

THE UNIVERSITY OF ALBERTA

THE EFFECTS OF COMPETITION ON ACHIEVEMENT MOTIVATION,
TEST ANXIETY, SES, AND DIFFICULTY OF TASK

BY



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ABSTRACT

The aim of this study was to assess the effects of competitive and non-competitive instructional environments on performance, and to investigate the relationship between achievement motivation, test anxiety, and instructional environment for different socioeconomic groups at three levels of task difficulty.

Tasks taken from a 'culture fair' intelligence test, at three levels of difficulty, were administered to 115 Grade 5 boys. The design employed both univariate and multivariate four-way analyses of covariance, with I.Q. being used as the covariate, and with factors of Environment (competitive vs non-competitive), Achievement Motivation (HighMS vs LowMS), Test Anxiety (HighTA vs LowTA), and Socioeconomic Status (HighSES vs LowSES).

The results indicated that both environments exerted facilitating and inhibiting effects on performance at Medium and High Task Difficulty, but had no differential effect on performance at the lowest level of task difficulty. Significant first-order interactions were obtained involving SES and Environment, and SES and Achievement Motivation. Two significant second-order interactions were also obtained. Implications for the use of Competition in the classroom are discussed.

Predictions made on the basis of achievement motivation theory were also tested and were not supported by the results. Tentative suggestions are made for qualifications to some propositions of this theory.

The present study was largely exploratory in its investigation of competition. However, some implications for future research on both classroom competition and achievement motivation are suggested.

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CHAPTER ONE

INTRODUCTION

Of the many different motivational conditions utilised by teachers one of the most common is competition, an environment which is generally assumed to be an effective mode of classroom interaction. Recently, however, this assumed efficacy has been the subject of discussion among observers of the educational process. One such critic Melyin Silberman (1971), has described the 'hidden curriculum' as inviting

Destructive competition among students by dominating social interaction. (p.316)

Similarly Arthur Staats (1971) stated that

When one is concerned that the system of rewards is effective for all children, one begins to question the value of competition for producing intellectual learning. (p.203)

These views find support among other critics of Western education. The accounts of teachers' given in Herndon (1972), and Jackson (1968) and those of educational academics, Biggs (1972), Silberman (1971), Illich (1971) attest to a discomfort with the use and effects of competition in schools. Complementing such criticism is that levelled against norm-referenced evaluative techniques which also utilise a competitive approach to the allocation of marks and grades (Bloom, 1971).

There is, however an opposite viewpoint. Many research

Studies have found that competition facilitated performance on specific tasks (Owens (1970), Clifford (1971), Church (1964). Performance on specific tasks. Owens (1970), Clifford (1971), Church (1964). David Ausubel also supports this claim:

Competition stimulates individual effort and productivity promotes higher standards and aspirations, and narrows the gap between capacity and performance...Competition makes group games and everyday tasks less monotonous (1968, p.424).

Controversy exists concerning the effects of competition. The literature reviewed in the next section makes apparent one reason for this controversy; the research on competition has been carried out in such a variety of settings and on such a range of tasks that any integration of findings is made difficult. This literature review also highlights the absence of detailed study of the operation of competition in the classroom, using tasks relevant to the classroom. This latter conclusion points to the setting for this study; the investigation of the influence of classroom competition upon performance.

As a motivational technique competition interacts with other variables. Because the classroom teacher is vitally concerned with achievement, the operation of the achievement motive is clearly relevant to any study of performance. Achievement motivation is also of interest for its apparently competitive nature; it is defined in terms of competition with a standard of

excellence' (Atkinson, 1966, p.203), and as 'entering into competition with other persons' (Smith, 1969, p.1). Concern with achievement motivation involves recognition of the role of test-anxiety, for resultant achievement motivation is defined in terms of the resultant of two opposing tendencies, that to achieve success and that to avoid failure.

The lack of control over task variables is a major weakness, in the external validity sense, of studies involving competition; tasks vary both in the nature of their content and in difficulty. While the classroom setting of this study suggests that the content be relevant to that situation, it is also clear that control for difficulty of task must also be achieved.

These then are the parameters of this study: competitive and non-competitive environments are compared in their effect on performance and in their interaction with personality and task variables.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Competition has been a subject of interest for the social sciences for many years. Margaret Mead surveyed the presence of competition in primitive societies as early as 1937. Other studies, concerned for the most part with Western society, assessed the influence of such factors as political ideology (Bronfenbrenner, 1962), economic structure (Romney and Romney, 1963), and child-rearing practices (Barry, Bacon and Child, 1957) upon competitive modes of social interaction. These have been classic studies and though they have surveyed competition and its effects within a wide context, they have all been observational and descriptive rather than manipulative.

Theoretical Views of Interpersonal Competition

May and Doob (1937), in summarising works on competition and cooperation up until that time, presented a view of competition centered upon the existence of a common goal which was not equally available to all individuals striving for it. In this style of behavior there were few 'affiliative contacts' between competitors. (May, in Deutsch, 1949, p. 130). May and Doob set out a more detailed inventory of the conditions accompanying competition and cooperation than had previously been available, yet most of

Their work was concerned with collating results rather than developing a particular view of the nature of these variables (see May, 1937, pp. 888-889).

Morton Deutsch (1949) approached directly the problem of a theory of competition, and he like many other writers coupled it with cooperation. Deutsch considered competition in terms of modes of social interaction and followed May and Doob in making the basic concept in his theory the availability of a 'goal-region.' He defined the competitive situation as one with

Contriently interdependent goals...so that if a goal-region is entered by any individual...the other individuals will, to some degree, be unable to reach their respective goals in the social situation under consideration (1949, p. 132).

This has remained the central theoretical concept in Deutsch's writings on competition, and has an important place in his theory of conflict (1969a, 1969b).

Deutsch, and May and Doob agreed on two key components of a competitive situation:

1. A goal common to a number of individuals or groups.
2. Limitation of the possibility of attainment of that goal.

Festinger (1954) took a different approach to competition, placing it in the context of the more general social comparison process. According to his theory social comparison arises from the individual's drive to evaluate his opinions and abilities when there is no objective, non-social standard of comparison available. Then

People evaluate their opinions by comparison, respectively with the opinions and abilities of others (1954, p. 118).

Given this drive toward social comparison, Festinger saw two processes contributing to competition. First, there is the 'unidirectional drive upwards' present in every individual, a drive to do better, to gain a higher score. The second pressure on the individual, which acts in concert with the first, is a pressure towards uniformity, to make the opinions and abilities of the group the criterion. As a result of these two forces the individual is driven to protect his position of superiority vis-a-vis that of the group, i.e. to be competitive. Further, because of the drive to do better, the members of the group are all pressured to maintain a position slightly superior to that of the rest of the group. Thus Festinger saw something of a spiral effect resulting from the drive to evaluate opinions and abilities against those of others.

Like Deutsch, Festinger also made goal-striving a necessary condition for competitive behavior. In contrast to Deutsch, he placed more emphasis on the role of personality factors; the drive to evaluate, and the push upwards to superiority. So far the competitive personality has received only tentative examination. (Kelley and Stahelski, 1970), while the evaluation component of social comparison has received some attention in a classroom context (Pepitone, 1972).

Evaluation has also been the subject of concern for

workers in social facilitation theory; the effect of the presence of others on individual behavior. Thus Cottrell (1967) suggested that coaction effects and the expectation of either positive or negative outcome combine to produce competitive behavior. In testing the claims made by this theory, Wankel (1972) found that while rivalry did have an effect on performance in a reaction-time task, audience presence and coaction were not criterial attributes of a competitive situation. In Wankel's view the evaluative component of the rivalrous situation accounted for much of the effect of competition.

There is then agreement within these theories about the components important in competitive behavior, though it is obvious that attempts to provide an adequate theoretical framework for study of this phenomenon have not been pursued at great length. In summary, competition as a mode of social interaction competition is characterised by:

1. The presence of a goal common to a number of persons.
2. Limitation of availability of this goal, or of reward, so that it is not equally available to all.
3. Evaluation of the individual in relation to others.

Research Involving Interpersonal Competition

One of the peculiar features of research on competition is that it has involved a number of different fields within psychology. The different approaches are outlined briefly in this next section.

