THE EFFECTS OF "GAME" AND "TEST" INSTRUCTIONS ON THE WISC-R
PERFORMANCE OF HIGH- AND LOW-TEST ANXIOUS CHILDREN

THESIS

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The purpose of this study was to investigate the effects of "game" and "test" instructions on the intelligence test performance of high- and low-test-anxious children. Eighty-one subjects diagnosed as learning disabled were given the Test Anxiety Scale for Children (TASC) to determine their level of test anxiety. Based on TASC scores, 44 subjects were classified as either high- or low-test-anxious. These subjects were given the Wechsler Intelligence Scale for Children-Revised (WISC-R) using either game or test instructions to introduce the test. The resulting IQ and subtest configuration scores were used to compare high- and low-test-anxious subjects by the type of instructions they received prior to testing. This comparison yielded no significant differences between high- and low-test-anxious subjects, indicating that the way the WISC-R is introduced does not play a significant role in the WISC-R performance of high- and low-test-anxious children.
CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

In school settings, there is an increasing reliance on educational and
cognitive tests to help determine the future placement of students. School
psychologists use psychometric devices as key instruments in their
assessment process. Because the information they obtain from these tests
is so important to a student's future, the information needs to be accurate
and fair. However, there is a potential detractor from the validity of the
test results, and that is test anxiety (Sarason, Lighthall, Davidson, Waite, &
Ruebush, 1960).

Test anxiety, often cited as the most common source of emotional
distress in school-aged children (Barrios, Hartmen, & Shigetomi, 1981), may
be seriously debilitating for a student. Students with high test anxiety
have been found to perform more poorly on tests than their low test-anxious
counterparts (Gjesme, 1982; Sarason, 1963; Sarason & Mandler, 1952;
Holroyd, Westbrook, Wolf, & Badhron, 1978). Because intelligence tests may
play an important role in a child's school curriculum, it is imperative that
any debilitating factors of test performance on these tests be minimized.
The current study explored the effects of using "game" instructions and "test" instructions when introducing the Wechsler Intelligence Scale for Children-Revised (WISC-R) to high- and low-test anxious children who have been diagnosed as learning disabled. The intent of this study was to demonstrate the relationship between the type of test introduction used and the presence or absence of test anxiety. Such a relationship would hold direct implications for future testing with the WISC-R and other diagnostic tests.

**Definition of Test Anxiety**

Anxiety has been defined as a response to perceived danger in which an individual feels incompetent and expects failure (Sieber, 1980). While anxiety may be an adaptive mechanism that forewarns humans of possible dangers and triggers coping responses, in its non-adaptive mode it can elicit "incompetence and extreme and lasting misery" (Sieber, 1980, p. 18).

Specifically, test anxiety has been defined as an unpleasant feeling or emotional state that is accompanied by physiological and behavioral changes and that occurs in evaluative or formal testing situations (Ruebush, 1963; I. G. Sarason, 1975; Spielberger, 1966; Wine, 1971). The experience of test anxiety involves a variety of cognitive and attentional processes that
interfere with effective and successful task performance (Hill, 1972; Wine, 1971).

Theories of Test Anxiety

Drive-Oriented Approaches

Mandler and S. Sarason (1952) developed a theory of test anxiety by way of explaining the effects of anxiety upon intelligence test performance. The basis of their theory was the Hull Drive-Reduction Theory. Hull’s theory postulated that under the impetus of need or drive, an organism will act in such a way as to bring about a reduction of the particular need or drive. Mandler and S. Sarason postulated that anxiety evoked two types of drives: learned task drives and learned anxiety drives. Learned task drives may be elicited in response to any task an individual may encounter. The response to this drive is behavior which facilitates task completion, leading to eventual drive reduction.

Learned anxiety drives may be elicited in response to test situations. The anxiety drive leads to two types of responses: task-relevant responses and task-irrelevant responses. Task relevant responses function similarly to learned task drives in that both result in effective task completion.
Conversely, task-irrelevant responses interfere with successful task performance. These task irrelevant responses are "manifested as feelings of inadequacy, helplessness, heightened somatic reactions, anticipation of punishment or loss of status and esteem, and implicit attempts at leaving the test situation" (Mandler & S. Sarason, 1952, p. 166).

In a study done by Doris and S. Sarason (1955), the negative internal attributions associated with task irrelevant responses were demonstrated. They found that high-test-anxious individuals were more likely than low-test-anxious individuals to attribute responsibility to themselves for task failure.

In their study, 28 high-test-anxious subjects and 28 low-test-anxious subjects were selected on the basis of the Test-Anxiety Questionnaire. The subjects were presented with eight performance items taken from various standard intelligence scales. The situation was arranged so that either by manipulation of the time limits or reference to purported norms, the subject would pass four and fail four of the tests.

After success or failure on each test, subjects were asked to rank in order of relevance some items that might have contributed to their success or failure. The items included "self-blame" and "other-than-self" blame items.
for the failed tests, and "self-credit" and "other-than self" credit items for the passed tests. The high-test-anxious subjects blamed themselves for test failure to a significantly greater extent than the low-test-anxious subjects (p < .001).

Wine (1980) noted that the emphasis of Mandler and S. Sarason's theory upon the negative, self-centered responses of test anxious individuals has been adopted into the more current cognitive formulations of test anxiety theory. Indeed, this theory of test anxiety provided impetus for much of the related research that followed.

Spielberger's (1966) state-trait anxiety theory was also based on a theory of drive reduction. Spielberger identified two types of anxiety: state anxiety and trait anxiety. State anxiety (A-State) was defined as a "...transitory emotional state or condition of the human organism that varies in intensity and fluctuates over time... characterized by subjectively, consciously perceived feelings of tension and apprehension and activation of the autonomic nervous system" (Spielberger, 1972a, p. 39).

Conversely, trait anxiety (A-Trait) referred to "...relatively stable differences in anxiety proneness, that is, to differences in the disposition to perceive a wide range of stimulus situations as dangerous or threatening,
and in the tendency to respond to such threats with A-State reactions" (Spielberger, 1966, p. 39).

Spielberger (1972b) viewed test anxiety as a situation-specific form of trait anxiety. Within this context, high-test-anxious individuals were thought to respond to testing situations with higher elevations of state anxiety than low-test-anxious individuals.

As in Mandler and S. Sarason's theory of test anxiety (1952), the components of self-centered worry and physiological responding were thought to be present during evaluative situations. However, Spielberger theorized that the decrements in performance associated with test anxiety arose more from the high drive level of the A-State reactions than from cognitive self-worry (Spielberger, Anton, & Bedell, 1976).

Thus, the state of increased drive results in task-generated interference in high-test-anxious-individuals. This State -Trait theory is rooted primarily in the Spence-Taylor drive reduction theory (Spence & Spence, 1966), placing greater emphasis on the emotional rather than the cognitive components of test anxiety.

It has been demonstrated that high state anxiety interferes with short-term memory and problem-solving. Gross and Mastenbrook (1980)
conducted a study in which 33 college-aged subjects were given the State-Trait Anxiety Inventory (STAI). Subjects were divided into groups of high, medium, and low anxiety. After two practice trials, each subject was presented with six problem-solving tasks; completion of the tasks consisted of choosing the stimuli card that contained the experimenter defined answer to a problem.

The results showed that high state anxious subjects solved significantly fewer problems than the other groups. Several other studies also show that high state anxiety is associated with decrements in test performance (Leherissey, O'Neil, & Hansen, 1971; Sieber, Kameya, & Paulson, 1970). However, empirical support for the hypothesized relationship between A-Trait and A-State has been mixed (Heinrich, 1979; Van der Ploeg, 1979).

**Worry - Emotionality Conceptualization**

With the conceptualization of worry and emotionality as two separate components of test anxiety, Morris and Liebert (1967) put into effect a new approach to studying test anxiety. Previously, these two aspects of test anxiety had been grouped together under Mandler and S. Sarason's test anxiety theory (1952) as task-irrelevant responses to evaluational stress.
Morris and Liebert (1967) referred to worry as cognitive concern over one's performance, such as thinking about the consequences of failure, doubting one's own ability, negative self-evaluation, and comparing one's own ability to others. Emotionality referred to self-perceived increases in autonomic arousal and physiological changes, such as sweating, an upset stomach, and/or a racing heart. Because of the complex nature of the emotionality component of test anxiety, different assumptions regarding its role have been made. There appear to be two main hypotheses about the relationship of emotionality or physiological responding to test anxiety that are stated either implicitly or explicitly in most theories of test anxiety (Holroyd & Appel, 1980).

Some theorists hypothesize a direct relationship between emotionality and anxiety. For example, Spielberger, Anton, and Bedell (1976) have suggested that high levels of physiological arousal and feelings of apprehension trigger cognitive ruminations and error tendencies that disrupt test performance. Thus, Spielberger et al. (1976) assume that emotionality plays a central role in both the performance deficits and cognitive ruminations associated with this state. Similarly, Epstein (1972) argues that "almost all the phenomena attributed to anxiety are actually consequences of arousal" (pp. 307-308).
Other conceptualizations of test anxiety hold that the test anxious component of emotionality bears little relationship to individual differences of test performance. These theories place emphasis on the worry responses as opposed to the autonomic activity elicited by testing situations (Mandler, 1972; Sarason, 1975, 1978; Wine, 1971, 1978).

While many studies have found significant physiological changes in individuals as a response to evaluational stress (Bliss, Migeon, Branch, & Samuels, 1956; Powell, Eidsorfer, & Bogdonoff, 1964; Schnore, 1959; Smith & Wenger, 1965; Tucker, Antes, Stenslie, & Barnhardt, 1978), individual differences in these responses between high- and low-test-anxious individuals in test situations has not been substantiated.

