

THE RELATIONSHIP OF ANXIETY, REPORTED ABILITY TO
SWIM, AND A PERCEPTUAL-MOTOR SKILL

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CHAPTER I

PRESENTATION OF THE PROBLEM

Introduction

Psychologists spend much of their time measuring and assessing the complex factors which describe human behavior. Perhaps no other human characteristic is as pervasive, while at the same time experimentally difficult to manipulate, as that of anxiety. For centuries the concept of anxiety was generally recognized in literature, philosophy, and religion, but not until recent years has research been directed toward the discovery of more precise definitions of anxiety and its behavioral correlates.

Of the many tests used to measure anxiety, the Taylor Manifest Anxiety Scale (MAS) is one of the most popularly used. Its value as a measuring instrument of anxiety for adults has been demonstrated repeatedly in experimental research and clinical studies.

The anxiety of an individual in relation to his performance ability is an area that has received much attention by investigators. In some cases it appears that performance may be enhanced by a certain amount of anxiety and, in other cases, handicapped. There is certainly a wide range of performance tasks available for investigation which have

not yet been thoroughly explored, such as various motor skill tests, participation and competence in athletic activities, and ability to perform well in certain lines of work.

The MAS is being used more and more in an attempt to relate the concept of anxiety to performance ability. It is in the area of this problem which the present study is concerned.

Statement of the Problem

The problems relevant to this study are concerned with the effect of specific performance criteria on the MAS. The purpose of the study is to determine if MAS scores are related to the following:

- (1) a subject's inability to swim
- (2) a subject's performance on a pursuit rotor task
- (3) the effects of an interaction of these criteria.

Background Knowledge and Theory

Almost fifty years ago, Freud singled out anxiety as the crucial problem of emotional and behavioral disorders. His proposition has been substantiated with the further development of psychotherapy. Today it is recognized on all sides that anxiety is much more prevalent than was suspected five decades ago. Symonds noted that "it would surprise most persons to realize how much of their behavior

is motivated by a desire to escape anxiety by either reducing it or disguising it in one way or another" (8, p. 138).

Anxiety is a universal human experience and, in moderate degrees, is a mechanism of self-preservation. As a state of apprehension that alerts the organism to danger, anxiety is necessary for survival, and, as a protective device, anxiety is analagous to pain, which also is a warning of danger. Both pain and anxiety can be destructive, in that both can pervade everything that an individual thinks, feels, and does (7).

When anxiety becomes excessive, it not only impairs mental functioning, but disrupts the physiologic functioning of the entire organism (7). Anxiety is associated with the same physiologic concomitants as fear, although there are some important basic differences. Fear is defined as an emotional response to a known identifiable danger that is accompanied by physiologic alterations that prepare the organism for fight or flight. In contrast, anxiety is the emotional response to an unidentifiable threat to something in the core or essence of the personality. Certain organismic changes may accompany anxiety, but rather than serve a constructive function, they may become the basis of neurotic or psychotic illness by the development of defense mechanisms that serve to reduce the anxiety (7).

A person experiences various fears on the basis of a security pattern he has developed; but in anxiety it is the security pattern itself which is threatened (7). No matter how great a fear may be, it is experienced as a threat which can be located and to which some adjustment can be made. What is important is the relationship of the person to the feared object, and if the object can be removed by reassurance or by flight, the apprehension disappears. This is not the case with anxiety, since it attacks the foundation, or essence, of the personality. The individual cannot identify the threat or objectively describe it and, therefore, is powerless to cope with it.

Freud (3), in the latter formulation of his evolving theory of anxiety, viewed anxiety as a danger arising within a person. The function of anxiety is to warn the person of impending danger; it is a signal to the ego to flee the threatening region or attack the threatening object. But because the source of danger originates from within, the person cannot flee or attack a physical object and must resort to the use of psychological defense mechanisms. Freud thought that anxiety aroused man to prevent the recurrence of the painful experience.

Throughout the individual's infancy, childhood and adolescence, attitudes of disapproval from the parents are an

important source of anxiety. According to Karen Horney, anxiety is

. . . the feeling a child has of being isolated and helpless in a potentially hostile world. In general, anything that disturbs the security of the child in relation to his parents produces basic anxiety. (4, p. 41)

She also found that the insecure, anxious child develops various strategies with which to cope with his feelings of isolation and helplessness (4). If a child cannot get love, he may seek to obtain power over others, compensate by becoming highly competitive and independent, or turn his aggression inward and belittle himself.