Developmental and cross-cultural studies

Within recent years a number of studies have looked at the strength of competition and cooperation in different age groups and across several cultures. Many of the studies have used the paradigm developed by Madsen and Shapira (1969), involving the observation of competitive and cooperative behavior under different reward conditions. Subjects were placed in game-like situations in which they could cooperate or compete with other persons. The data arising from these studies (Madsen and Nelson (1973), Madsen (1971), McClintock and Nuttin (1969)) showed clearly that manipulation of reward, through instructions, affected the amount of competition or cooperation. The cross-cultural replication, of these same studies, in Mexico, Belgium, and Israel showed significant differences in willingness to compete, or cooperate in different cultural and sub-cultural groups; urban children were more competitive than rural children, city children more competitive than those in a kibbutz. Further, a pattern of increasing competitiveness up until age 9 years was also apparent. In all these studies change in reward conditions and in the content of instructions proved effective manipulative techniques.

A survey of these studies also indicated the relationship between competition and socioeconomic level. The work of Madsen (1967) in Mexico showed a difference in levels of competitiveness between poor children, both rural

and urban, and urban middle-class children; the former group being the less competitive. Madsen suggested that subcultural differences were largely responsible for the observed difference in level of competition. However McKee and Leader (1955) found that preschool children of Low SES level were more competitive than children of middle-class white American families. The relationship of SES and competition is further confused by other contrasting results. Owens (1970) found that in his sample middle-class children competed more on a marble-dropping task than did the lower-class children. On the other hand Nelson and Madsen (1972), using a similar task, found no differences in competitiveness between negro and white lower class and white middle-class four year-olds. In a wider context Lawton (1969) points to one other complicating factor when he notes a distinction between interclass and intraclass competition. Thus in a school setting, while lower-class children may opt out of competitions with their middle-class peers, they may be competitive in interacting with other lower-class children.

Knowledge relating to this influence of SES on competition does not then allow any firm conclusions to be drawn. This is due in part to the use by different experimenters of different tasks and different age groups in their studies.

Competition and Group Interaction

Social psychologists have established a firm tradition of study involving competition; the discussion of the theories of competition is evidence of that. Kelley (1952) emphasised evaluation as one of the key functions of a reference group; the other function of the group he identified was that of source and enforcer of standards. In its normative function Kelley saw the group as providing a standard of measurement for the individual. This view is very similar to that of Festinger, especially his 'drive toward uniformity.'

Like research in the developmental field much of the social psychology work has been concerned with behavior in game-like situations, especially the Prisoner's Dilemma Game. This places a small number of individuals in situations where they must make decisions about their own future moves, considering both their opponents likely strategy and the possible payoff. Deutsch, in summarising much of this work, concluded that generally competition appeared a less attractive mode of group interaction than cooperation, because it resulted in less production by the group, greater levels of tension within the group, and less satisfaction for individual group members.

Research of this type is of limited relevance for the classroom, partly because it is carried out in a game-like context, and also because it attends primarily to group outcomes. In contrast, classroom activity is concerned

primarily with situations which do not involve games, and is more concerned with the individual as a unit than with results of group interaction.

The Description of Environments

One factor which makes difficult the comparison of studies within this area is that different conditions have been studied in company with competition. Thus some have opposed competition and cooperation, others competition and conflict, and rivalry has also been used as an alternative to competition, in the sense that rivalry is less noble than competition. (The semantic confusion surrounding the construct of competition is illustrated by Wankel's (1972) use of rivalry as one attribute of competition.) The position adopted here is that the component concepts of competition are sufficiently numerous and complex to necessitate investigation on their own, without introducing a separate set of concepts involved in another composite variable such as cooperation. Thus in this study competition is compared with non-competition.

A further distinction is made here between two types of competition. Interpersonal competition involves the direct interaction of a group of individuals, and the consequent 'public' evaluation, comparison, and reward on the basis of the individual's standing relative to that of the group. This form of competition has all the criterial attributes of competition outlined in the discussion of

theoretical views of this variable. It is interpersonal competition which is the subject of this study. Another, logically distinct type of competition may be termed intrapersonal competition. In this type, the processes of evaluation, comparison, and reward are basically internalised, and are executed by the individual using his own criteria of excellence. The normative component of interpersonal competition, whereby individual ~~with~~ is judged relative to that of the group, is missing from intrapersonal competition.

Competition and Task Difficulty

Since most studies of competition have looked at performance they have also, explicitly or implicitly, been concerned with difficulty of task. More often than not the concern has been implicit; task difficulty has rarely been included as a factor in the design of the study. In addition, most experiments involving competition have used different tasks. While Church (1964) investigated the effect of competition on reaction-time on a switching task, Mogar (1962) used a tracking task, Hamblin (1964) a table-levelling problem, and Wilson (1965) syllogistic reasoning as task variable. It is not surprising that there is a problem created for anyone wanting to integrate the findings of research on competition. The importance of the task is further emphasised when results from studies using apparently similar tasks are compared. Kalish (1966) found

that competition made no difference to level of performance on a concept-attainment test, while in Wilson's study the subjects in the competitive condition made fewer errors on syllogistic reasoning than did Ss in the cooperative condition. These results suggest that even when tasks are similar in nature it is possible that the difficulty level of the tasks could account for the contrasting patterns of results.

In the studies reviewed above, difficulty of task has not been manipulated within the experimental situation. Thus it was the intent in this study to use tasks of a similar nature and to vary the level of difficulty of those tasks, using empirically derived estimates of difficulty for the experimental population

Test Anxiety

O'Neil, Spielberger and Hansen (1969) studied the relationship between state-anxiety and performance on easy and difficult mathematical concept-attainment tasks using computer-assisted instruction. They found that High Anxious Ss made more mistakes on the difficult tasks than would Low Anxious Ss, but that this pattern reversed on the Easy tasks. O'Neil et. al. also found an increase in state-anxiety on the difficult tasks. In a follow-up study, Tennyson and Woolley (1971) noted a similar increase in anxiety with increased task difficulty, and also found that the effect of anxiety was different for High and Low Anxious groups.

depending upon the initial level of anxiety.

The view of anxiety used in the above studies is that developed by Spielberger, and is centred around a distinction between Trait-Anxiety, a relatively permanent psychological disposition, and State-Anxiety, a momentary, process variable aroused by a particular situation. In these studies the level of State Anxiety had increased with increased level of task difficulty. Though this paradigm will not be used in this study as a measure of test anxiety, it is important to note the relationship between anxiety and task difficulty.

The relationship between anxiety and competition is by no means as clear as that indicated above for task difficulty and anxiety. Intuitively one would expect a linear relationship to exist between anxiety and increasing competition. However evidence for such a relationship is relatively scarce. Sieber (1969) points to the existence of increased anxiety in a test situation; she defines test anxiety as

A state of uneasiness, discomfort, fear or nervousness which an individual may experience when he perceives that his performance is going to be evaluated. (p.46)

Sarason (1960), in his work on test anxiety, provides a similar definition and notes the attendant personality disturbance and learning difficulties (p.9). It must be noted that neither Seiber nor Sarason make any assumptions about competitive environments; they talk only of evaluation and test-like situations.

It is argued here that several lines of evidence point to the existence of higher anxiety in the competitive environment, though it is realised that such arguments are in no way conclusive. There is evidence from studies comparing norm-referenced and criterion-referenced evaluative techniques that the former, normative, evaluation is associated with a significant increase in problems of self-concept for a large group of the population (Torshen, 1969). It is possible that one of the contributing causes is the increased anxiety level associated with the interpersonal competition in a normative evaluation.

Christy, Geland, and Hartmann (1971) argue that competition does increase the individual's general level of arousal. Taking the Bandura and Walters (1963) view that frustration serves as an arousal stimulus, they argue that competition is also an arousal stimulus because it is a form of frustration; it exposes the individual to the threat of defeat, and to unpredictability of outcome. It is possible that this increased frustration is accompanied by increased anxiety. Church (1967) found that there was higher arousal in a competitive condition, using palmar skin conductance as index of arousal. Thus it seems reasonable to suggest that the increased arousal noted in the competitive situation is also indicative of an increased level of anxiety.

Anxiety is also relevant for this study because of its

relationship with achievement motivation; test anxiety is used as a measure of the Motive to Avoid Failure in that theory. Indeed the view of this Motive to Avoid Failure held by Atkinson supports the arguments made above for examining the relationship of Test Anxiety and performance in a competitive situation.

The concept of an inhibitory tendency yields an explanation derived from achievement motivation theory of why persons who score high on the TAQ normally tend to perform more poorly on competitive achievement tests than their less anxious peers (Atkinson and Feather, 1966, p. 335).