In one study (Holroyd, Westbrook, Wolf, & Badhorn, 1978), 36 female college students scoring in the upper quartile on the Test Anxiety Scale were identified as high-test-anxious, and 36 female college students scoring in the lower quartile were identified as low-test-anxious. The heart-rate and skin resistance of these students were continuously monitored as they completed two performance tasks in a test situation.

The first task was a modified version of the Stroop Color-Word task in which the subject was presented with six sheets of paper, each
containing 21 words randomly arranged on different colors. The subject was required to identify the first letter of the color each word was printed on as rapidly as possible.

The second task consisted of eight difficult anagrams. An anagram is a word made by transposing the letters of another word. Following completion of these tasks, the subjects filled out several self-report measures. Both self-report and performance measures indicated that the examination situation successfully evoked evaluative stress in the high-test-anxious subjects. High-test-anxious subjects reported experiencing significantly higher levels of anxious arousal and had significantly lower test scores than the low-test-anxious subjects. However, differences in reported anxiety and test performance were not accompanied by corresponding differences in autonomic reactivity. High- and low-test anxious individuals showed virtually identical changes in skin conductance level and heart rate responses as revealed by an analysis of variance. Only heart-rate variability, which seemed to reflect differences in attention and cognition of the test anxious subjects, was able to successfully differentiate high- and low-test-anxious women.

Darley and Katz (1973) presented 20 fifth grade boys with a difficult counting task while continuously monitoring their heart-rate with EKG
electrodes. The task involved guessing how many objects were present on each of a series of slides. First, the task was presented as a guessing game. Next, the task was presented as a test. After completing the tasks, the subjects were given the Test Anxiety Scale for Children (TASC).

A mixed two-way analysis of variance design was used to compare the subjects' average heart-rate before and after receiving differential task instructions. Results showed significant acceleration of heart-rate in the test condition and significant deceleration of heart rate in the game condition. However, scores on the TASC were not significantly correlated with heart-rate.

Mandler and Kremen (1958) conducted a study in which the Manifest Anxiety Scale, Body Perception Scale, and the Autonomic Perception Questionnaire (APQ) was administered to 45 subjects. On the APQ, subjects rated the extent to which their experience of anxiety was accompanied by perceptions of changes in heart-rate, perspiration, temperature, respiration, gastrointestinal sensations, muscle tension, and facial flushing.

The 19 highest scoring subjects and 13 lowest scoring subjects were then exposed to a stress situation involving three extremely difficult tasks:
a logical reasoning test, a vocabulary test, and a verbal maze task. Subjects were told that the tasks were standardized intelligence tests which should present no difficulty to the average college student. While performing the tasks, a six-channel polygraph test was used to obtain measures of autonomic activity in the subjects.

As in the previously mentioned studies, results from this study indicated that actual autonomic activity was unrelated to test performance. Interestingly, however, subjects' overestimation of their autonomic arousal during tests was correlated with poor test performance ($r = -.27$) and was enhanced when autonomic activity was held constant ($r = -.45$). Mandler and Kremen (1958) have suggested that preoccupation with autonomic activity may serve as a distractor in test-taking situations, but actual autonomic responsivity "is not a necessary antecedent to preoccupation with autonomic events" (p. 395).

In the foregoing studies, a relationship between test anxiety and emotionality was not observed. While high-test-anxious individuals consistently reported higher levels of autonomic arousal, the actual tonic level of autonomic activity that was monitored could not be reliably differentiated from low-test-anxious individuals on the basis of
physiological response. Likewise, test performance was associated with self-reports of worry and arousal, but were unrelated to actual autonomic arousal. Thus, individual differences in test anxiety were not found to be related to differences in autonomic arousal in an examination situation.

These results may be interpreted in different ways. One may assume that the symptoms of test anxiety and the associated performance deficits result more from the way emotionality is perceived than from actual high levels of autonomic arousal (Holroyd & Appel, 1980). Others may perceive cognitive processes such as self-preoccupation and self-awareness as playing a role in the self-reports of increased autonomic arousal during test taking (I. Sarason, 1975). Finally, performance differences may be influenced by the individual's cognitive response to the autonomic feedback (Bandura, 1977). That is, test anxious individuals may perceive symptoms of autonomic arousal as confirmation of their inability to cope in evaluative situations.

While emotionality may not be consistently related to test anxiety and test performance, the worry component of test anxiety generally is. The following studies demonstrated that worry factors were elevated under evaluative stress and are inversely related to performance, suggesting that they may interfere with performance.
Morris and Liebert (1970) conducted a two-part study to determine the relationship of the worry and emotionality components of test anxiety to performance expectancy and test scores. In study I, 95 college students were asked to record their pulse rates in four different time periods and immediately preceding a test. Subjects then completed a 10-item questionnaire composed of 5 worry items and 5 emotionality items taken from the Test Anxiety Questionnaire. Subjects were also asked to rate how well they expected to do on an examination.

In study II, 91 high school seniors were used as subjects. This study replicated study I except that pulse rate was taken after the questionnaire by some of the students and before the questionnaire for the others.

In study I, worry, but not emotionality formed an inverse relationship with test performance. In study II, both worry and emotionality were inversely related to performance. In both study I and study II, worry and emotionality were negatively correlated with expectancy. And in both studies, worry and emotionality were significantly correlated with each other, sharing considerable variance. Partial correlations done in both studies revealed that when the common variance between worry and emotionality was controlled, worry was negatively correlated with
examination scores, but emotionality was no longer significantly related to examination scores.

Doctor and Altman (1969) also conducted a study investigating the relationship between worry and emotionality and test performance. In their study, 159 college students served as subjects. Immediately preceding distribution of the final examination for a course, subjects were asked to complete the Test Anxiety Questionnaire which measures the worry and emotionality components of test anxiety. Subjects were also asked to rate how well they expected to do on the exam. Results showed that while worry was inversely related to performance expectations, emotionality was negatively related ($p < .01$). In addition, subjects that scored high on worry items scored significantly lower on the final exam than did students who scored low on worry items. The relationship of emotionality and test performance was more complex. At high levels of worry, emotionality was unrelated to test scores, but at low levels of worry, low-emotionality subjects scored significantly better than high emotionality subjects ($p < .05$).

Deffenbacher (1977) conducted a study investigating the relationship of worry and emotionality and test performance on the Miller Analogies
Test, a scholastic aptitude test. Subjects were 82 students. Prior to taking the test, subjects were asked to complete a 10-item Worry-Emotionality Inventory. Results showed that both worry and emotionality were negatively correlated with performance. However, when partial correlations were calculated, only worry continued to form a significant negative relationship with performance on the Miller Analogies Test ($r = -0.244, p < .05$). Subjects with high worry scores solved significantly fewer analogies correctly than subjects with low worry scores ($p < .01$). The effects of emotionality, however, varied with worry level. At low levels of worry, emotionality was unrelated to performance, but at high levels of worry, high emotionality was debilitating to test performance.

Consistent patterns of results emerged from these studies. In all of these studies, worry and emotionality were significantly correlated. Worry consistently formed a negative or inverse relationship with performance expectations and actual test performance. The findings of emotionality in relation to performance or performance expectations were not consistent. Worry accounted for more variance in relationship to performance and performance expectations. Furthermore, studies controlling the common variance show that worry forms a negative correlation with performance,
whereas emotionality no longer correlates with performance. Thus, it is the cognitive, self-preoccupation, worry component of test anxiety that interferes most directly with task performance.

A recent review of the literature (Morris, Davis, & Hutchings, 1981) corroborated the above findings and added that worry and emotionality are "...developed through different learning experiences that may or may not coincide for a given individual, and under the control of different situational stimuli that may or may not coincide in a given situation" (p. 522).

This viewpoint may account for the fact that some individuals experience worry without emotionality in evaluative settings while others experience both or neither one. In distinguishing between worry and emotionality, Morris and Liebert (1967) set a new course for research into the underlying nature of test anxiety. This line of research took the study of test anxiety from the drive-oriented approaches to the cognitive-attentional approaches of test-anxiety.

Cognitive-Attentional Theory

In Wine's (1971) literature review of test anxiety, she cited many studies that lent support to a cognitive attentional approach to test anxiety. This theory holds that the "highly test-anxious person responds to
evaluative testing conditions with ruminative, self-evaluative worry, and thus, cannot direct adequate attention to task-relevant variables” (p.99). According to this direction of attention hypothesis, as the high-test-anxious individual responds to a task with self-oriented responses, attention is directed away from the task. Consequently, a lower proportion of time is spent on the task itself and performance suffers (Wine, 1971).

This cognitive attentional theory is consistent in many respects with Morris and Liebert’s (1967) worry-emotionality conceptualization of test anxiety. Wine (1971) considered worry to be the main detractor from test performance as it is “attentionally demanding” (p.100), and interferes with task concentration. Emotionality, however, was thought to require little attention. Only individuals who consciously focus on physiological reactions will be distracted by emotionality.

A number of studies provide evidence regarding the self-preoccupation of test-anxious individuals. For example, Many and Many (1975) found that high-test-anxious individuals tend to be negatively self-preoccupied, describing themselves in self-devaluing terms on paper and pencil measures. In their study, 4,367 pupils in grades four through eight served as subjects. They were administered the Coopersmith’s Self-Esteem Inventory and the Test-Anxiety Scale for Children. There were statistically...
significant negative correlations between the measure of self-esteem and the measure of test anxiety when scores were analyzed by total group, by grade level, and by sex. Although these correlations tended to be low to moderate ($r = -.24$ to $-.42$), they were consistent in suggesting a negative relationship between self-esteem and test anxiety.