Horney was also concerned with the possible neurotic or irrational solutions to problems involving disturbed human relationships. Among these was a need to restrict one's life within narrow borders and to remain inconspicuous. Horney pointed to another need from which inner conflicts develop, the need for perfection. A person exhibiting such a need fears mistakes and is afraid of being criticized.

Modern interpretations of anxiety have included studies of the physiological factors and cultural patterns. In summing the various theories, two kinds of anxiety have been suggested to exist, the central, "free-floating" anxiety and peripheral anxiety (7). Central anxiety, which originates in early life and permeates the personality, is based primarily on unconscious processes of which the

individual is usually unaware. This generalized type of anxiety may be manifested as a diffuse emotion, not associated with any particular experience such as a phobic reaction or a psychosomatic symptom. Peripheral anxiety, however, is related to more recent experiences and situations such as employment, finances, and domestic problems. Obviously, in many instances there will be no clearcut distinction between these two types of anxiety.

The sources of peripheral anxiety are largely determined by the same patterns as the superego (7). As the conscience develops, conflicts arise between the instinctive needs and the restrictions and inhibitions imposed by the conscience. The conscience then assumes the approval-disapproval function previously exerted by the parental figures. This internal censor precipitates guilt feelings about forbidden sexual and aggressive impulses.

Normal anxiety is an apprehensive reaction which threatens the integrity of the individual. The most outstanding characteristic of normal anxiety is that it can be managed by constructive activity and does not necessitate repression or other mechanisms for its solution. However, extremely high or neurotic anxiety is disproportionate to the threat, and, if the conflict situation cannot be solved by constructive action, one of the various defense mechanisms may be used, such as avoidance of situations.

Goldstein (5), in providing a biological base for anxiety, explains why such avoidance takes place. He denies that an organism can be understood as being made up of various "drives," the blocking of which results in anxiety. He asserts that the only primal need of an organism is to make its environment adequate to itself by actualizing its own nature. An inadequate organism may seek to shrink its world to that for which its capacities are adequate, thus avoiding the catastrophic situation.

Whatever the source of anxiety, it is apparent from the above theories that it is generally believed that individuals seek to avoid it in their everyday behavior. For example, an individual may turn away from unpleasant sights, refuse to discuss unpleasant topics, or refuse to face unpleasant situations. He may procrastinate or become too busy with other matters to face his real problems. Thus, by ignoring or denying unpleasant reality, the individual is able to protect himself from stress temporarily (2). Individuals who are highly anxious will attempt to avoid anxiety in many different situations because of a fear of failure. Various studies (to be discussed in Chapter II) have shown that highly anxious individuals of a neurotic type do not participate in many activities in which individuals functioning at a normal level of anxiety are commonly involved.

One area with which this study is concerned is that of sports. In light of the existing theories of anxiety, it is assumed that most individuals who do not participate in sports, such as swimming, do so because they are highly anxious individuals who avoid this situation for fear of failure. The sport of swimming was chosen for investigation because it is a skill which almost everyone today has an opportunity to learn at one time or another by the time he reaches adulthood.

Under severe stress there is a narrowing of the perceptual field and increased inefficiency in performance in general. As a consequence, it is difficult and often impossible for the individual with a high level of anxiety to interpret or function in many situations. As anxiety increases beyond a minimal level, reasoning, problem solving, and adaptive efficiency progressively decrease (2). In work records in business and industry these reactions show up in inconsistency of performance and lowered efficiency. Anxious subjects also generally do less well on such tasks as digit-symbol substitution and digit recall (6).

Spence, Farber, and Taylor (1) suggest that individuals who are relatively anxious may become much more anxious under stressful conditions such as a testing situation. There is some indication that this is a valid statement,

and that low anxiety subjects are better performers on various intellectual and motor tasks.

It is to be expected, therefore, that subjects who perform poorly on tasks such as a visual-motor skill test may be more anxious than those who perform well. The lowered efficiency of these subjects should evidence itself in higher anxiety scores obtained with a reliable measure of anxiety.

Hypotheses

From the assumptions drawn by the investigator after examination of the pertinent theory and background material in the area of anxiety and performance, three hypotheses have been formulated.

(1) Subjects who report that they do not swim or swim very little score significantly higher on the MAS than subjects who report that they are average swimmers or swim very well.

(2) Subjects who perform poorly on the pursuit rotor task score significantly higher on the MAS than those who perform well on the pursuit rotor task.

(3) With respect to anxiety scores, there is an interaction between perceptual-motor coordination and an individual's reported ability or inability to swim.