Competition and Achievement Motivation

Based on a view of motivation as affective arousal, McClelland et.al. (1953) posited the existence of an achievement motive. Atkinson later took up the development of the propositions basic to the theory of achievement motivation and reported empirical support for them in two reviews (Atkinson, 1964; Atkinson and Feather, 1966). Achievement motivation theory is one of a number of expectancy-value theories which attempts to explain behavior within the domain of achievement-oriented activity. It attributes

The strength of a tendency to undertake some activity to the cognitive expectation, or belief, that the activity will produce a certain consequence, and the attractiveness, or value, of the consequence to the individual. (Atkinson, 1966, p. 328).

Specifically Atkinson claims that the tendency to act is a multiplicative function of a motive or need (M), a certain strength of expectancy or probability of success (Ps), and

the incentive value of success at that activity (I_s). This may be expressed as

$$T = M \times P_s \times I_s$$

Where $I_s = 1 - P_s$.

In achievement-related activities, it is claimed, two major tendencies are operative; one is a Tendency to Achieve Success (T_s), the other is the inhibitory tendency not to undertake actions expected to lead to failure- the Tendency to Avoid Failure (T_{af}). The resultant of these is the Tendency toward action (T_a). T_a is a linear combination of the two tendencies where one is a negative tendency.

$$T = T_s + (-) T_{af} + T_{ext}$$

Where T_{ext} is a recent addition to the theory which includes influences of tendencies not associated with achievement.

M_s is measured by means of the Thematic Apperception Test (TAT) and M_{af} is measured by a test anxiety (TA) test.

Atkinson isolates two groups for special study in his research, the High achievement motivation group and those Low in achievement motivation. For these groups Atkinson makes the following predictions:

1. Persons in whom $M_s > M_{af}$ will show a more marked preference for intermediate achievement-risks than persons in whom $M_{af} > M_s$.
2. Persons in whom $M_s > M_{af}$ will perform an achievement-related task more efficiently and rapidly than will the $M_{af} > M_s$ group.

3. The group in which $M_s > M_{af}$ will be less persistent than persons in whom $M_{af} > M_s$, at a task initially presented as difficult and when there are other achievement-related activities available as alternatives. (1966, p.303-304.)

The theory of achievement motivation is clearly relevant to performance studies, and on the basis of its predictions one should expect differential patterns of performance for the High M_s Low TA and Low M_s High TA groups. Veroff (1969) has suggested that the strength of 'social-comparison' achievement motivation is strongest after age nine, so that Atkinson's predictions would seem directly applicable to the children to be used in this study.

When one comes to examine this theory several questions are not readily answered. First, would one expect the same pattern of results in competitive and non-competitive situations? Further, since it is hypothesised that these situations involve different levels of anxiety, and the theory also makes assumptions about the performance of different anxiety groups, would the performance of the different achievement motivation groups be the same in situations different in level of anxiety? Finally, the definitions of an achievement-related situation raise the question of whether such a situation is in fact only a competitive one. The quotations listed below all suggest that it is reasonable to characterise the achievement-

related situation as competitive,

It applies when an individual knows that his performance will be evaluated by himself or by others) in terms of some standard of excellence, and that the consequences will either be a favorable or an unfavorable evaluation (Atkinson, 1964, p.241).

Test anxiety scores and the psychogalvanic index of manifest anxiety were positively correlated, as they should be if each was a measure of fear aroused in a competitive situation (Atkinson, 1966, p.23).

... A situation which is structured as a test, involving considerable pressure toward doing well (Feather, 1966, p.38).

For many students, homogeneous ability grouping should provide a competitive achievement situation more nearly approximating one of intermediate probability of success (O'Connor, Atkinson and Horner, 1966, p.231).

Achievement-related motivation refers to the personality factors that come into play when a person undertakes a task at which he will be evaluated, enters into competition with others, or strives to attain some standard of excellence (Smith, 1969, p.1).

(Given that these definitions all refer to the same type of situation, and that they contain frequent references to competition, it would appear that the achievement-related situation is not defined with it would appear that the achievement-related situation is not defined with great precision. Consequently the following questions are suggested:

1. Can one equate 'competition with others' and 'striving to attain a standard of excellence'?
2. Is evaluation by self the same process as evaluation by others?
3. Could one logically conceive of two types of achievement-related situations, one competitive and

the other non-competitive?

4. Is achievement motivation theory relevant to test situations involving 'pressure toward doing well' and 'fear' ?

Within the literature such questions have been raised but not extensively investigated. Maehr and Sjögren (1971), in reviewing studies in achievement motivation, suggested that there was confusion about both the competitive element inherent in the definition, and the nature of the standard of excellence. They postulated the use of both internal and external standards, resulting in the development of two types of achievement motivation; self-competitive and social-competitive motivations. A similar distinction was made by Veroff (1969) when he suggested that two types of achievement motivation develop with age; an autonomous achievement motivation and a social comparison achievement motivation. Like Maehr and Sjögren, Veroff uses competition as the basis for differentiating these types, distinguishing between competition with norms set by oneself (autonomous) and the competition with norms of the group (social comparison).

Therefore achievement motivation is relevant because of its predictions about performance, and also because of its relationship with competition. The distinction made in this study between competitive and non-competitive environments allows examination of that relationship in two

important ways. First, the influence of situational variables on achievement motivation can be studied - predictions from the theory can be examined in the two environments. In addition the influence of task difficulty on the different achievement motivation groups can also be assessed.

Competition and the Classroom

The presence of competition in the classroom is well documented by many critics of Western education, though the research on this use of competition is still very small in volume. Pepitone (1972) showed that social comparison behavior could be observed in Grade 3 girls and was elicited by cognitive uncertainty and by similarity of task. When children were asked to complete a matching task with a completed model either present or absent, they exhibited more competitive behavior when the model was absent. In that condition the children were forced to evaluate their efforts against those of others, and there was a rise in the amount of 'besting' behavior; with the model present as a standard of excellence they were significantly less competitive.

Clifford (1971) compared performance of Grade 5 and 6 subjects in individual goal-setting and competitive conditions. Performance in the competitive environment was shown to be a function of initial ability, presence or absence of reward, and the nature of the comparison group.

In a further study, Clifford, Cleary and Walster(1971), the interaction of competition and task difficulty was noted. When a simple motor task was given to the subjects performance was significantly better in the competitive condition; with the task changed to a mathematics ability test the difference in performance levels for the two conditions disappeared. Clifford(1972) gave a vocabulary learning task to Grade 5 boys and girls over a two week period. She found a vocabulary learning task to Grade 5s over a two week period. She found a significant increase in the interest engendered under the competitive instructions, but there were no significant differences on measures of performance or retention between the groups.

The role of competition in the classroom is certainly not clear from these studies, for although ability, reward, and group effects were noted no study has looked at the task difficulty factor in its interaction with other relevant variables. This then appears to be a significant area of classroom behavior in need of further investigation.

Concluding discussion of Related Literature

1. Theoretical analyses of competition indicate three defining attributes of a competitive environment; presence of a common goal; limitation of availability of reward or goal attainment; and evaluation of individual performance relative to that of others.

2. Competitiveness exists in differing strengths across different cultures and subcultures.
3. Competition interacts with socioeconomic status though the nature of this interaction is confused by contrasting patterns of results.
4. While evaluation is a key function of a reference group, competitive evaluation has disadvantages in a group situation which are not associated with a cooperative mode of social interaction.
5. A relationship between competition, test anxiety, and task difficulty is suggested.
6. Achievement motivation theory, while dealing with motives relevant to the classroom is suggested to be related to competition. The existence of different achievement-related situations is postulated.
7. Research on classroom competition has generally confirmed the relevance of the propositions outlined within several of the theories of competition. These are stated in summary form on page 7.

CHAPTER THREE

RATIONALE AND HYPOTHESES

General Statement of the Problem

The aim of this study was to assess the effect of competitive and non-competitive instructional environments on performance, and to investigate the relationship between achievement motivation, test anxiety and instructional environment for different socioeconomic groups at three levels of task difficulty.

Rationale for Design of the Study

The basic rationale for this study emerges from the review of the literature, and each of the variables involved has been discussed in that section. The intention in this section is to discuss the variables as they relate specifically to this study.

The instructional environments used were those suggested by Kalish (1966), competitive (CE) and non-competitive (NCE). This paradigm was adopted in an attempt to make specific the operative components of competition, and also to avoid introduction of the concept of cooperation.

The involvement of achievement motivation had two purposes. Initially the achievement motive was seen to be important for

Performance on the cognitive tasks chosen for the study. Further, it was intended that this study have the additional purpose of investigating the empirical adequacy of predictions arising from achievement motivation theory in regards to both situational context and difficulty of task. The method chosen for the latter purpose was to compare the accuracy of predictions involving performance level, persistence, and risk-preference, in the two instructional environments.