According to a study conducted by I. Sarason and Koenig (1965), high-test-anxious individuals also described themselves in self-devaluing terms in oral interview situations. In their study, 24 male and 24 female undergraduate students served as subjects. Subjects were divided into groups of high- and low-test-anxious based on their Test Anxiety Scale scores. Each subject was instructed to talk on a given topic for eight 3-minute periods. In the first two periods, the subject described him- or herself generally and him- or herself in school situations. Results showed that high-test-anxious subjects made more negative statements than did low-test-anxious subjects ($p < .025$). In addition, high-test-anxious subjects made significantly more negative self-references than were made by the low-test-anxious subjects ($p < .01$). These results replicated the findings made by I. Sarason and Ganzer (1962, 1963).
Marlett and Watson (1968) found that high-test-anxious individuals were more likely to report non-task relevant thoughts when being evaluated than low-test-anxious persons. In their study, 220 ninth grade males were administered the Albert-Haber Test Anxiety scale to determine the presence or absence of anxiety. Subjects performed a task which they were told was a measure of intelligence. The task involved finding the proper sequence in which to push four buttons. It was arranged that the subjects would not be able to find the proper sequence until the 14th trial. Subjects were told that most individuals could find the proper sequence in two or three trials. A buzzer sounded after each incorrect trial.

After the task, the subjects were asked to complete a questionnaire which was designed to measure the degree of anxiety the subject had experienced. On this questionnaire, high-test-anxious subjects acknowledged experiencing a significantly greater incidence of non-task-relevant thoughts, such as worrying about their performance, than low-test-anxious subjects \((p < .01)\). These results replicate the findings of Mandler and Watson (1966). Similar studies (Neale & Katahn, 1968; I. Sarason, & Stoops, 1978) corroborate these findings.

In summary, the high-test-anxious person appears to be more negatively self-preoccupied and self-deprecatory than their
low-test-anxious counterpart. It has been demonstrated that a cognitive component is essential to the understanding of test anxiety.

**Task-Generated Interference.** More recently, Deffenbacher (1978) has suggested a third distractor or interfering variable that increases with evaluative stress. This factor, known as task-generated interference, has been defined as "the tendency to become preoccupied with inefficient or irrelevant, task-produced competing responses" (Deffenbacher, 1980, p. 123).

Deffenbacher (1978) investigated this hypothesis. From 185 subjects who had been given the Test Anxiety Scale, 34 high-test-anxious and 34 low-test-anxious subjects were randomly selected. Prior to the administration of 13 high-difficult anagrams, half of the high-test-anxious group and half of the low-test-anxious group received "high stress instructions" which stressed the intelligence testing nature of the task they were about to perform. The other subjects received "low stress instructions" emphasizing that subjects were not expected to solve all the anagrams. Upon completion of the anagrams, subjects completed a post-task questionnaire which contained a task-generated interference scale. The task-generated interference scale contained items such as thinking back to anagrams which had not been solved.
Analysis of results showed that the low-anxiety groups reported less task-generated interference than the high-anxiety-high-stress group ($p < .01$). Between group comparisons revealed that the high-anxiety-low stress and the low-anxiety-low-stress groups solved more anagrams than the high-anxiety-high-stress groups ($p < .05$).

A study done by Dusek, Kermis, and Mergler (1975) also investigated task-generated interference. In this study, 144 fourth and sixth grade children served as subjects. The subjects were divided into high- and low-test-anxious groups. Each subject was administered an incidental and central learning task. The incidental learning task was embedded in the central learning task, but was not relevant to the central learning task. Thus, attention to the incidental learning task would be defined as task-generated interference.

Half the subjects in each subgroup performed under game instructions (low evaluative stress conditions) and the rest under test instructions (high evaluative stress conditions). In addition, half the subjects were told to name or label the central stimuli and the rest were not. Labeling was used as a relevant task-orienting strategy.

A significant main effect was found in which the low-test-anxious children had higher central learning scores and lower incidental learning
scores than the high-test-anxious children. Under game instructions, there were no differences between high- and low-test-anxious subjects. Under test instructions in which the labeling strategy was used, there were no differences between high- and low-test anxious subjects. But for children not using this strategy, low-test anxious subjects had significantly higher mean score than high-test-anxious subjects.

These results supported the hypothesis that under evaluative stress, high-test-anxious children attend to task-generated interference to a greater extent than low-test-anxious children. It is also consistent with the hypothesis that task-irrelevant attention detracts from task performance.

Thus, within an attentional interpretation of test anxiety, evaluative stress may create behavior that directs attention away from the task by way of autonomic arousal (emotionality), self-oriented cognitions (worry), and/or by competing response tendencies generated by the task itself (task-generated interference).

**Characteristics of the Test-Anxious Individual**

Numerous studies have been conducted to reveal a general profile of the test anxious student. While test anxiety may affect everyone at one
time or another, it appears to affect some individuals to a greater extent than others.

In I. Sarason's study (1963), 219 eleventh-grade students and 241 twelfth grade students were administered the Test Anxiety Scale (TAS), and the School and College Ability Test (SCAT), a test designed to measure a student's capacity to do college-level work. A significant negative correlation was found between test anxiety and SCAT scores for males and females in both grades. Correlations for females ranged from $r = -.30$ to $r = -.55$ ($p < .01$). Correlations for males ranged from $r = -.14$ (non-significant) to $r = -.27$ ($p < .01$). The negative correlations found were significantly larger for female than for male subjects.

Payne, Smith, and Payne (1983) compared test anxiety across grade, sex, and race. In a study using a sample of 181 fourth grade students and 258 eighth grade students, a 15-item modification of the Survey of Feelings About Tests was given. An analysis of scores did not show significant mean differences across grade, but did find significantly ($p < .05$) higher scores for female students and black students compared to the other students.

Significantly higher test anxiety scores for black students than for white students were also found using the Test Attitude Inventory (Clawson,
Firment, & Trower, 1981). In this study, 150 ninth grade students and 112 seventh grade students were tested for anxiety. Grade point average and math and language percentile scores as measured by the Comprehensive Test of Basic Skills (CTBS) were collected.

Anxiety scores were reported as emotionality, worry, and total score. Black students significantly outscored white students on all three components. White students grade point average and scores on the CTBS were significantly higher than black students. Because these students have all attended the same school since first grade, differences in educational background could not be used to explain these academic differences. Thus, test anxiety was seen as playing a probable role in poorer test performance for black students than white students.

Studies have found that the level of ability is related to test anxiety with those low in ability being more anxious than those high in ability. Gjesme (1982) conducted an experiment using 507 sixth grade students as subjects. Subjects were divided into groups of high-, moderate-, and low-ability-groups based on their performance on a group test of problem solving. The Test Anxiety Scale for Children (TASC) was used to assess the level of each subject's test anxiety. Main effects were revealed for the sex
of the subject ($p < .005$), with girls having significantly higher TASC scores than boys. In addition, the low ability subjects reported significantly higher levels of test anxiety than the moderate or high ability subjects.

Paul and Eriksen (1964) reported similar findings in their study. Subjects were 118 female college students. The experiment was planned for a day when these students would take a course examination. Subjects were asked to return that evening to participate in the study. The experimenters made every attempt to make the students feel as relaxed and non-anxious as possible. Each subject completed a Test Anxiety Questionnaire (TAQ) as well as a short examination comparable to the test that they had taken that morning. Subjects were told that their scores on the experimental examination would in no way affect their grades and that all scores would be kept in the strictest of confidence. It was believed that the examination taken earlier in the day would be more anxiety arousing that the experimental examination.

Test scores from the first test were obtained for comparison with the experimental examination. In addition, scores on the Cooperative School and College Ability Test were obtained. Results revealed significant negative correlations between the TAQ and the scholastic ability measure.
on verbal ($r = -0.33$), quantitative ($r = -0.20$), and total ($r = -0.31$). In addition, a small negative correlation was found between the TAQ and the anxiety arousing examination ($r = -0.19$).

Bryan, Sonnefelds, and Grabowski (1983) postulated that learning disabled (LD) children might experience a higher degree of test anxiety than nondisabled (NLD) children. He based this hypothesis on studies that have shown LD children to have relatively lower self-esteem than NLD children (Halechko, 1976). In addition, these children are frequently confronted by academic failures (Bryan et al., 1976).

A study was conducted in which 60 LD children were matched with 60 NLD children on the basis of grade, race, sex and IQ. Subjects were given the Test Anxiety Scale for Children and the Sarason Lie Scale for Children. As was predicted, LD children obtained higher test anxiety scores than NLD children ($p < 0.03$). Thus, LD children may suffer from test anxiety to a greater degree than NLD children.

In summary, these studies have found higher test anxiety for black students than for white students, for females than for males, for individuals of low ability than of high ability, and for LD children than for NLD children.
Effects of Test Anxiety on Learning and Problem-Solving

Early research on anxiety sought to identify the consequences of anxiety on specific tasks. Simple conditioning research was used to study differences in the responses of high- and low-anxious subjects (Spence and Farber, 1954; Spence & Taylor, 1951; Taylor, 1951). These studies were based on drive theory and postulated that the high-anxious subjects would have a higher drive level than the low-anxious subjects, leading to a higher level of response for the high anxious subjects.

In these studies, subjects were divided into groups of high and low test anxious based on their scores on the Taylor Anxiety Scale. Subjects were conditioned to blink their eyes in response to a particular tone or to a light. An air puff in the eye occurred when subject's did not blink. Results from these studies indicated that high-anxious subjects were superior to low-anxious subjects in acquiring simple conditioned reponses.