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CHAPTER II

RELATED STUDIES

The Taylor MAS has been used widely as a measure of anxiety. Since the items used in the scale were obtained from the Minnesota Multiphasic Personality Inventory (MMPI), the validity of the Taylor scale tends to rest with the validity of the MMPI. Several validation studies (2, 3, 4) have tended to support the validity of the Taylor scale. Spence (9) argued for the construct validity of the MAS as an operational definition of "manifest anxiety," which is now renamed "emotionality" or "emotional reactivity."

Whiting and Stembridge (11) made an extensive study (N = 1,540) of the personality characteristics of the persistent non-swimmers. Two categories of students were tested: (1) those who had received previous instruction and were still unable to swim, and (2) those who had never received previous instruction. Junior Maudsley Personality Inventories were given to eleven and twelve year old boys in a variety of secondary schools.

Whiting and Stembridge felt that among the student non-swimmers, those who had received previous swimming

instructions and were still not able to swim, there were personality characteristics present which influenced their ability to swim. Subjectively, they thought a degree of introversion might be suggested, particularly exemplified by lack of confidence in themselves, fear of the water, social inhibition, and lack of persistence in initial attempts to swim. The results of the study revealed that the really persistent non-swimmer is likely to be more introverted than swimmers from the same population. In addition, highly significant differences in neuroticism scores between non-swimmers and swimmers were indicated.

Ryan and Kovocic (7) used heat and gross pressure to induce pain in an effort to determine the relationship between pain response and athletic participation. The pain response was defined by the pain threshold and pain tolerance levels of three groups of subjects: contact athletes, non-contact athletes, and non-athletes. From observations of everyday experiences in athletics, it was expected that the ability to withstand pain should be related to participation in certain types of athletic events. In many sports the ability to withstand pain appears to be essential to successful performance. A highly significant difference was found between groups on pain tolerance. Contact athletes tolerated more pain than non-contact athletes, who in turn tolerated more pain than the

non-athletes. Correlations between the two measures of pain tolerance was .82.

In another study concerned with the relation between pain tolerance and personality characteristics, Beecher (1) and Lambert (5) analyzed the factors which influence the amount of pain an individual can tolerate. They found that prominent factors were fear, anxiety, and desire for group membership.

Spence, Farber, and Taylor (10) found low-anxiety subjects to be better performers on a complex finger maze. The investigators concluded that persons who scored high on the MAS were individuals who become anxious or over-react emotionally when tested in complex or unusual situations though they are not especially anxious when performing simple, familiar tasks. Rosenbaum (6) supported these conclusions, and Sheppard and Abbey (8), using the Toronto Complex Coordinator, showed similar results in respect to performance on a complex perceptual-motor task.

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CHAPTER III

PROCEDURE

Subjects

The subjects used in this study were 48 male and female students, ranging in age from 17 to 22 years. They were selected from a group of 264 students enrolled in freshman psychology courses at North Texas State University.

Materials and Apparatus

In order to establish whether the subjects were swimmers or non-swimmers, it was necessary to administer an Athletic Skills Questionnaire (see Appendix, p. 31) to the original group of students. The questionnaire yielded a measure of each subject's ability or inability to swim. A self-report questionnaire was used in preference to performance tests because of the lack of facilities available to test performance in swimming.

The Taylor MAS (1) was the principal measuring instrument used in this study. The Taylor scale was derived from approximately 200 items of the MMPI. These items were submitted to five judges, and fifty items that at least four judges agreed reflected manifest anxiety were retained in the Taylor scale. The group upon which the test was

standardized included 1,971 students at State University of Iowa. The test-retest coefficient for the scale was found to be .82 over a five month period and .81 for a period of nine to seventeen months (1).

The Taylor scale, made up of fifty true-false statements related to manifest anxiety, is administered under the title of Biographical Inventory. The subject is instructed to answer true to those items which he feels accurately portray him, and false to those which do not apply to him.

A pursuit rotor apparatus, providing a complex task involving eye-hand coordination, was used to determine psycho-motor ability. A timer was attached to the apparatus, which registered the total amount of time that a subject stayed in contact with the target.

Method

Before the formal collection of data, the investigator administered the Athletic Skills Questionnaire to twenty-six students in an undergraduate psychology course. When the results were analyzed, it was found that five girls and only two boys were classified as non-swimmers. In light of these results, a matched groups design was chosen to control the possible extraneous influence of the sex variable.

A second pilot study was conducted in order to establish a cut-off time to differentiate high and low performances on the pursuit rotor task. A non-random group of twenty students (eleven males and nine females) performed the pursuit rotor task for three practice trials and five timed test trials, and a median time of 64.39 seconds was obtained. In view of these results, subjects scoring 65 seconds or above on the pursuit rotor task during the study were included in the high performance groups, while subjects scoring below 65 seconds were included in the low performance groups.