It was clear from the literature reviewed that difficulty of task was a key variable. Much of the confusion surrounding the effects of competition would seem to be due to a failure to control for the difficulty of the task. The work of Clifford(1972) further developed the importance of task difficulty within tasks of a similar nature. Thus the tasks chosen were all from the same test and the three groups, at each level of difficulty, were equivalent in content.

The inclusion of achievement motivation necessitated the measurement of test anxiety. However, test anxiety was implicated by two other sources of evidence. There was evidence of an interaction between anxiety and task difficulty(Tennyson and Woolley,1971). Moreover it was maintained that a higher level of anxiety would be characteristic of the CE.

Other Relevant Variables

Ability

Clifford's (1971) study showed that performance in a competitive environment was partly a function of an interaction between ability, reward and group composition. Thus it was intended to gather I.Q. measures for the sample to allow control for this variable through its use as a covariate.

Sex

Differential sex effects had been noted in the measurement of several variables involved in this study. Veroff (1969) found that boys responded to increased achievement arousal with increased achievement motivation level, whereas girls showed a decrease in achievement motivation level following increased arousal. Horner (1969) also found different strengths of achievement motivation in males and females, and suggested the existence of a Fear of Success motive which was stronger in women than in men, and which accounted for the superior performance of men over that of women in the competitive situations employed in the study. Sarason (1960), Phillips (1962), and Feld and Lewis (in Smith, 1969) all reported higher Test Anxiety levels in girls than in boys. Phillips also found an interaction between sex, SES, and anxiety. In his sample he found that there were more children of high anxiety level in the lower-class, but that there were more girls than boys with high anxiety scores within that SES group.

Socioeconomic Status (SES)

A final classificatory variable, more difficult to control for, had been shown to interact with some of the variables in this study. This was SES. Veroff, Atkinson, Feld and Gurin (1960) found different strengths of achievement motivation in different SES groups; those with higher achievement motivation level tended to have more education, and higher occupational level. Heckhausen (1967) also reported increased achievement motivation in higher SES groups. The widespread influence of this SES effect suggested that it should be taken into account in this study. Thus it was decided to select a sample which would be homogeneous with respect to SES.

Definitions

Achievement-related activity is activity undertaken by an individual with the expectation that his performance will be evaluated in terms of some standard of excellence. (Atkinson, 1966, p. 328.)

Achievement motivation is motivation aroused in an achievement-related situation.

Interpersonal Competition is a mode of social interaction which results from the activation of a competitive motive.

Competition involves the following components:

1. A common goal for all persons.
2. Limitation of availability of the goal, so that it is not equally available to all.
3. Evaluation of individual performance through

comparison with group performance.

4. Dispensation of reward on the basis of performance relative to that of the group.

Test Anxiety is a state of uneasiness, discomfort or nervousness which an individual may experience when he perceives that his performance is to be evaluated in a 'test-like' situation. (Sieber, 1969)

Task difficulty is defined as the probability that members of a group will make an incorrect response on items of similar nature.

Competitive environment has the following attributes:

1. A common goal, attainment of prizes.
2. A limited goal-availability, a restricted number of prizes.
3. Rewards dispensed on the basis of performance relative to that of the group.

Non-competitive environment deliberately avoids the use of interpersonal competition. It is characteristic of intrapersonal competition that:

1. No common goal is set for the group.
2. There is no limitation of reward; self-reinforcement is emphasised.
3. There is no normative evaluation; instead performance is evaluated using the individual's own criteria.

Performance is defined in terms of a score on the test items used in the study.

Hypotheses

Following a review of the related literature the following General Hypotheses were formed:

General Hypothesis A

There is a statistically significant relationship between performance and instructional environment.

General Hypothesis B

There is a statistically significant relationship between achievement motivation and instructional environment.

General Hypothesis C

There is a statistically significant relationship between instructional environment and performance on tasks of differing degrees of difficulty.

Specific Hypotheses

The following specific hypotheses were formed:

Hypothesis 1

The majority of studies reviewed in the previous Chapter suggested that competition had a facilitating effect on the performance of simple tasks.

H 1 :

At Low Task Difficulty Ss will perform better in the CE than in NCE.

Hypothesis 2

Clifford (1972) found no significant differences in performance on a power test between competitive and non-competitive conditions.

H 2 :

At High TD there will be no significant difference between performance in the CE and the NCE.

Hypothesis 3

This hypothesis is based on the assumption of a generally inhibitory effect of test anxiety.

H 3 :

In a competitive environment High TA subjects will perform more poorly than Low TA Ss at all levels of Task Difficulty.

Hypothesis 4

Studies by Christy et. Al. (1971) and Church (1967) suggest the following hypothesis:

H 4 :

High TA Ss will perform better in the NCE than in the CE.

Hypotheses 5, 6, and 7 were designed to test the meaningfulness of the distinction drawn between competitive and non-competitive achievement-related situations.

Hypothesis 5

H 5 :

High Ms Low TA subjects will perform better in the CE than in the NCE.

Hypothesis 6

H 6 :

High Ms Low TA subjects will perform better in the CE than will Low Ms High TA Ss.

Hypothesis 7

H 7 :

Low Ms High TA Ss will perform better in the NCE than in the CE.

Hypothesis 8

This hypothesis was made so that the predictions made by Atkinson and O'Connor and Feather (both in Atkinson and Feather, 1966) could be tested in both environments.

H 8 :

The predictions below will receive a greater degree of confirmation in the CE than in the NCE.

H 8:1 :

Ss High in Ms will show a more marked preference for intermediate achievement-risks than will Ss Low in Ms.

H 8:2

Ss High in Ms will perform an achievement-related task more efficiently and more rapidly than

subjects Low in Ms.

H 8:3 :

High Ms Low TA Ss will persist longer at the initial task when probability of success (Ps) is high (Ps > .50) than when Ps is low (Ps < .50).

H 8:4 : High Ms Low TA Ss will persist less than Low Ms High TA when the task is initially presented as difficult, and when alternative achievement Tasks are available.

CHAPTER FOUR

METHOD

Sample

The Initial sample contained 158 Grade 5 boys from four schools in the Edmonton Public School system. From this number 16 subjects were dropped because of absence from one of the testing sessions. In addition 19 were omitted because of incomplete classificatory data, either I.Q.scores or SES rating, and 8 tests or protocols were spoiled. This left a final sample of 115 boys. The age range of the sample was from 10 years 1 month to 11 years 10 months, and mean Lorge-Thorndike I.Q. was 111.

The design proposed for the study initially excluded SES for the reasons discussed at the end of the previous chapter. This assumption of homogeneity of socioeconomic status was not valid and thus the sample did include different SES groups.

Girls were excluded from the study because of the expected interactions of sex with both achievement motivation and test anxiety. Similarly age was controlled by limiting the sample to one Grade level; Grade 5 boys had been used in previous studies, and the age range indicated above had not been shown to be a likely source of confounding of effects.

Testing Sessions

Two testing sessions were held in late 1972 and early 1973, with approximately two months interval between sessions. All testing was carried out in groups in school classrooms, including some sessions in open areas. In the first session the Test Anxiety Scale for Children (TASC) (Sarason, Davidson, Lightall and Waite, 1958) and the achievement motivation test were administered to all groups. The TASC is included in Appendix B and is a self-report test requiring Yes/No answers to 30 questions.

The achievement motivation test is a modified version of the Thematic Apperception Test and was developed by Smith (1969, p. 114), using verbal cues instead of the normal pictorial cues used with the TAT. This verbal cueing of stories had been used in the studies of Winterbottom (in Atkinson, 1958) and Smith (1969), both of whom used the same grade levels in their samples. The test required Ss to write short stories in response to four topics, and these stories were then scored for achievement imagery according to the manual of McClelland et. al. (in Atkinson, 1958). The instructions and the topics for the stories are included in Appendix A.

On the basis of scores on these two tests Ss were classified as either High or Low on Test Anxiety, and High or Low on Motive to Achieve Success (Ms) using a median split for both sets of scores. Four blocks of subjects were then formed, yielding the following groups:

- High Ms Low TA
- High Ms High TA
- Low Ms Low TA
- Low Ms High TA

Members of these four groups were then classified as either High or Low SES, using scores on the Blishen scale (Blishen et.al., 1968) and making a median split for the whole sample, and then randomly assigned to either the Competitive environment (CE) or the Non-competitive environment (NCE). With the use of a 2 (Environment) x 2 (Achievement Motivation) x 2 (Test Anxiety) x 2 (SFS) design subjects were in each of the 16 cells. Cell identification and frequencies are given in Table 2.