Other studies examined the effects of anxiety on serial rote learning. Montague (1953) divided subjects into groups of high- and low-anxious based on their scores on the Taylor Anxiety Scale. He presented subjects with three lists of three-letter nonsense syllables. List I used items of high similarity and low associative value; list II used items of low
similarity and low associative value; and list III used items of low similarity and high associative value. These syllables were presented in serial fashion to the subjects who were instructed to remember the syllables. After being shown the list, they were asked to record as many syllables as they could remember.

The performance of high-anxious subjects was superior to low-anxious subjects when the associative value of the syllables was high and the similarity of the words within the list was low. Conversely, the performance of low-anxious subjects was superior to high anxious subjects when associative value of the syllables was low and the similarity of the syllables within the list was high.

Spence, Farber, and McFann (1956) conducted a two-part study concerning the effects of anxiety on paired-associates learning. In this study, 40 subjects were divided into groups of high- or low-anxious. In part I, subjects were presented with 15 pairs of 2-syllable adjectives. Adjectives were paired so that there would be a strong association between the paired stimulus-response words. After two trial exposures to the list, subjects were asked to respond to the stimulus word with the correct paired response.
In part II of this study, the same procedure was followed, but the word list was different. The word list contained four paired adjectives from the word list in part I; the associative connections between these pairs was very strong. For each of the stimulus words of these four pairs, two synonymous adjectives were also used as stimulus words. Each of these adjectives was paired with another adjective which had little or no connection with the stimulus word. Thus, this list involved learning in which competing response tendencies would be present. The performance of the high-anxious subjects' in part I of this study was superior to that to the low-anxious subjects. In contrast, the low-anxious subjects' performance was superior to the high anxious subjects' performance in part II of the study.

The inferior performance of the high anxious subjects in situations involving competing responses elicited by the task stimuli may be explained by drive theory. That is, while higher drive would tend to give the advantage to the high-anxious subjects in cases in which the correct response was the strongest, the low-anxious subjects would be at an advantage when competing or interfering responses were elicited by the stimulus.

These and similar findings indicated that high-anxious subjects' performance on learning tasks was superior to the performance of
low-anxious subjects when variables competing with the correct response are weak. However, low-anxious subjects show superior performance when there are strong interfering variables or variables competing with the correct response.

Based on findings such as these, Palmero, Castaneda, and McCandless (1956) hypothesized that low-anxious children would achieve a higher level of performance than high-anxious children in a complex learning situation. In their study, 36 fourth grade subjects were required to learn to turn off different colored lights by two buttons which were connected to them. In situations where the correct response was not the dominant response, high-anxious children were expected to show impaired performance. The results supported this hypothesis. Low-anxious subjects performed significantly better than high-anxious children in this situation.

It has been suggested that performance on tasks employing verbal materials and involving complex rules may be more seriously impaired by high levels of anxiety than tasks employing non-verbal materials or verbal tasks relying on simple associative processes (Sarason, Hill, & Zimbardo, 1964). Stevenson and Odom (1965) conducted a study in which they compared the effects of anxiety on children's performance in learning and
problem-solving tasks. The subjects included 318 fourth- and sixth-grade children. All children received the following five tasks: a paired associates task, a concrete discrimination task, an abstract discrimination task, a concept formation task, and an anagrams task. Subjects were also given the Test Anxiety Scale for Children.

Significant negative correlations were found between level of anxiety and performance on paired associates and anagrams, the two tasks involving the use of verbal materials. The researchers concluded that verbal IQ but not performance IQ tends to be correlated negatively with anxiety level.

Another study was conducted to determine the effects of anxiety and intelligence on concept formation. Denny (1966) used the The Taylor Manifest Anxiety Scale to assign subjects to groups of high- and low-anxious. He used the verbal and mathematical aptitude tests from the College Entrance Exam test to divide groups by level of intelligence.

The measure of concept formation proficiency was determined by the number of erroneous conclusions made as to whether or not attributes were included in the concept. Intelligence and anxiety interacted in affecting performance. Among high-intelligent subjects, those with high-anxiety made fewer errors than those with low-anxiety. Among the low-intelligent
subjects, those with high-anxiety made more errors than those with low anxiety.

These results were consistent with the drive theory in that the tasks were expected to be less complex for the high- than for the low-intelligent subjects. Thus, high- and low-intelligent subjects with high-anxiety would be expected to have a high drive, but the high-intelligent subjects would be faced with less competing variables than the low-intelligent subjects, who would find the task more difficult. Consequently, the low-intelligent high-anxious subjects would appear to have to deal with more task-elicited interfering variables, which previously has been shown to be detrimental to high-anxious subjects.

Ruebush (1960) suggests that test-anxiety may have both interfering and facilitating effects on test performance. He postulated that test-anxiety influences performance primarily by defensive reactions to the anxiety. These defensive reactions may manifest themselves as cautiousness.

In problem-solving situations where such defensive reactions are an asset, anxiety has a facilitating effect on performance; however, where such defensive reactions are a liability, anxiety has an interfering effect upon performance.
Ruebush (1960) conducted a study in which 280 sixth grade boys were used. Subjects were divided into groups according to levels of anxiety and intelligence as measured by the Yale Test Anxiety Scale and the Otis Mental Ability Test. Subjects were given the 12-item short form of the Witkin Embedded Figures Test in which a subject must locate a given simple figure which is embedded in a complicated figure. Subjects were scored by the amount of time it took him or her to find the figures. Subjects were also scored on the total number of figures solved. A cautiousness score was calculated by determining the ratio of the number of requests to see the simple figure while solving a problem divided by the number of wrong guesses.

Results indicated that high-anxiety subjects obtained significantly higher cautiousness scores than low-anxiety subjects. Because the embedded figures task is one in which cautiousness is considered an asset to problem-solving, it was predicted that high-anxious subjects would perform significantly better than low-anxious subjects on this task. This prediction was confirmed.

The preceding studies show that the effect of anxiety on test performance varies according to several factors. These factors include the
type of task (verbal/performance, perceptual-motor/concept formation), the complexity of the task, the interfering variables elicited by the task, and the intelligence level of the subject. Anxiety and its effects on performance may also be affected by the nature of the task itself.

The Current Study

Statement of the Problem

Children with learning disabilities are frequently tested to determine appropriate classroom placement and educational programming for them. Thus, important decisions may be based, in part, upon a child's test scores. Obviously, the accuracy of these tests in revealing a child's true capabilities is imperative to appropriate programming.

While measures are taken to ensure the reliability and validity of these tests, the factor of test anxiety is often overlooked. Nevertheless, test anxiety may serve as a detractor from the validity of test results (I. Sarason, et al., 1960).

I. Sarason (1961) hypothesized that instructions and degree of anxiety interact in affecting performance. According to I. Sarason (1961), the conditions under which a test takes place is determined, in part, by the instructions administered immediately prior to the test. I. Sarason (1980) stated:
The performance of highly test-anxious persons on complex tasks is deleteriously affected by ... achievement orienting instructions that either inform subjects that some kind of evaluation of their performance will be made or provide some other rationale for the importance of performing well. When persons are reassured that a negative evaluation of their performance will not be made, highly test anxious persons often perform as well or better than those who are typically less worried (p. 8).

In his study, Sarason (1961) created threat and non-threat conditions by the way in which a test was introduced. Based on their scores on the Test Anxiety Scale, 191 college students were divided into groups of high, middle, and low anxiety. Prior to taking a very difficult anagram test, subjects were told that the tasks on which they were about to work were directly related to their level of intelligence, and that "the anagrams could be solved easily by individuals of average intelligence" (p. 165). These instructions created what was called a personal threat condition because, in reality, the subjects could not solve every anagram. The rest of the subjects were told that "the anagrams were quite difficult and that successful completion of them in the alloted time was highly unlikely" (p.
These instructions were designed to create nonthreatening conditions in which anxieties would be allayed.

A $2 \times 3$ analysis of variance revealed that under the threat condition, the middle- and low-test-anxious students performed at a significantly higher level than the high-test-anxious students ($p < .01$). Based on these results, Sarason (1961) concluded that the nonthreat instructions functioned as reassurance for high-test-anxious students, but seemed to lower the motivational level and performance of the less test anxious students.

S. Sarason, Mandler, and Craighill (1952) gave both stressful and non-stressful instructions to 36 high and 36 low-test-anxious college students on a timed digit-symbol task. Some subjects were told that they could easily complete the task within the time limit. In reality, solution within the allotted time was impossible (stressful instructions). Other subjects were informed that the task was difficult, and that they would not be expected to finish (non-stressful instructions). Results indicated that the high-test-anxious students attained higher scores under the non-stressful instructions while the low-test-anxious individuals worked better under stressful instructions.
In a second experiment of this study, 12 high-test-anxious and 12 low-test-anxious subjects were tested. Some of the subjects received instructions stressing the intelligence-testing nature of the task they were about to perform. Other subjects received non-stressful instructions. All subjects were asked to work the Kohs' block design and a stylus maze. Each subject was given five trials on each task. The high-test-anxious subjects who received the stressful instructions made significantly more errors than their low-test-anxious counterparts (S. Sarason, et al., 1952).

I. Sarason (1958) investigated another instructional variation which he labeled the "reassurance" condition. Seventy-six college students were divided into groups of high- and low-test-anxious based on their scores on the Test Anxiety Scale. After instructing subjects to learn a serial list of nonsense syllables, the subjects were informed that many people become tense when performing this task and that they should expect progress to be slow. Subjects were further instructed not to worry about how they were doing, but rather to concentrate on the task at hand. The other subjects only received the standard test instructions.

