and the Lov score for Father plus the Dom score for Mother and the Lov score for Mother will be higher for candidates completing UDT training than for those who did not complete training.
7. The values obtained by dividing the number of adjectives used to describe Self only by the number of adjectives used to describe each of the three - Self, Father, Mother - will be higher for candidates completing UDT than for those who fail to complete training.
8. Candidates completing UDT training will have higher I.X. values than those failing to complete training.

H_1 and H_2 are based on the findings of aggressiveness and correlating with successful performance in stress situations and on the assumption that the Dom score on the ICL may be related to aggressiveness.

H_3 is based on the assumption that being reared by dominate parents should allow for the learning to perform under pressure.

H_4 is based on the Freudian theory of identification that a strong and hostile father evokes identification. Further assumptions implied are that candidates more strongly identified with their father should be better able to perform under the stress of UDT training and that Dom minus Lov for father reflects the characteristics necessary for identification under the Freudian concept of identification.

H_5 is based on the approach to identification which holds that identification is evoked by a strong and nurturent father and on the assumptions that candidates more strongly identified with their father

should be better able to perform under the stress of UDT training and also that Dom plus Lov score for Father on the ICL reflects a strong and nurturent father.

H_4 and H_5 are not compatable hypotheses, but are based on opposing views of identification. They are stated positively in order to test them without accepting one view in preference to the other.

H_6 is based on the assumption that candidates from a strong and nurturent family pattern should be better able to perform under stress of UDT training and that Dom plus Lov for Father, plus Dom plus Lov for Mother on the ICL reflects a family pattern which is strong and nurturent.

H_7 is based on the assumption that candidates with a stronger concept of self as an individual will be better able to perform under the stress of UDT training and that the number of adjectives used to describe self divided by the number of adjectives used to describe all three is an indication of the strength of the concept of self as an individual. There are also the underlying assumptions that adjectives used to describe all three are the adjectives that the subjects used to describe a "common concept of humanness" and that the adjectives used to describe only Self reflect his concept of Self as an individual.

H_8 is based on the assumptions that candidates more strongly identified with the father than with the mother will be better able to perform under the stress of UDT training. Further assumptions are that the similarity of Self description and Father description on the ICL can be called identification with the father and that the similarity of Self description and Mother description can be called identification

with the mother. The function of the dominator in the I.X. is an attempt to control for the difference in the rate of adjective usage.

CHAPTER VII

RESULTS

The sample was divided into four groups: an officer-pass group (15 candidates), and officer-fail group (10 candidates), and E.M.-pass group (18 candidates), and an E.M.-fail group (83 candidates). The officer-pass group and officer-fail groups were compared on the eight measures, as were the E.M.-pass and E.M.-fail groups. The comparisons were limited to descriptive statistics.

The mean, the variance, and the sample size for each hypothesis were calculated for each group and these results are presented in Table 3. The heterogeneity of variance of this data was too great to allow the use of any inferential statistics based on a comparison of means.

The sample was recombined into two groups: a pass group (33 candidates - 15 officers and 18 E.M.'s) and a fail group (93 candidates - 10 officers and 83 E.M.'s). Since the percentage of officer passes was much higher than the percentage of E.M. passes, the data were examined to see if the officers accounted for a disproportionate amount of the difference between the pass group and the fail group. This condition was true for only one measure, H_4. The pass and fail groups were then compared by using the median test (see Siegel, 1956, pp. 111-115). A median was calculated for each of the eight measures. Then the number of passes above the median, the number of passes below the median, the number of fails above the median, and the number of fails below the median were counted. The groups were dichotomized according to those scores which exceed the median and those which did not exceed the median. Thus, scores failing at the median were placed in the latter category. A 2 x 2 contingency table

Table 3

Means, Variances and Sample Sizes

For Measures H_1 Through H_8

	H_1			H_2		
	Mean	Variance	N	Mean	Variance	N
Officers Pass	59.7	59	15	8.8	75.6	15
Officers Fail	62.1	15.9	10	10.2	34.6	10
E.M.'s Pass	58.7	356	18	9.05	130.7	18
E.M.'s Fail	57.8	111	83	6.55	73.9	83

	H_3			H_4		
	Mean	Variance	N	Mean	Variance	N
Officers Pass	125.3	194	15	16.7	218	15
Officers Fail	127.4	11	10	16.7	46	10
E.M.'s Pass	124.8	1007	18	17.11	178.3	18
E.M.'s Fail	124.5	68	83	11.1	88.3	83

Table 3 (Cont'd.)