The second test session was devoted entirely to the performance tests. Tasks, taken from Cattell's Culture Fair Intelligence Test, were first given to a sample of 120 Grade 5 children in the Edmonton Separate School system. These tasks were then arranged into three groups of twenty questions. The three groups were differentiated on the basis of task difficulty. The Low Task Difficulty items (Low TD), labelled 'EASY', were those which were answered correctly by 80% of the pilot-study sample; the Medium Task Difficulty tasks (Med TD), labelled 'MEDIUM', were answered correctly by between 45 and 55%; the last group, labelled 'DIFFICULT', were the High Task Difficulty items (High TD), and were answered correctly by 20% of the pilot sample.

The final testing session was conducted by two experimenters, with the CE and NCE groups being tested simultaneously.

In the final session each subject was given three test booklets, an Example Sheet, and an Answer Sheet. These are all included in Appendix C. Once Ss were assigned to their respective environments the initial instructions were read and the groups worked through the Example Sheet. Questions were answered by repetition of the relevant parts of the Instructions. Then the final instructions, different for the two environments, were read and the tests started. When finished the subjects were free to leave the room. On the Answer Sheet all Ss were asked to indicate the order in which they completed the tests, with preferred test being that done initially, and also to note the time of starting and finishing each test. Data from these last two parts were used for the task-preference and persistence analyses.

Rationale for Choice of Instruments

The TASC was chosen for two main reasons. First, it had been used in previous studies involving achievement motivation in elementary schoolchildren, as a measure of Maf (Smith, 1969, Feld and Lewis, 1969.) The intent of this study to compare results obtained with those of other studies necessitated that the same instruments be used. Secondly, the use of the TASC made conceptual sense. As indicated in the literature review the CE and NCE used in

this study were similar to the 'test-like' situations which were the subject of Sarason's initial study (Sarason, 1960, p.8).

The achievement motivation measure also suggested itself for it had been used in similar studies of this motive, and it was the most suitable for this sample. Again its use was mandatory if comparisons with other studies were to be made.

The tasks finally selected for the second testing session were the subject of a much longer search. For they had to satisfy three criteria:

1. It was necessary for purposes of relevance to the classroom that the tasks involve a cognitive rather than a motor skill. The items chosen involved various modes of information processing, serial tasks, matrix manipulation and like and different comparisons.
2. Any set of tasks needed to be easily divisible into levels of difficulty to enable investigation of the relationship of risk-preference and achievement motivation, and also the interaction of competition and task difficulty.
3. The final requirement made of the tasks was that they should be somewhat novel for the experimental population. This restriction was imposed so that as much as possible of any established ability hierarchy could be removed from the CE environment, to prevent an established "betting order" from making the

environmental manipulations ineffective. For this reason the tasks chosen were not typical Mathematics or English Language tests.

The Cattell tests satisfied each of these criteria; reports from the teachers indicated that they were in fact new to the classes tested.

Description of the Environments

As indicated in the previous Chapter the major difference between the two environments was in the emphasis placed on interpersonal competition in the CE, and the lack of this in the NCE. The critical components stressed were the comparison and evaluation of performance relative to that of the group, and the dispensation of reward on the basis of relative excellence. These elements formed the basis of the instructions for the CE and were deliberately omitted from the NCE instructions. Similar instructions had been used in a study by Wankel (1972). The prizes offered were all of candies, and they did seem to be of significant value to the CE groups.

Scoring Procedures.

The TASC was easily scored; answers were either Yes or No and the greater the number of Yes responses the greater the Test Anxiety score.

Scoring of the achievement motivation test was a more complicated process. The procedure followed was that outlined in the manual developed by McClelland et.al. (in

Atkinson, 1958). Two scorers were used and both trained themselves separately to the criterion of acceptable reliability specified in the manual. Following initial training in rating for specific categories, practice stories were scored and results compared with those of the expert scorers given in the manual. All stories were then scored by the first scorer and stories selected at random (N=80) were then fully marked by the second scorer. Reliability measures for the final ratings were computed, with percentage agreement being 84% and the Spearman Rank Order correlation coefficient being $r=0.87$.

The final tests were composed entirely of multiple-choice items, and were scored directly from the Answer Sheet. Following this, data for the final sample was tabulated and analysed according to the procedures outlined in the following Chapter.

CHAPTER FIVE

STATISTICAL ANALYSIS AND RESULTS

Initially it was proposed to analyse the data for this study using a three-way Analysis of Variance design (Environment x Test Anxiety x Achievement Motivation), to be carried out for each of the three levels of Task Difficulty. At this stage it was assumed that the sample would be homogeneous with respect to SES. As indicated in the description of the sample this $p=0.0001$). Assumption proved to be invalid when tested (School x SES, $F=28.78$, thus blocks of High and Low SES groups were formed, using a median-split on the total sample, and SES was included as a fourth factor in the design. Further, since the tasks were taken from an intelligence test and were shown to correlate (see Table 4) significantly with I.Q., scores for Lorge-Thorndike tests were taken from school records and I.Q. was used as a covariate. Thus the final design was a four-way multivariate analysis of covariance. (Environment x Achievement Motivation x Test Anxiety x SES), with I.Q. as the covariate. This was carried out for each of the three dependent variables (3 levels of Task Difficulty) separately and together using both MANCOVA and ANOVA. The following were the factor levels:

Factor A: Environment

1. Competitive (CE).

2. Non-competitive. (NCE) .

Factor B: Achievement Motivation

1. High motive to achieve success (High Ms) .
2. Low motive to achieve success (Low Ms) .

Factor C: Test Anxiety:

1. High test anxiety (High TA)
2. Low test anxiety (Low TA) .

Factor D: SES:

1. High SES
2. Low SES

The major part of the analysis was carried out using the NYBMUL program available through the Department of Educational Research Services of the University of Alberta. This program carries out separate univariate tests of main effects and interactions for each dependent variable, and then calculates a Step-Down F-ratio for each of the above main effects and interactions.

The Step-Down F procedure is akin to a series of analyses of covariance and indicates the effect of each dependent variable on subsequent dependent variables; thus the F-ratio for the second variable is tested with the effect of the first removed, and so on (Bock, in Cattell, 1966, p. 828.)

Finally NYBMUL computes a multivariate F-ratio and tests the significance of this for each main effect and interaction, when The three dependent variables are

Table 1 Identification and Frequencies

<u>Cell</u>	<u>Factor levels</u>			<u>N</u>
	<u>Environ</u>	<u>Achievement Motivation</u>	<u>Test Anxiety</u>	
1	1	1	1	8
2	1	1	1	8
3	1	1	2	7
4	1	1	2	8
5	1	2	1	7
6	1	2	1	8
7	1	2	2	9
8	1	2	2	9
9	2	1	1	5
10	2	1	1	7
11	2	1	2	7
12	2	1	2	5
13	2	2	1	8
14	2	2	1	6
15	2	2	2	7
16	2	2	2	9

Total N = 115

Table 2. Cell Means

Cell	Variates: Adjusted Means			I.Q.
	Low TD	Medium TD	High TD	(observed means)
1	17.36	11.72	5.53	109.83
2	17.48	13.61	5.12	111.13
3	18.14	13.14	5.05	119.29
4	15.75	11.59	4.28	101.25
5	16.89	11.54	4.84	106.43
6	17.37	11.18	5.98	107.38
7	17.99	12.83	3.91	114.22
8	18.43	10.92	4.19	110.00
9	17.84	12.23	5.48	122.20
10	17.79	11.29	3.57	106.00
11	17.74	13.24	6.37	113.44
12	18.17	13.71	2.90	107.40
13	18.15	13.44	4.77	105.88
14	16.25	11.32	4.05	115.00
15	16.55	9.27	4.47	119.43
16	18.32	11.36	3.68	106.78

Table 3. Summary Table for 4-way MANCOVA and ANCOVA

Source	DF	Univariate F			Step-Down F			Multi- variate F
		Low TD	Med TD	High TD	Low TD	Med TD	High TD	
A	1	.15	.11	1.41	.15	.26	1.24	.55
B	1	.01	3.02	.75	.01	3.68 [?]	.25	.27
C	1	.10	.02	2.13	.10	.09	2.05	.75
D	1	.07	.52	3.41 [?]	.07	.44	2.95 [?]	1.16
AB	1	.59	.09	.02	.59	.00	.01	.19
AC	1	.00	.23	2.05	.01	.25	2.37	.88
AD	1	.18	.02	5.15 [*]	.18	.00	5.29 [*]	1.83
BC	1	.47	1.23	.66	.47	2.17	.32	.98
BD	1	.39	.26	4.17 [*]	.39	.65	4.72 [*]	1.93
CD	1	.07	.00	.69	.06	.01	.69	.25
ABC	1	.37	4.75 [*]	.02	.37	4.37 [*]	.31	1.67
ABD	1	.47	.60	.17	.47	1.24	.06	.58
ACD	1	2.11	6.19 [*]	.01	2.11	4.24 [*]	.29	.42 [?]
BCD	1	1.34	1.08	.76	1.34	.41	.01	.58
ABCD	1	.02	.04	.38	.02	.02	.34	.13
ERROR	98							

* $p < .05$? $.10 > p > .05$

considered simultaneously. The multivariate F is computed with a package-based error-rate equal to the chosen level of significance (α). In effect this applies a smaller level of significance to each test of equality of mean-vectors. In contrast the univariate test computes the F-ratio with a contrast-based error-rate (α) for each dependent variable. The MANCOVA test is thus more conservative. Given that task difficulty was varied in this experiment the multivariate F was considered an important statistic.