Results indicated that high-test-anxious subjects who received the "reassurance" instructions performed significantly better than
high-test-anxious subjects who received the standard test instructions. Conversely, the "reassurance" condition was detrimental to the performance of the low-test-anxious subjects when compared to their performance using only the standard-test-instructions.

The preceding studies all seem to indicate that high-test-anxious subjects perform best under nonstressful instructions, while the low-test anxious subjects perform best under stressful instructions. These studies further indicate that using stressful instructions with high-test-anxious subjects may have a deleterious effect on performance, whereas non-stressful instructions may adversely affect the performance of low-test-anxious subjects. According to these studies, the type of instructions preceding a test may indeed effect test performance.

Purpose of the Present Study

The present study was based on the concept that the type of instructions used to introduce a test may influence the performance of high- and low-test-anxious individuals. Specifically, this study focused on high- and low-test- anxious children who have been diagnosed as learning disabled. Because of the frequency with which these children are tested, it was believed that the issue of test anxiety was particularly relevant to them.
A frequently used device for measuring a child's current intellectual ability is the Wechsler Intelligence Scale for Children Revised (WISC-R, .1974). This test of intelligence is highly standardized in order that each child receive the same chance to demonstrate his abilities and so that the score may be compared to the normative sample to yield valid and reliable results.

The one area on the WISC-R that has not been standardized is the way in which the test is introduced. While the WISC-R manual (Wechsler, 1974) places great importance on establishing rapport with each child before administering the test, it gives no instructions on how the test should be introduced. Consequently, an evaluator's method of introducing this test is largely left up to his or her discretion.

The primary purpose of this study was to investigate the effects of introducing the WISC-R with test instructions and game instructions on the performance of high- and low-test-anxious children. The secondary purpose of this study was to gain information that would aid school psychologists and diagnosticians, who routinely use the WISC-R as an assessment instrument, in eliciting the best performance from the children they test.
Hypotheses

Following from the above discussion, these specific hypotheses were formulated:

I. There will be a significant difference between the Verbal, Performance, and Full Scale IQ scores of subjects receiving game instructions and test instructions.

II. There will be a significant difference between the Verbal, Performance, and Full Scale IQ scores of high-test-anxious subjects and low-test-anxious subjects.

III. There will be a significant difference in the Verbal, Performance, and Full Scale IQ scores for high-test-anxious subjects receiving the game instructions as compared to high-test-anxious subjects receiving the test instructions to the WISC-R.

IV. There will be a significant difference in the Verbal, Performance, and Full Scale IQ scores for low-test-anxious subjects receiving the game instructions as compared to low-test-anxious subjects receiving the test instructions to the WISC-R.

V. There will be a significant difference between the mean WISC-R subtest scores of Arithmetic, Digit Span, and Coding (third factor) for
high-test-anxious subjects receiving the "game" instructions compared to the "test" instructions.

VI. There will be a significant difference between mean WISC-R subtest scores of Arithmetic, Digit Span, and Coding (third factor) for low-test-anxious subjects receiving the "game" instructions as compared to "test" instructions.

Hypothesis V and VI were derived from WISC-R profile research which suggested that the subtests of Arithmetic, Digit Span, and Coding (Kaufman, 1979; Sattler, 1988) were subject to be negatively influenced by anxiety.
CHAPTER II

METHOD

Subjects

The subjects were 44 fifth and sixth grade children drawn from three local school districts in north-central Texas. Specifically, these subjects consisted of 29 males and 15 females. The subjects' age range fell between 10 to 13 years with a mean age $\pm$ standard deviation of $11.64 \pm .71$. Subjects' IQ scores fell between 85 and 115 based on WISC-R IQ scores found in students' records.

These individuals were chosen from 81 students who had received the Test Anxiety Scale for Children (TASC; S. Sarason, Davidson, Lighthall, & Waite, 1958). Following pretesting with the TASC, the upper and lower third of the scale distribution were operationally defined as high- and low-test-anxious, respectively. Only high- and low-test-anxious subjects were used in this study. Due to attrition, only 45 of the 48 subjects designated as high- and low-test-anxious (TA) subjects were actually
included in the rest of this study. Table 1 presents means, standard
deviations (SD), and cutoff scores for subjects on the TASC pretest
instrument.

Table 1

Means, Standard Deviations, and Cutoff Scores on the TASC

<table>
<thead>
<tr>
<th>Sex</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Cutoff for low TA</th>
<th>Cutoff for high TA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>55</td>
<td>14.91</td>
<td>6.83</td>
<td>≤10</td>
<td>≥19*</td>
</tr>
<tr>
<td>Females</td>
<td>26</td>
<td>17.27</td>
<td>6.04</td>
<td>≤14</td>
<td>≥20*</td>
</tr>
</tbody>
</table>

*Maximum score = 30.

All subjects had been diagnosed as learning disabled (LD) by personnel in their school district and in accordance with the State Board of Education Rules and Regulations. School district standards for labelling students "learning disabled" entailed that students be of normal intelligence but demonstrate some academic problem, typically in reading, writing, or arithmetic. The diagnoses were based on the results of a battery of tests
including the WISC-R and an achievement test, generally the
Woodcock-Johnson Psycho-Educational Battery for Children. Students who
were also diagnosed as having emotional or neurological difficulties, along
with learning disabilities, were excluded from the sample.

**Design**

High- and low-test-anxious subjects were assigned to cells in a 2 x 2
factorial design by stratified randomization. Groups were equivalent with
regards to age, sex, and IQ (see Table 2). Each group received game and test
instructions to introduce the WISC-R.

This design was used to compare the effects of each introduction on
the performance of high- and low-test-anxious children. A one-way analysis
of variance (ANOVA) was employed to analyze Verbal, Performance, and Full
Scale IQ differences in high- and low-test-anxious children and in game and
test instructions. A two-way ANOVA was used to analyze the effects of
game and test instructions on the Verbal, Performance, and Full Scale IQ
scores of high- and low-test-anxious subjects. In addition, a two-way
ANOVA was employed to analyze the effects of game and test instructions
on the experimental subtest configuration comprised of Arithmetic, Digit
Span, and Coding subtests. A t-test was used to analyze differences in Full
Scale IQ scores obtained by the two examiners in order to determine the presence or absence of an examiner bias.

Examiners who administered the WISC-R were blind as to the anxiety level (high or low) of the subjects tested. In order to eliminate as many sources of variability as possible, examiners were briefed on general test administration practices. The importance of adhering to standardized procedures was emphasized.

Because research has conclusively shown that examiners differ in how they score responses (Bradley, Hanna, & Lucas, 1980; Brannigan, Rosenberg, Loprete, & Calnen, 1977), the test protocols were all scored by one examiner who was blind as to whether the protocol represented a high- or low-test-anxious child. In addition, protocols were checked by another examiner to assure that no errors in scoring were made. Scores from the WISC-R were recorded on a Subject Data Sheet in which subjects were identified by numbers rather than names. In this way, subject confidentiality was maintained.

**Instruments**

The Test Anxiety Scale for Children (TASC; S. Sarason, Davidson, Lighthall, and Waite, 1958) was used to determine the presence or absence
of test anxiety in children. This 30-item test is read to the child who simply circles "yes" or "no" on an answer sheet after each question is read. Questions range from worries specific to taking tests to more general school-related anxieties (See Appendix C).

Sarason, Davidson, Lighthall, & Waite (1958) found split-half reliability to be high, $r = 90$. With a sample of 93 third-grade students, the split-half reliability was also reported to be high, $r = .88$ (Mann, Taylor, Proger, & Morrell, 1968), but found test-retest reliability to be only moderate, $r = .67$.

The Wechsler Intelligence Scale for Children-Revised (WISC-R, Wechsler, 1974) was used to measure the current level of intellectual functioning in children. The WISC-R contains 12 subtests. Six of the subtests form the Verbal Scale (Information, Similarities, Arithmetic, Vocabulary, Comprehension, and Digit Span), and the other six from the Performance Scale (Picture Completion, Picture Arrangement, Block Design, Object Assembly, Coding, and Mazes). The 12 subtests together form the Full Scale. These 3 scales provide 3 IQ scores.

A factor analysis of the standardization group revealed 3 factors that efficiently describe the WISC-R: Verbal Comprehension, Perceptual Organization, and Freedom from Distractibility (Kaufman, 1975). Verbal
Comprehension appears to measure a variable common to the Verbal Scale subtests. Perceptual Organization appears to measure a variable common to the Performance Scale subtests. It is the combination of these 2 scales that make up the Full Scale. The third factor, Freedom from Distractibility, appears to measure the ability to concentrate or remain attentive. The Arithmetic, Digit Span, and Coding B subtests appear to measure this third factor.

The WISC-R was standardized on a sample of 2200 children selected as a representative of the population in accordance to the 1970 United States Census. The standardization sample included 11 different age groups ranging from 6-6 to 16-6 years, with 200 children in each group. The sample included 100 girls and 100 boys at each age level. The sample of Whites, Blacks, Asians, American Indians, Puerto Ricans, and Mexican Americans were in the same proportions found in the 1970 Census (Wechsler, 1974).

The WISC-R has excellent reliability. With the standardization groups for all age ranges, each of the 3 IQ Scales has an internal consistency reliability coefficient of .89 or above. Based on the 11 age groups, the average internal consistency reliability coefficients are .96 for the Full Scale IQ, .94 for the Verbal Scale IQ, and .90 for the Performance Scale IQ.
Criterion validity of the WISC-R has been investigated by correlating it with the WPPSI. Wechsler (1974) conducted a study in which 50 male and female 6-year-olds were given the two tests in counterbalanced order. The correlations between each of the three scales were .80 for Verbal Scales, .80 for Performance Scales, and .82 for Full Scales. The differences between the mean IQ's on all three scales were higher on the WPPSI than on the WISC-R, but only by a small amount (1.5, 2.8, and 2.5 IQ points, respectively).