The actual experimental procedure involved two stages. In the first stage, the swimmer and non-swimmer designation was determined, and in the second stage, both the pursuit rotor task and the MAS were administered. All tests were administered by the investigator.

Initially, each student in the original subject group was asked to check appropriate answers on a six question Athletic Skills Questionnaire, the nature of which was discussed earlier in this chapter. The subjects were given the following instructions:

This questionnaire is concerned with your athletic abilities. For each question there are four possible answers. You should check the answer which best indicates your present ability to perform each skill.

Of the six questions, only the question "do you swim?" was relevant to the study. In response to this question, subjects who checked answers (a) "not at all" or (b) "not very well" were designated as non-swimmers. Similarly, subjects that checked (c) "average" or (d) "very well" were designated as swimmers.

In performing the pursuit rotor task, subjects were asked to stand in front of the apparatus and hold the stylus loosely in their dominant hand. The subjects participated in three practice trials and five timed test trials with the turntable speed set at forty-five revolutions per minute. One trial consisted of a twenty-second interval during which the turntable rotated at the designated speed, and was followed by a twenty-second intertrial interval during which the turntable did not rotate. While the turntable rotated, the subjects were to try to maintain contact with the target, a small metallic disc on the surface of the turntable. The total time that a subject stayed on target was recorded at the end of the five test trials.

In administering the MAS, the following directions were given:

This test consists of fifty true-false statements. If a statement describes you more than it does not describe you, place a T by the statement. If the statement does not describe you, place an F by the statement.

The results obtained were scored according to instructions outlined by Taylor (1).

Statistical Treatment

Since the subjects in this investigation were classed on the basis of pursuit rotor performance and ability to swim, analysis of variance was used in order to test the separate and interactive effects of these variables on anxiety scores. A two-by-two design was used, presenting two levels of swimming ability and two levels of performance on the pursuit rotor task. Anxiety scores constituted the dependent measure. Twelve subjects were placed in each cell, with equal numbers of males and females in each cell.

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CHAPTER IV

ANALYSIS OF DATA

Results

The results did not confirm the hypothesis that subjects who report that they do not swim or swim very little score significantly higher on the MAS than subjects who report that they are average swimmers or swim very well. Nor was the second hypothesis, that subjects who perform poorly on the pursuit rotor task score significantly higher on the MAS than those who perform well on the pursuit rotor task, supported by the results. However, an interaction between these two variables was obtained which was significant at the .05 level. The results of the analysis of variance procedure are illustrated in Table I.

TABLE I
SUMMARY OF ANALYSIS OF VARIANCE FOR REPORTED ABILITY
TO SWIM AND A PERCEPTUAL-MOTOR SKILL

Source of Variation	Sum of Squares	df	Mean Squares	F	P
Between Swim	140.0820	1	140.0820	2.095	N. S.
Between Performance	14.1832	1	14.0832	.211	N. S.
Interaction	252.0840	1	252.0840	3.771	.05
Within	2941.6668	44	66.8560
Total	3347.9170	47

The interaction effect between swimming ability and performance, as shown in Figure 1, indicates that individuals who are high performers, regardless of their swimming ability, do not differ a great deal in anxiety scores. The low performing individuals, on the other hand, differ considerably on anxiety scores, depending on whether they are swimmers or non-swimmers.



Fig. 1. Interaction between pursuit rotor performance and ability to swim.

To determine whether these differences between high performing swimmers and non-swimmers, and between low

performing swimmers and non-swimmers, were significant differences, t-tests were computed for each of these relationships. The results of these tests, expressed in Table II, indicate a significant difference between swimmers and non-swimmers at a low performance level, but not between swimmers and non-swimmers at a high performance level.

TABLE II
MEANS AND TESTS OF SIGNIFICANCE FOR HIGH PERFORMING SWIMMERS AND NON-SWIMMERS AND FOR LOW PERFORMING SWIMMERS AND NON-SWIMMERS

Group		Mean	<u>t</u>	P
High Performance	Swimmers	16.583	.44	N. S.
	Non-Swimmers	15.417		
Low Performance	Swimmers	12.083	2.33	.05
	Non-Swimmers	21.083		

Discussion

Although no relationship was established between performance and anxiety or between ability to swim and anxiety, the interaction which was found to exist has meaningful implications regarding both performance and swimming ability in relation to anxiety. The fact that the high performing individuals' anxiety scores did not differ significantly between swimmers and non-swimmers might be accounted for by the theory that individuals who are more skilled, either

by nature or by training, are not affected by anxiety in the same way as those who are lacking in such performance skills. That is, the individuals who do not perform as well are more influenced by a high level of anxiety and, for various defensive reasons, do not participate in activities such as swimming.