Unfortunately NYEMUL has disadvantages which are due largely to the fact that the quality of its documentation does not match its statistical sophistication and versatility. The output from the program does not include means adjusted for covariates and, in this study this hindered the detailed investigation of higher-order interactions.

Results

MANCOVA

The results of the MANCOVA are set out in Table 3. F-ratios and probabilities are given for each main effect and interaction. Three separate F values are given; the univariate F for tests on each dependent variable taken separately, a Step-Down F for the same tests, and the multivariate F for the test of equality of mean-vectors for main effects and interactions for the dependent variables considered simultaneously.

Table 4. Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11
1. School	1.00										
2. Environment	.01	1.00									
3. His Bevel	-.14	.00	1.00								
4. TA level	.12	.00	.00	1.00							
5. Low TD	.05	.02	.43	.09	1.00						
6. Medium TD	.06	-.09	-.04	.02	.47***	1.00					
7. High TD	.16	-.13	-.06	-.11	.12	.27**	1.00				
8. SES	.09	.02	.02	-.02	-.05	-.03	.19*	1.00			
9. Task Preference	.09	-.04	.14	-.02	-.02	.05	.09	-.01	1.00		
10. Persistence	-.06	-.20*	.02	.08	.12	.26**	.22*	-.19*	.04	1.00	
11. I.Q.	-.05	.06	-.02	.06	.40***	.34***	.21*	-.22*	-.02	-.03	1.00

* p < .05

** p < .01

*** p < .001

Correlation Matrix

Table 4 shows Pearson product-moment correlations for the final sample. The correlations between the covariate, I.Q., and the dependent variables were all significant at the .05 level, indicating that the use of the covariate was justified as a means of adjusting for initial inequity between the groups. Correlations among the dependent variables were lower than expected, though, with one exception, they were significant beyond the .05 level. The exception was perhaps a result of loading the Low and High TD tests with different sets of items. The correlation between Persistence (Total time) and Environment was significant at the .05 level, and it is discussed in a following section. The correlation involving SES and performance on the High TD items was not expected, though it does reinforce the decision to use SES as a factor in the design. The remaining significant correlations were not meaningful within the present study. Of further relevance was the lack of significant correlation between Achievement Motivation level and Task-preference and this result is given attention in a following section.

School, SES, and Achievement Motivation

Two chi-square tests of independence were carried out. The first indicated a strong relationship between school and SES group ($p < .0001$). The second test indicated that

Table 5. Persistence: Mean time to completion (min.)

<u>Group</u>	<u>Environment</u>	Total Test	<u>Time</u>		
			Low TD	Med TD	High TD
High Ms	CE	27.65	4.91	9.37	10.94
	NCE	26.79	6.34	9.06	10.91
Low Ms	CE	29.15	5.77	10.53	10.96
	NCE	25.80	5.56	8.59	10.38
High Ms High TA	CE	27.83	6.35	9.35	11.29
	NCE	26.47	5.69	9.00	9.88
High Ms Low TA	CE	27.48	5.53	10.76	10.00
	NCE	27.12	6.00	8.71	11.94
Low Ms Low TA	CE	28.06	5.59	10.88	10.76
	NCE	25.41	5.18	9.00	9.71
Low Ms Low TA	CE	30.24	6.25	10.25	11.70
	NCE	26.18	5.88	8.33	11.06

achievement motivation level was independent of school membership ($p > .15$). Test Anxiety level was also independent of school membership for this sample.

Achievement Motivation and Persistence

As discussed earlier achievement motivation theory, as outlined by Atkinson (Atkinson and Feather, 1966) suggests a certain pattern of persistence behavior for the HighMs LowTA and the LowMs HighTA groups. (see Hypothesis 8). To enable predictions from this theory to be tested within this study measures of persistence were taken, both of total time spent at the tasks and time spent on the initial achievement task. This information was taken from answer-sheets. Results for both measures are given in Table 5 and are discussed in the following chapter. Tables 6 and 8 show results of more detailed examination of this persistence data. Table 6 summarises results for analysis of scores using Total Time to Completion as dependent variable. The only significant effect was for A (Environment) ($p < .05$). This effect was then examined further for persistence on the initial task. In this analysis results for the two groups singled out within the theory of achievement motivation were compared. Details for the analysis are given in Table 7. No significant differences in persistence at the initial task were found between these two Groups, at any level of task difficulty.

Table 6. Persistence: Time to completion on Total Test

Summary Table for 3-way ANOVA (Environment x
Achievement Motivation x Test Anxiety)

<u>Source of variation</u>	<u>DF</u>	<u>F</u>	<u>p</u>
A	1	5.47	.02
B	1	.08	.78
AB	1	1.93	.17
C	1	.81	.37
BC	1	.54	.46
AC	1	.01	.91
ABC	1	.45	.50
ERROR	107		

Table 7. Persistence on Initial Achievement Task

Summary table for t tests

<u>Initial task preference</u>	<u>Groups compared</u>	<u>Environment</u>	<u>t</u>	<u>p</u>
Low TD	High Ms Low TA v Low Ms High TA	CE and NCE	.56	.29
	High Ms Low TA v Low Ms High TA	CE NCE	-.39 1.03	.35 .16
Low TD	High Ms Low TA v High Ms Low TA	CE NCE	.67	.26
	Low Ms High TA v Low Ms High TA	CE NCE	2.28	.02
Med TD	High Ms Low TA v Low Ms High TA	CE	.18	.22
High TD	High Ms Low TA v Low Ms High TA	CE and NCE	-.02	.49
	High Ms Low TA v Low Ms High TA	CE NCE	.07 .45	.78 .33
High TD	High Ms Low TA v High Ms Low TA	CE NCE	.29	.39
	Low Ms High TA v Low Ms High TA	CE NCE	.23	.43

Achievement Motivation and Task Preference

Subjects were asked to indicate their initial task preference and frequencies of preference are tabulated in Table 8. As with the persistence data only the groups studied in previous experiments were examined in detail on this measure.

Table 8. Summary Table for Task-Preference Data

<u>Group</u>	<u>Environment</u>	<u>Frequency of choice at preferred level of difficulty</u>		
		Low TD	Med TD	High TD
High Ms High TA	CE	8	2	6
	NCE	7	4	1
High Ms Low TA	CE	9	2	4
	NCE	9	0	3
Low Ms High TA	CE	8	3	4
	NCE	12	0	2
Low Ms Low TA	CE	12	2	1
	NCE	10	1	5

Table 9. Task-Preference

Summary table for t tests for
High Ms Low TA v Low Ms High TA groups -

<u>Task difficulty</u>	<u>Environment</u>	<u>z</u>	<u>p</u>
High TD	CE	-	-
	NCE	.57	.58
Med TD	CE	-	-
	NCE	-.38	.70
Low TD	CE	.45	.65
	NCE	.61	.54

CHAPTER SIX

DISCUSSION OF RESULTS

Discussion Of General Hypotheses

In General Hypothesis A it was assumed that there would be a statistically significant relationship between performance and instructional environment. Support for this prediction was found in four of the main effects and interactions tested, indicating that the hypothesised environmental effects were strong when found, but the small number of interactions shows that there is no simple linear, or curvilinear relationship existing between these two variables.

General Hypothesis B proposed that achievement motivation and environment were significantly related. This effect (Environment x Achievement Motivation x Test Anxiety) was found, though it too was specific to certain groups on tasks of Medium difficulty.

A significant relationship between environment and task difficulty was predicted in General Hypothesis C. The pattern of this relationship was not as simple as was predicted; there was no increase in the inhibitory effect of competition with increase in task difficulty, as indicated by the lack of significance of the multivariate Fs. A significant group of the experimental population, Low SES subjects, were in fact helped more by the competitive

On the most difficult tasks. Like the relationships in the above hypotheses this one is also restricted in its effect.