Another study which used 72 six-year-olds was conducted (Quereshi & McIntire, 1984). This study also counterbalanced the WISC-R and the WPPSI. Correlations between each of the three scales were .86 for the Verbal Scales, .77 for the Performance Scales, and .85 for the Full Scales.

A Subject Data Sheet was used to record demographic information about the children as well as their scores on the WISC-R. Numbers were used in place of names to identify the subjects. In this way, subject confidentiality was maintained (See Appendix B).

Procedure

Upon receiving permission from the three school districts, examiners were assigned to work with the diagnosticians in the various schools.
Parental consent was obtained by the schools for comprehensive assessments to be made on the children used in the study.

First, the TASC was given to the children in their classrooms. Next, the high- and low-test-anxious subjects were divided into four groups as shown in Table 2. Children were taken, one at a time, from their classrooms to a quiet room where he or she was seated across from the examiner. The examiner spent the first 10 to 15 minutes establishing rapport with the child. Next, the examiner introduced the test using either game instructions (see Appendix D) or a test instructions (see Appendix E).

The game instructions were designed to arouse as little anxiety as possible. These instructions stressed the game-like nature of the various tasks on the WISC-R. The test instructions were designed to be anxiety-arousing. These instructions stressed the intelligence-testing nature of the test and the importance of doing well on the test.

After introducing the WISC-R, the test was administered according to standardized procedure. Half-way through the test, after the Block Design subtest, the child received a 3 to 5 minute break in which he or she got a drink of water and/or used the restroom. After the break, the test resumed. Upon completion of the test, the child was escorted by the examiner back to the classroom.
Examiners

Examiners were one male and one female psychology graduate student in their mid-twenties. Both examiners had two years practicum work in the public schools where they received experience administering the WISC-R.

Examiners giving the WISC-R may obtain different responses from children (Bennett, 1970; Schwartz & Flanigan, 1967). In some studies, female examiners have been able to elicit better performance from children than males, but no systematic trends have been found (Back & Dana, 1977; Bradbury, Wright, Walker, & Ross, 1975; Pedersen, Shinedling, & Johnson, 1968). With ethnic minority children, the examiner's race appears to play no significant role in a child's performance (Sattler & Gwynne, 1982). Consequently, the choice of examiners was not made on the basis of sex or race, but on the basis of experience.
CHAPTER III

RESULTS

General Demographics of Sample

Subjects consisted of 29 males and 15 females. A significantly greater proportion of males than females (approximately 2:1) were used in this study. This difference may be explained by the significantly higher number of males than females with learning disabilities in the resource classes from which this sample was drawn.

There were 23 fifth grade subjects and 21 sixth grade subjects. Among these subjects, 37 were caucasian (84.09%), 4 were hispanic (9.09%), and 3 were black (6.82%). The mean Full Scale IQ score ± standard deviation for the total group of subjects was 97.25 ± 10.52.

The subjects were divided into four groups which were equivalent with regards to age, sex, and IQ. IQ scores were based on WISC-R Full Scale IQ scores found in the students’ records. Table 2 provides a description of these groups according to the mean age, sex, and mean IQ of subjects in each group.
Table 2

Groups by Age, Sex, and IQ

<table>
<thead>
<tr>
<th>Game Instructions</th>
<th>Test Instructions</th>
</tr>
</thead>
</table>

**High-Test-Anxious**

<table>
<thead>
<tr>
<th>Mean Age</th>
<th>Mean IQ</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.64</td>
<td>97.27</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>

**Low-Test-Anxious**

<table>
<thead>
<tr>
<th>Mean Age</th>
<th>Mean IQ</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.00</td>
<td>97.55</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: \( N = 11 \) for each group.
A two-tailed $t$-test revealed no significant differences between the scores obtained by each of the examiners, $t = .04, df = 42, p < .05$. Thus, there did not appear to be an examiner bias on the administration of the WISC-R (see Table 3).

Table 3

**T-test: Examiner by Full Scale IQ**

<table>
<thead>
<tr>
<th>Examiner</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>SE</th>
<th>F</th>
<th>2-tailed probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23</td>
<td>97.30</td>
<td>10.24</td>
<td>2.14</td>
<td>1.17</td>
<td>.972</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>97.19</td>
<td>11.07</td>
<td>2.24</td>
<td>1.17</td>
<td>.972</td>
</tr>
</tbody>
</table>

$N$ = Number of Subjects

$M$ = Mean

$SD$ = Standard Deviation

$SE$ = Standard Error

**Hypothesis I**

Hypothesis I stated that there would be a significant difference in the Verbal Scale (VS), Performance Scale (PS), and Full Scale (FS) IQ scores of subjects receiving game instructions and subjects receiving test
instructions. Table 4 presents the means, standard deviations (SD) and range of scores from minimum (Min) to maximum (Max) for subjects receiving game and test instructions.

Table 4

Means, SD, and Range of VIQ, PIQ, and FSIQ by Instructions

<table>
<thead>
<tr>
<th>Scale</th>
<th>Group</th>
<th>Mean IQ Score</th>
<th>SD</th>
<th>Min Score</th>
<th>Max Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS</td>
<td>&quot;game&quot;</td>
<td>91.32</td>
<td>11.24</td>
<td>73.00</td>
<td>113.00</td>
</tr>
<tr>
<td>VS</td>
<td>&quot;test&quot;</td>
<td>93.41</td>
<td>10.21</td>
<td>77.00</td>
<td>112.00</td>
</tr>
<tr>
<td>PS</td>
<td>&quot;game&quot;</td>
<td>100.64</td>
<td>11.49</td>
<td>81.00</td>
<td>123.00</td>
</tr>
<tr>
<td>PS</td>
<td>&quot;test&quot;</td>
<td>106.77</td>
<td>12.17</td>
<td>73.00</td>
<td>123.00</td>
</tr>
<tr>
<td>FS</td>
<td>&quot;game&quot;</td>
<td>95.27</td>
<td>10.14</td>
<td>76.00</td>
<td>118.00</td>
</tr>
<tr>
<td>FS</td>
<td>&quot;test&quot;</td>
<td>99.23</td>
<td>10.74</td>
<td>77.00</td>
<td>117.00</td>
</tr>
</tbody>
</table>

Note: $N = 22$ for each group.
The hypothesis, as computed by an ANOVA, for differences in Verbal, Performance, and Full Scale IQ scores of subjects based on instructions was not confirmed. Appendix F contains data describing the analysis.

**Hypothesis II**

Hypothesis II stated that there would be a significant difference in Verbal Scale (VS), Performance Scale (PS), and Full Scale (FS) IQ scores of high- and low-test-anxious subjects. Table 5 presents the means, standard deviations (SD), and range of scores from minimum (Min) to maximum (Max) for high- and low-test-anxious subjects.

The hypothesis, as computed by an ANOVA, for differences between the Verbal, Performance, and Full Scale IQ scores of high- versus low-test-anxious subjects was not confirmed. Appendix G contains data describing this analysis.

**Hypothesis III and IV**

Hypothesis III stated that there would be a significant difference between the Verbal, Performance, and Full Scale IQ scores of high-test-anxious subjects receiving game instructions as compared to test instructions. Hypothesis IV made the same prediction for low-test-anxious subjects. Moreover, a two-way ANOVA produced nonsignificant
Table 5

Means, SD's, and Range of VIQ, PIQ, and FS IQ by Anxiety Level

<table>
<thead>
<tr>
<th>Scale</th>
<th>Group</th>
<th>Mean IQ Score</th>
<th>SD</th>
<th>Min Score</th>
<th>Max Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>VS</td>
<td>High TA</td>
<td>91.50</td>
<td>12.18</td>
<td>73.00</td>
<td>113.00</td>
</tr>
<tr>
<td>VS</td>
<td>Low TA</td>
<td>93.22</td>
<td>9.10</td>
<td>75.00</td>
<td>109.00</td>
</tr>
<tr>
<td>PS</td>
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<td>11.81</td>
<td>81.00</td>
<td>120.00</td>
</tr>
<tr>
<td>PS</td>
<td>Low TA</td>
<td>104.50</td>
<td>12.61</td>
<td>73.00</td>
<td>123.00</td>
</tr>
<tr>
<td>FS</td>
<td>High TA</td>
<td>96.50</td>
<td>11.69</td>
<td>76.00</td>
<td>118.00</td>
</tr>
<tr>
<td>FS</td>
<td>Low TA</td>
<td>98.00</td>
<td>9.42</td>
<td>77.00</td>
<td>114.00</td>
</tr>
</tbody>
</table>

Note: N = 22 for each group. TA = Test-Anxiety.

main effects for Verbal, Performance, and Full Scale IQ scores, and
nonsignificant interactions for Verbal, Performance, and Full Scale IQ
scores between type of instructions and anxiety-level. Appendix H provides a summary of results from the two-way ANOVA performed.

**Hypothesis V and VI**

Hypothesis V and VI stated that there would be a significant difference between the experimental subtest configurations (mean of the subtests Arithmetic, Digit Span, and Coding) of high-test-anxious subjects receiving game versus test instructions and low-test-anxious subjects receiving game versus test instructions. These hypotheses were not confirmed. A two-way ANOVA produced nonsignificant main effects and nonsignificant interactions between the experimental subtest configuration and the type of instructions received by both high- and low-test-anxious subjects. Appendix I provides a summary of the results from this two-way ANOVA.
The six hypotheses generated by this study were not statistically confirmed. Comparing subjects on the basis of instructions given prior to the test did not result in significant differences in Verbal, Performance, or Full Scale IQ scores. Nor did this comparison result in a significant difference in the experimental subtest configuration (mean of Arithmetic, Digit Span, and Coding). While not statistically significant, children receiving game instructions scored better than subjects receiving test instructions, particularly on the Performance Scale ($p = .093$).