On the basis of these results, it is concluded that more notice should be taken of the personality of the non-swimmer and his perceptual-motor abilities if better and quicker results by swimming instruction are to be achieved. It seems likely that a person with poor visual-motor coordination, who is also highly anxious, may perceive his early experiences in water as distressful and possibly harmful. The swimming methods in general use now are not the most suitable for dealing with such individuals. Perhaps a better method could be devised which would be aimed at overcoming these handicaps encountered by the non-swimmer.

There is contradictory evidence concerning the effect that anxiety has on performance tasks. While Farber and Spence (5) have found that the performance of anxious subjects was significantly poorer than that of non-anxious subjects, the findings reported in this study agree with those of Axelrod, Cowen, and Heilizer (1), who did not find such a relationship to exist. It appears that anxiety, in some instances, may serve as drive or motivation

to perform well, rather than serve as a detriment to performance. This may have been the case in the present study, at least for some of the subjects. Further research in this area is needed in order to identify situations in which anxiety acts as a motivation or a hindrance to an individual's performance.

The fact that a significant difference in anxiety scores was not found to exist between swimmers and non-swimmers may have been due to the tendency of some subjects to give socially desirable responses to self-rated personality items, regardless of their content. Such a tendency may have manifested itself on the Athletic Skills Questionnaire, resulting in distorted reports of the subjects' ability to swim. Had the facilities been available, a swimming performance test might have been a superior criterion to that of the athletic inventory.

Although the MAS is one of the most widely used anxiety scales, there still exists the problem of discovering, defining, and measuring the unitary anxiety or anxieties which may exist. Spence (4) has argued for the construct validity of the MAS as an operational definition of "manifest anxiety," while Eysenck (3) regards anxiety as a combination of both introversion and neuroticism. On the other hand, Cattell (2) has found anxiety, neuroticism, and extroversion to be three relatively independent

personality dimensions and has published inventories for the measurement of both neuroticism and anxiety.

In the task of defining anxiety positively, it will be necessary to discover in what ways anxiety can be distinguished from such contaminating factors as neuroticism, extroversion, and stress, to name a few. Until this problem of instrumentation is solved, psychologists will be attaching "anxiety" to a scale for which much variability is still unaccounted.

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CHAPTER V

SUMMARY

To investigate the influence of an individual's inability to swim, performance on a pursuit rotor task, and the interaction of these criteria on MAS scores, an Athletic Skills Questionnaire was administered to 264 freshman students enrolled in freshman psychology courses at North Texas State University. From these students, 48 males and females were selected, being matched on sex and classified according to ability to swim and pursuit rotor performance. Analysis of the MAS scores revealed that neither ability to swim nor pursuit rotor performance had a significant influence on anxiety. However, it was found that the interaction of these criteria was significant at the 5 per cent level ($F = 3.771$). Another relationship, also significant at the 5 per cent level, was found to exist between swimmers and non-swimmers who performed poorly on the pursuit rotor task ($t = 2.33$).

It was concluded that anxiety, in some instances, may serve as drive or motivation to perform well rather than as a detriment to performance, as was hypothesized. It was also concluded that individuals who are more skilled

in perceptual-motor performance, either by nature or by training, are not influenced by anxiety in the same way as those who are lacking in such performance skills. The individuals who do not perform as well are influenced more detrimentally by a high level of anxiety than skilled individuals.

It was suggested that more notice should be taken of the personality characteristics and the perceptual-motor ability of the non-swimmer if progress is to be made in teaching him to swim. The methods now in use for teaching such individuals to swim may be highly ineffective in light of this evidence.

In the future it will be necessary to discover how anxiety can be distinguished from other contaminating factors. Until this is done and the concept of anxiety is adequately defined, results of studies using various anxiety scales may be distorted by the variability within the scales.

APPENDIX

ATHLETIC SKILLS QUESTIONNAIRE

1. Do you bowl?
(a) Not at all _____ (b) Not very well
(c) Average _____ (d) Very well
2. Do you fence?
(a) Not at all _____ (b) Not very well
(c) Average _____ (d) Very well
3. Do you play tennis?
(a) Not at all _____ (b) Not very well
(c) Average _____ (d) Very well
4. Do you swim?
(a) Not at all _____ (b) Not very well
(c) Average _____ (d) Very well
5. Do you dance?
(a) Not at all _____ (b) Not very well
(c) Average _____ (d) Very well
6. Do you play baseball?
(a) Not at all _____ (b) Not very well
(c) Average _____ (d) Very well

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