Discussion of Specific Hypotheses

The presence of significant higher-order interactions among these variables indicated that many of the specific hypotheses were too simple in formulation. The hypotheses taken directly from achievement motivation theory were in general not supported by the results here; certain of the predictions were shown to be in need of qualification.

Hypothesis 1 was not supported; there was no significant difference in performance between the two environments at Low TD. This same relationship held for all effects and interactions at this level of task difficulty and appears to be a consistent pattern for tasks of this nature. Directly comparable results are not common in the literature, for most 'simple' tasks are those not involving any cognitive skills. If the nature of the task is not considered, this result is clearly contrary to those of Wilson(1965), Clifford(1971) and Brunning, Somer and Jones(1966) which all found a competitive environment to be more conducive to performance on simple tasks than non-competitive or cooperative environments. This is not to claim that the nature of the task should be neglected; indeed that factor would seem to be crucial in explaining the different findings in studies using quite different tasks.

Further explanation for this finding may reside in the novelty effect associated with the intrusion of the experimenters into the classroom. This may have created an environment sufficiently different from normal classroom procedure that both environments were initially arousing. This view is given some support by the task preference data which shows that the majority of children chose to start on the easy tasks

Hypothesis 2 was supported by the findings of this study; there was no significant difference between performance in CE and NCE at High TD tasks. This agrees with the findings of both Kalish(1966) and Clifford(1972). Such results reinforce the view that competition is not a simple phenomenon; it does not operate on an all-or-none basis facilitating performance on simple tasks but not on difficult ones. The interactions to be discussed later show that any predictions as to the effect of competition must acknowledge the role of subject variables, such as SES, and also the type of task involved.

From Hypothesis 3 High Anxious Ss were expected to perform more poorly in the CE than Low Anxious Ss. This result was expected from the rationale underlying the concept of a Motive to Avoid Failure(Maf) contained within the theory of achievement motivation. There it is maintained that the individual in whom $Maf > Ms$ should display a lower level of performance, especially on tasks of intermediate difficulty (Atkinson, 1966, p.323). The

individual High in Maf is identified by a High Test Anxiety score. The results indicate that Test Anxiety did not have the predicted inhibitory effect in the CE, when the 2-way interaction (Environment x Test Anxiety) is considered. However, when the 3-way interaction (Environment x Test Anxiety x Achievement motivation) in Figure 1 is examined, it can be seen that the competitive environment did have a different effect on different anxiety groups, but only when both Test Anxiety and Achievement motivation were considered together.

A similar explanation can be applied to the prediction contained in Hypothesis 4, that High Anxious Ss would perform better in NCE than in CE. In the literature review it was shown that both Sarason (1960) and Atkinson (1966) assume that anxiety is present in situations involving evaluation; the further assumption was made in this study that anxiety would be greater in CE than in NCE. Consequently this assumption of greater anxiety attending a competitive situation must be regarded as unproved. Alternatively the hypothesis must be entertained that the CE in this experiment was not an anxious one. If it was not more anxiety invoking than the NCE the High Anxious Ss would not show the expected decrement in performance. In defence of the instructions used it must be said that they were similar in nature to the 'test-like' situations described by Both Atkinson and Sarason, and had proved

Figure 1a.

(Environment x Achievement Motivation
x Test Anxiety interaction)

COMPETITIVE ENVIRONMENT

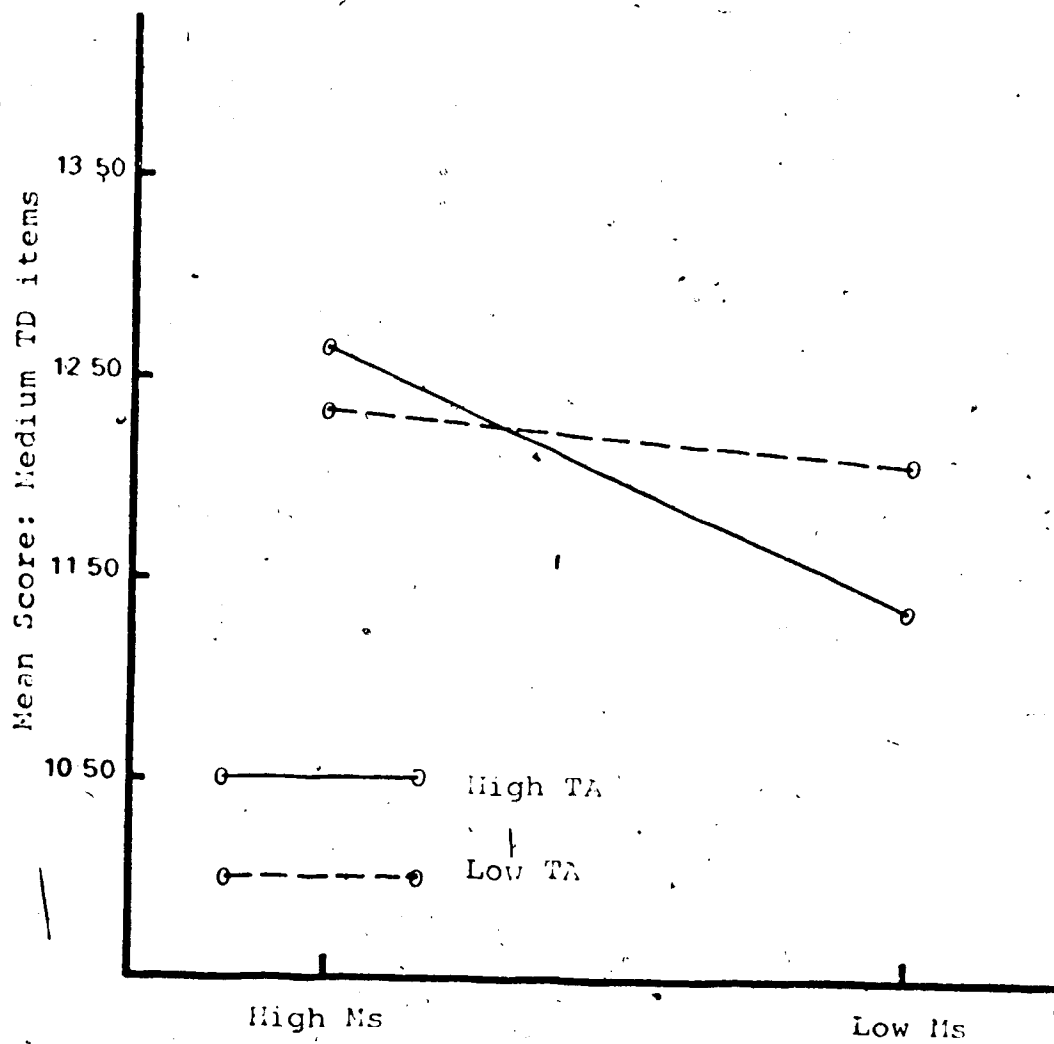
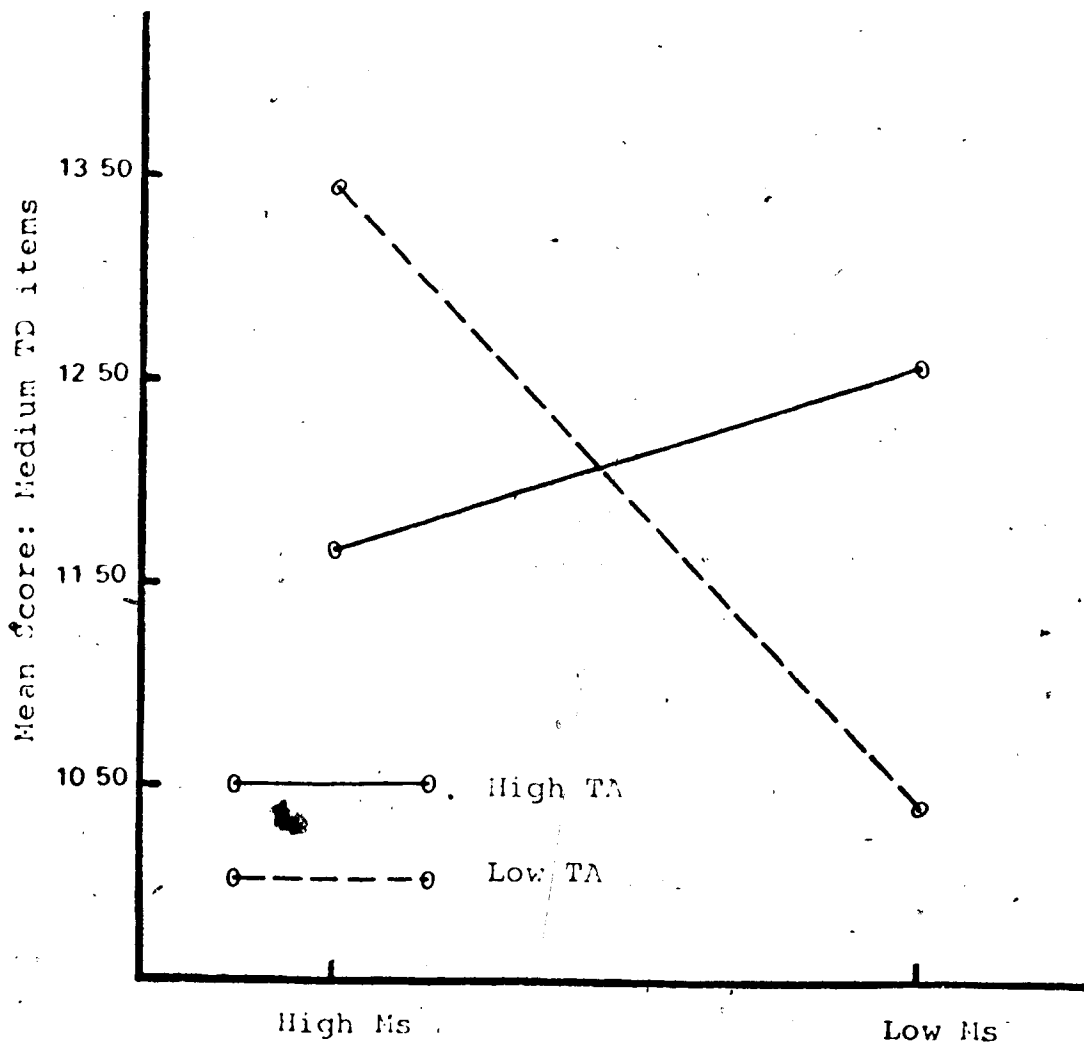