The Performance Scale consists of mazes, puzzles, and blocks and may appear more game-like than the Verbal Scale, consisting of Arithmetic, Vocabulary, and Information questions. It is possible that under the game instructions, children were more likely to be aware of the game-like nature of these tasks than under test instructions, and consequently, were less distracted by anxiety.

Previous research (I. Sarason, 1958, 1961; S. Sarason, Mandler, & Craighill, 1952) has found that high-test-anxious subjects perform better
under non-stressful than stressful instructions, and that low-test-anxious subjects perform better under stressful than non-stressful instructions. These finding were not fully supported by the current study. While statistically nonsignificant, this study found that both high- and low-test-anxious subjects performed better under game or nonstressful instructions than under test or stressful instructions.

Comparing subjects on the basis of anxiety-level did not result in significant differences in Verbal, Performance, and Full Scale IQ scores. Nor did this comparison result in a significant difference in the experimental subtest configuration. Past research (Gjesme, 1982; Holoroyd, Westbrook, Wolf, & Badhorn, 1978; I. Sarason, 1963; S. Sarason & Mandler, 1952) has found that low-test-anxious subjects generally perform better in evaluative situations than high-test-anxious subjects. The current study contradicts these findings as the average performance of high-test-anxious subjects did not significantly vary from the average performance of the low-test-anxious subjects.

The conflicting results between the past and present studies on test anxiety may be explained by the differences in the samples of each. While
past research on test anxiety has been conducted mainly with adults, the current study used children as its sample. In addition, this study used learning-disabled subjects who may routinely have difficulty on tests; whereas, the previous studies have used non-impaired subjects (often college students). In comparing this research to past research, results may differ because high- or low-test-anxious children with learning disabilities respond to evaluative situations differently than high- or low-test-anxious college students.

Differences surrounding the test in the current study and past studies may also help explain their conflicting results. The test employed in the current study, the Wechsler Intelligence Scale for Children-Revised (WISC-R) must be given on a one-to-one basis with each child, requiring much interaction between the subject and the examiner. In addition, the WISC-R takes approximately one and one-half hours to administer, requiring much time to be spent between the subject and the examiner.

Similar studies done on test anxiety in the past used anagrams (I. Sarason, 1961) and the memorization of nonsense syllables (I. Sarason, 1958) as their means of testing subjects. These tests would allow the subject to work more independently, requiring less one-to-one interaction
between the subjects and the examiner, than the WISC-R. In addition, it does not appear that these tests would take as much time to administer as the WISC-R.

Probably the most important variable influencing the differences in the test results of the past and current study on test anxiety is rapport between the subject and the examiner. Only the current study required that rapport be established between the examiner and the subject before the onset of testing.

A good rapport between the subject and the examiner may have served to enhance the performance of all subjects, regardless of the instructions they received prior to testing. Thus, the variable of rapport may account for the differences in test results between past studies and the present study.

The establishment of rapport between examiner and child may also be a key factor in the nonsignificant results yielded by this study. The type of instructions a subject receives may be less significant if steps have already been taken to help the subject feel relaxed and comfortable. Furthermore, both of the examiners in this study stated that if they noticed that a child seemed to be anxious, they took extra measures to relieve the child's anxiety. In effect, the strength of the "test" instructions to evoke
evaluational stress may have been dampened, if not altogether extinguished, by the calming actions of the examiners.

The fact that all subjects had been tested with the WISC-R in past evaluations may have confounded this study. The subjects' preconceived ideas about the test may have interfered with the orienting instructions they received from the examiners in this study, producing different results.

In addition, it is possible that results may have been confounded because the criteria for dividing groups into high- and low-test-anxious were not stringent enough to achieve two distinct groups. That is, the two groups may have been too similar with regards to anxiety-level for significant differences to be found between groups.

Future studies might use a lie scale and/or defensiveness scale to help eliminate subjects who should not be included in either group. In addition, more stringent cutoff's may be obtained by dividing groups by standard deviations from the mean rather than dividing groups by thirds.

Surprisingly, the research on test-anxiety in learning-disabled children is limited. Because of the frequency with which these children are tested, more research into this area of test anxiety is needed. Future
research might focus on the effects of test anxiety on examinations administered within the classroom.

While the findings from this study were nonsignificant, the implications of these results are still noteworthy, providing valuable information to school psychologists, diagnosticians and others involved in the diagnostic testing of children. These results call attention to the importance of rapport in eliciting the best test performance from children.

It appears that rapport may even supersede anxiety-level in influencing test performance. With these results in mind, examiners should make a special effort to maintain a good rapport with the child throughout testing. In addition they should be aware of the child's non-verbal cues, such as shaky hands, flushed face, or poor eye contact, which signal to the examiner that the child feels anxious and that renewed efforts at establishing rapport may be needed.

In conclusion, the results from this study indicate that the way the WISC-R is introduced does not play a significant role in the WISC-R performance of high- and low- test anxious children with learning disabilities. The generalizability of these results to non-learning-disabled children is not known. The opportunities for future research into this area of test anxiety are plentiful.
APPENDIX A

PARENT PERMISSION FORM
CONSENT FOR COMPREHENSIVE INDIVIDUAL ASSESSMENT

NAME: __________________________ D.O.B: __________ SCHOOL: ________________

YOU WERE SENT THE NOTICE FOR A COMPREHENSIVE INDIVIDUAL ASSESSMENT ON _______________ (DATE)

WE ARE ASKING FOR YOUR PERMISSION TO TEST YOUR CHILD/ YOU TO FIND OUT WHAT YOUR CHILD'S/ YOUR EDUCATIONAL NEEDS ARE.

PLEASE CHECK THE YES BOXES ONLY IF YOU AGREE THAT THE STATEMENTS ARE CORRECT. IF THE STATEMENTS ARE NOT CORRECT, CHECK THE NO BOXES. WHEN YOU HAVE FINISHED, PLEASE SIGN YOUR NAME WITH THE DATE AND RETURN THE FORM TO THE SCHOOL AS SOON AS POSSIBLE.

YES__ NO__ I HAVE BEEN FULLY INFORMED AND DO UNDERSTAND THE ASSESSMENT PROCESS AND WHY IT IS BEING RECOMMENDED FOR MY CHILD/ME. IF NO, PLEASE EXPLAIN:

YES__ NO__ I HAVE BEEN GIVEN THE NAME AND TELEPHONE NUMBER OF A SCHOOL STAFF MEMBER THAT I MAY CALL IF I WISH TO HAVE MORE INFORMATION OR IF I HAVE ANY QUESTIONS. IF NO, PLEASE EXPLAIN:

YES__ NO__ I DO GIVE MY PERMISSION FOR THE TESTING THAT HAS BEEN RECOMMENDED FOR MY CHILD/ME. IF NO, PLEASE EXPLAIN:

YES__ NO__ I UNDERSTAND THAT MY CONSENT IS VOLUNTARY AND MAY BE WITHDRAWN AT ANY TIME. IF NO, PLEASE EXPLAIN:

SIGNATURE OF PARENT, GUARDIAN, SURROGATE PARENT OR ADULT STUDENT __________________________ DATE __________

SIGNATURE OF INTERPRETER, IF USED __________________________ DATE __________

PLEASE RETURN THIS FORM TO __________________________ SCHOOL STAFF MEMBER

AT __________________________ NAME OF SCHOOL AS SOON AS POSSIBLE.
SUBJECT DATA SHEET

Descriptive Data

Master #: _____
Random Run #: _____
DOB: ___ ___ ___ ___ ___
Date Subject Run: ___ ___ ___ ___ ___
Age: ___
Grade: 5 or 6
Race: ___
Sex: M or F
Exp. ID #: 1 or 2
School: ______________________

Dependent Variables

I _____ PC _____
S _____ PA _____
A _____ BD _____
V _____ OA _____
C _____ Cd _____
DS _____ M _____

GAME or TEST
APPENDIX C

TEST ANXIETY SCALE FOR CHILDREN
Test Anxiety Scale for Children

Instructions

I'm going to be asking you some questions—questions different from the usual school questions for these are about how you feel and so have no right or wrong answers. First I'll hand out the answer sheets and then I'll tell you more about the questions. Do not write your name on your answer sheet.

As I said before, I am going to ask you some questions. No one but myself will see your answers to these questions, not your teacher or your principal or your parents. These questions are different from other questions that you are asked in school. These questions are different because there are no right or wrong answers. You are to listen to each question and then put a circle around either "yes" or "no." These questions are about how you think and feel and, therefore, they have no right or wrong answers. People think and feel differently. The person sitting next to you might put a circle around "yes" and you may put a circle around "no." For example, if I asked you this question: "Do you like to play ball?" some of you would put a circle around "yes" and some of you would put it around "no." Your answer depends on how you think and feel. These questions are about how you think and feel about school, and about a lot of other things. Remember, listen carefully to each question and answer it "yes" or "no" by deciding how you think and feel. If you don't understand a question, ask me about it. Now let's begin. Here is the first question:
Test Anxiety Scale for Children

1. Do you worry when the teacher says that she is going to ask you questions to find out how much you know?
2. Do you worry about being promoted, that is, passing from the ____ to the ____ grade at the end of the year?
3. When the teacher asks you to get up in front of the class and read aloud, are you afraid that you are going to make some bad mistakes?
4. When the teacher says that she is going to call upon some boys and girls in the class to do arithmetic problems, do you hope that she will call upon someone else and not on you?
5. Do you sometimes dream at night that you are in school and cannot answer the teacher's questions?
6. When the teacher says that she is going to find out how much you have learned, does your heart begin to beat faster?
7. When the teacher is teaching you about arithmetic, do you feel that other children in the class understand her better than you?
8. When you are in bed at night, do you sometimes worry about how you are going to do in class the next day?
9. When the teacher asks you to write on the blackboard in front of the class, does the hand you write with sometimes shake a little?
10. When the teacher is teaching you about reading, do you feel that other children in the class understand her better than you?
11. Do you think you worry more about school than other children?
12. When you are at home and you are thinking about your arithmetic lesson for the next day, do you become afraid that you will get the answers wrong when the teacher calls upon you?