Means, Variances and Sample Sizes

For Measures H_1 Through H_8

	H_5			H_6		
	Mean	Variance	N	Mean	Variance	N
Officers Pass	115.9	61	15	231.7	53808	15
Officers Fail	112.3	62.8	10	229.5	53155	10
E.M.'s Pass	112.9	80	18	228.4	51984	18
E.M.'s Fail	113.0	679	83	225.2	50625	83

	H_7			H_8		
	Mean	Variance	N	Mean	Variance	N
Officers Pass	32.4	4729	15	3.9	14	15
Officers Fail	22.9	2124	10	1.4	6.9	10
E.M.'s Pass	71.96	21105	18	4.2	65.9	18
E.M.'s Fail	31.5	992	83	1.0	131.2	83

with expected and obtained values for each of the measures was set up. (See Siegel, pp. 107-108, pp. 111-112 and Hays, 1964, p. 596). A chi-square test was performed to test significance.

Since the results obtained from the median tests are different from the inferences that would likely be made on the basis of the means, the 2 x 2 contingency tables are presented in Table 4 for comparison.

The measure significant at a conventional level of confidence was H_4 which was significant at the .05 level. Significant at the .3 level of confidence were H_7 and H_8. H_5 was significant at the .3 level of confidence, but not in the expected direction. Instead of the Dom score for Father plus the Lov score for Father being higher for the candidates completing UDT training, it was lower. H_6 was significant at only .4 level and all others were very near chance expectancies.

Table 4

2 x 2 Contingency Tables
For Measures H_1 Through H_8

H_1

	Above Median	Below Median
Pass	16	17
Fail	46	47

H_2

	Above Median	Below Median
Pass	18	15
Fail	44	49

H_3

	Above Median	Below Median
Pass	15	19
Fail	44	48

H_4

	Above Median	Below Median
Pass	22	11
Fail	40	53

H_5

	Above Median	Below Median
Pass	13	20
Fail	49	44

H_6

	Above Median	Below Median
Pass	14	19
Fail	49	44

H_7

	Above Median	Below Median
Pass	19	14
Fail	44	49

H_8

	Above Median	Below Median
Pass	20	13
Fail	43	50

CHAPTER VIII

SUMMARY AND CONCLUSIONS

This study was an attempt to differentiate successful from unsuccessful candidates in UDT training according to their responses on the ICL. ICL data of 126 subjects were utilized. Eight hypotheses were generated based on impressions gained by the author from the literature and personal experiences. These hypotheses related to the candidate's perception of himself, his parents, and his own relationships with his parents.

The sample was divided into four groups on the basis of whether they passed or failed the training and whether they were officers or enlisted men. The mean, the variance and the sample size for each hypothesis were calculated for each group and these results were presented in Table 3. The heterogeneity of the variance did not allow the use of inferential statistics based on means.

The sample was regrouped into just two groups - a pass group and a fail group. Then medians were calculated. The resulting 2 x 2 contingency tables were presented in Table 4. Chi-square tests of significance were performed and the results reported.

The conclusions which can be drawn are limited. However, since only one of the measures was significant at a conventional level of confidence, and since other indicators of success in UDT training have been proven to be stronger predictors, it would seem that none of these measures would be recommended as additional selection criteria at this time.

In light of the present state of development of personality measures, the attempt to isolate predictive personality variables may have been either inadequate or premature. The logic developed for searching for

such personality variables still seems valid. However, the personality variables may be so subtle that the personality measures used were not sophisticated enough to detect the differences adequately. Only further research can tell us the value of personality measures in this area.

The significant measure and the three which tended toward conventional significance may serve as indicators of the directions in which further research should go. H_4 based on the Freudian theory of identification that a strong and hostile father evokes identification was significant at .05 in a positive direction. H_5 based on the approach that a strong and nurturent father evokes identification, achieved significance at the .3 level in a negative direction. Thus, perhaps interpersonal relationships with the father during childhood should be the objective of additional reserach. Also supporting this idea is the fact that H_8, based on candidates being more strongly identified with the father than the mother also achieved a significance of .3 as did H_7 based on strength of self-concept. Self-concept is another area probably worth further consideration, particularly its connection with paternal relationships.

Thus the areas which seem most promising for further research in light of the formulation developed here and the results of this study are interpersonal relationships with the father during childhood, or identification, and strength of self-concept as a distinct person.

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