13. If you are sick and miss school, do you worry that you will do more poorly in your schoolwork than other children when you return to school?

14. Do you sometimes dream at night that other boys and girls in your class can do things you cannot do?

15. When you are home and you are thinking about your reading lesson for the next day, do you worry that you will do poorly on the lesson?

16. When the teacher says that she is going to find out how much you have learned, do you get a funny feeling in your stomach?

17. If you did very poorly when the teacher called on you, would you probably feel like crying even though you would try not to cry?

18. Do you sometimes dream at night that the teacher is angry because you do not know your lesson?

The examiner then makes the following statement before continuing:

in the following questions, the word “test” is used. What I mean by “test” is any time the teacher asks you to do something to find out how much you know or how much you have learned. It could be by your writing on paper, or by your speaking aloud, or by your writing on the blackboard. Do you understand what I mean by “test”-it is any time the teacher asks you to do something to find out how much you know.
19. Are you afraid of school tests?
20. Do you worry a lot before you take a test?
21. Do you worry a lot while you take a test?
22. After you have taken a test do you worry about how well you did on the test?
23. Do you sometimes dream at night that you did poorly on a test you had in school that day?
24. When you are taking a test, does the hand you write with shake a little?
25. When the teacher says that she is going to give the class a test, do you become afraid that you will do poorly?
26. When you are taking a hard test, do you forget some things you knew very well before you started taking the test?
27. Do you wish a lot of times that you didn't worry so much about tests?
28. When the teacher says that she is going to give the class a test, do you get a nervous or funny feeling?
29. While you are taking a test do you usually think you are doing poorly?
30. While you are on your way to school, do you sometimes worry that the teacher may give the class a test?
We're going to be doing some fun things together today. Things that are a lot like games. For instance, there are some puzzles and some blocks that you will get to use. And there are some mazes to work, and even some funny cartoons to see. Just like when you play games, parts of what we do may be easy for you, and other parts may be hard. That's because some of the things are for kids younger than you, and some of the things are for kids older than you. So don't worry if you can't get all the answers right. I don't expect you to know all the answers. Do you have any questions before we start?

(Allow the child to respond.) Then let's begin.
"TEST" INSTRUCTIONS

We're going to be doing some important things together today. I am going to give you a test that isn't like the tests you usually take. It is a test to measure your intelligence. Intelligence is how well you solve problems and answer questions. Some of the test items will be hard for you, and some of the test items will be easy for you. That's because some of things are for kids older than you, and some of the things are for kids younger than you. I don't expect you to know all the answers, but I do expect you to do the very best you can. Do you have any questions? (Allow the child to respond.) Then let's begin.
APPENDIX F

SUMMARY OF ANOVA: TYPE OF INSTRUCTIONS BY VERBAL, PERFORMANCE, AND FULL SCALE IQ SCORES
<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1</td>
<td>48.091</td>
<td>48.091</td>
<td>.416</td>
<td>.522</td>
</tr>
<tr>
<td>Within Groups</td>
<td>42</td>
<td>4838.091</td>
<td>115.193</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>4886.182</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Df = Degrees of Freedom   SS = Sum of Squares   MS = Mean Squares
Table 7

**Summary of ANOVA: Type of Instructions by Performance IQ**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1</td>
<td>414.205</td>
<td>414.205</td>
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<td>.093</td>
</tr>
<tr>
<td>Within Groups</td>
<td>42</td>
<td>5882.955</td>
<td>140.071</td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>43</td>
<td>6297.159</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DF = Degrees of Freedom  SS = Sum of Squares  MS = Mean Squares
Table 8

Summary of ANOVA: Type of Instructions by Full Scale IQ

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1</td>
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<td>172.023</td>
<td>1.576</td>
<td>.216</td>
</tr>
<tr>
<td>Within Groups</td>
<td>42</td>
<td>4584.227</td>
<td>109.148</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>4756.250</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

DF = Degrees of Freedom   SS = Sum of Squares   MS = Mean Squares
APPENDIX G

SUMMARY OF ANOVA: ANXIETY LEVEL BY VERBAL, PERFORMANCE, AND FULL SCALE IQ SCORES
Table 9

Summary of AVOVA: Anxiety level by Verbal IQ

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
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<td>32.818</td>
<td>32.818</td>
<td>28</td>
<td>.595</td>
</tr>
<tr>
<td>Within Groups</td>
<td>42</td>
<td>4853.364</td>
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</tr>
<tr>
<td>Total</td>
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<td>4886.182</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

DF = Degrees of Freedom    SS = Sum of Squares    MS = Mean Squares
Table 10

**Summary of ANOVA: Anxiety Level by Performance IQ**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1</td>
<td>27.841</td>
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<td>.668</td>
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<tr>
<td>Within Groups</td>
<td>42</td>
<td>6269.318</td>
<td>149.269</td>
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<tr>
<td>Total</td>
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<td>6297.159</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

DF = Degrees of Freedom  
SS = Sum of Squares  
MS = Mean Squares
Table 11

Summary of ANOVA: Anxiety Level by Full Scale IQ

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1</td>
<td>24.750</td>
<td>24.750</td>
<td>.220</td>
<td>.642</td>
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<tr>
<td>Within Groups</td>
<td>42</td>
<td>4731.500</td>
<td>112.655</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>4756.250</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

DF = Degrees of Freedom  
SS = Sum of Squares  
MS = Mean Squares
APPENDIX H

SUMMARY OF ANOVA: TYPE OF INSTRUCTIONS BY ANXIETY LEVEL

FOR VERBAL, PERFORMANCE, AND FULL SCALE IQ SCORES
Table 12

Summary of ANOVA: Type of Instructions by Anxiety Level For Verbal IQ

<table>
<thead>
<tr>
<th>Source of Variation</th>
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<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety (A)</td>
<td>32.818</td>
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<td>32.818</td>
<td>.273</td>
<td>.604</td>
</tr>
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<td>Instructions (B)</td>
<td>48.091</td>
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<td>48.091</td>
<td>.400</td>
<td>.531</td>
</tr>
<tr>
<td>A x B</td>
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<td>.364</td>
<td>.003</td>
<td>.956</td>
</tr>
<tr>
<td>Residual</td>
<td>4804.909</td>
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<td>120.123</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SS = Sum of Squares  
DF = Degrees of Freedom  
MS = Mean Squares
## Table 13

### Summary of ANOVA: Type of Instruction by Anxiety Level

#### For Performance IQ

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety (A)</td>
<td>27.841</td>
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<td>27.841</td>
<td>.190</td>
<td>.665</td>
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<tr>
<td>Instructions (B)</td>
<td>414.205</td>
<td>1</td>
<td>414.205</td>
<td>2.833</td>
<td>.100</td>
</tr>
<tr>
<td>A x B</td>
<td>6.568</td>
<td>1</td>
<td>6.568</td>
<td>.045</td>
<td>.833</td>
</tr>
<tr>
<td>Residual</td>
<td>5848.545</td>
<td>40</td>
<td>146.214</td>
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</table>

SS = Sum of Squares  
DF = Degrees of Freedom  
MS = Mean Squares
Table 14

Summary of ANOVA: Type of Instruction by Anxiety Level for Full Scale IQ

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety (A)</td>
<td>24.750</td>
<td>1</td>
<td>24.750</td>
<td>.217</td>
<td>.644</td>
</tr>
<tr>
<td>Instructions (B)</td>
<td>172.023</td>
<td>1</td>
<td>172.023</td>
<td>1.510</td>
<td>.226</td>
</tr>
<tr>
<td>A x B</td>
<td>1.114</td>
<td>1</td>
<td>1.114</td>
<td>.010</td>
<td>.922</td>
</tr>
<tr>
<td>Residual</td>
<td>4558.364</td>
<td>40</td>
<td>113.959</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SS = Sum of Squares  DF = Degrees of Freedom  MS = Mean Squares
APPENDIX I

SUMMARY OF ANOVA: TYPE OF INSTRUCTIONS BY ANXIETY LEVEL FOR THE EXPERIMENTAL SUBTEST CONFIGURATION
Table 15

Summary of ANOVA: Type of Instructions by Anxiety Level

For the Experimental Subtest Configuration

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>Sig of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety (A)</td>
<td>1.720</td>
<td>1</td>
<td>1.720</td>
<td>.582</td>
<td>.450</td>
</tr>
<tr>
<td>Instructions (B)</td>
<td>6.323</td>
<td>1</td>
<td>6.323</td>
<td>2.139</td>
<td>.151</td>
</tr>
<tr>
<td>A x B</td>
<td>.494</td>
<td>1</td>
<td>.494</td>
<td>.167</td>
<td>.685</td>
</tr>
<tr>
<td>Residual</td>
<td>118.225</td>
<td>40</td>
<td>2.956</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SS = Sum of Squares    DF = Degrees of Freedom    MS = Mean Squares
References