Figure 1b.

(Environment x Achievement Motivation
x Test Anxiety interaction)

NON-COMPETITIVE ENVIRONMENT



effective in a study by Wankel (1972).

Hypothesis 5 was developed on the basis of Atkinson's characterisation of an achievement-related situation. It was argued that the sense of this definition used by Atkinson was basically competitive, and thus should be more applicable to the CE than to the NCE. Consequently it was predicted that the High Ms Low TA group would perform better in the CE than in the NCE. This prediction was not supported by the findings of this study. It is clear from Figure 1 that the High Ms Low TA group performed better in NCE, though not significantly better than they did in CE. Thus the distinction argued for in the literature review, suggesting the existence of two different achievement-related situations did not receive support; the difference in environment did not change the pattern of performance for this group. It is interesting to note that the two environments did have differential effects on groups other than the one examined here, suggesting that it is not entirely without value to consider such a distinction.

Criticism of Atkinson's definition of an achievement situation also led to the framing of Hypothesis 6, which predicted that the High Ms Low TA group would perform better in the CE than the Low Ms High TA group. From Figure 1 it can be seen that though the results were in the predicted direction there was no significant difference between performance of the two groups in this environment. Thus though the High Ms Low TA group did exhibit

superiority of performance it was not present in this study in the strength forecast. Figure 1 also shows that the best performance was that in the NCE, the environment least like the achievement-related situation described in the theory. The inclusion of a competitive component in that definition appears to be unnecessary.

In Hypothesis 7 it was predicted that the Low TA Ss would perform better in the NCE than in the CE. Again the results were in the expected direction but were not statistically significant. Because of the assumed higher anxiety in the CE it was expected that this group would find that environment much less conducive to good performance than the NCE. This was the general trend for this group though advantage of the NCE was not as great as had been expected. Once again this result calls into question the power of the competitive instructions and the actual level of test anxiety present in that situation.

Hypothesis 8 demanded a comparison of the applicability of other parts of Atkinson's theory of achievement motivation across the two environments used in this experiment. In Hypothesis 8:1 it was predicted that the High Ms Low TA group would show a more marked preference for intermediate achievement risks than would the Low Ms High TA Ss. This was tested by allowing choice of initial task from among three groups of problems of known levels of difficulty. The results do not give support to the prediction. As can be seen from Table 8 most of the

subjects showed an initial preference for tasks at the lowest level of difficulty, while the two groups singled out showed similar levels of preference for the intermediate-risk tasks (Med. TD). Tests of significance did not reveal any reliable differences in risk-preference for these groups at any level of task difficulty.

This finding supports that of Littig (1966) and suggests that the determinants of task- or risk-preference are more situation-bound than Atkinson's theory claims. The within-group choices show that different strategies were used in the two environments; in the CE some Ss in both groups saw the Med. TD tasks as preferable, whereas none chose them initially in the NCE. The implication here is that some element in the CE, possibly the reward led these S to be more cautious than their counterparts in the NCE. In terms of Atkinson's theoretical formulation this increased reward would have affected the Incentive of Success (Is); it was apparently not constant for both situations.

Hypothesis 8:2 has already been given some attention. This hypothesis states that the High Ms Low TA subjects should generally outperform the Low Ms High TA group. The main effect for Achievement Motivation did not reach the chosen level of significance but showed that the findings followed the pattern predicted by the theory, and in both environments the High Ms Low TA group performed better than the other group.

The third of the predictions made by Atkinson and O'Connor (Atkinson and Feather, 1966, p. 304) suggested that the High Ms Low TA group would persist longer at the initial task where the probability of success is high ($P_s > .50$) than at a task where P_s is low ($P_s < .50$). This was Hypothesis 8:3, and the results show clearly that it was not supported by the persistence data of this study. More detailed investigation of these results (see Table 7) showed that Analysis of Variance (Environment x Achievement Motivation x Test Anxiety) was carried out on the Total Time to Completion measures. The only significant effect was that for Environment. The mean scores of the two groups were then compared directly on persistence at initial task, the criterion used in the studies of Feather (in Atkinson and Feather, 1966). Again no differences were found between the groups, at any level of task difficulty. The only differences found were those for the Low Ms High TA subjects who showed more persistence on Low TD items in the CE than in the NCE. This significant within-group difference is quite distinct from that predicted to hold between the groups.

The discrepancy between the predicted and experimental results suggests that further study be made of the specific nature of persistence, and also of its developmental nature. For it is in these two respects that this study is different to that of Feather; his subjects were college students and they were asked to persist at a

pencil-tracing task.

Persistence was also the subject for Hypothesis 8:4, which predicted that High Ms Low TA Ss would show less persistence than Low Ms High TA at a task initially presented as difficult, when other achievement tasks were available as alternatives. This was not found in this study, and further suggests the need to investigate the parameters involved in persistence behavior.

Concluding Discussion of Hypotheses

Two major points emerge from the above discussion. First, it is clear that some of the initial hypotheses were not well developed; several were couched too much in all-or-none terms. The second implication is that parts of the theory of achievement motivation cannot be accepted as being equally applicable to all situations and to all types of tasks. Thus while the distinction made between two types of achievement situations did not appear in this study, for the groups singled out within the theory, it was important for other groups. Finally the risk-preference and persistence components of the theory need to be verified, and replicated in different contexts.

Discussion of Results in Relation to Variables used in Study

Environment and SES

Figure 2 indicates a clear ordinal interaction between instructional environment and SES. In the Competitive environment High SES scored at about the same level as the Low SES on the High TD items, whereas in the Non-competitive environment the High SES performed significantly better than the Low SES subjects ($p < .03$). A further examination of this interaction using Newman-Keuls technique, showed that all group means differed significantly from that of the Low SES in the NCE. Table 10 shows that while the mean scores for the High SES did not differ significantly between environments ($p > .10$), both in the CE and the NCE they scored significantly better than the Low SES-NCE. On the other hand the Low SES performed significantly better in the CE than in the NCE ($p < .05$).

One possible explanation for this finding is that suggested by Eley (1972), that High and Low SES groups differ in the use they make of the reward value, as opposed to the informational value, of a reinforcer. According to this argument the High SES would be expected to place greater value on the information they received from a reinforcer, information as to the adequacy of their responses. This pattern does not hold for the Low SES who would be expected to see the reinforcer as important more for the reward it offered. Similar findings, Douvan (1956) and Terrell, Durkin and Wiesley (1959) have suggested that different types of reinforcement affect the two SES groups differently. Thus Douvan found that, while middle class Ss

Figure 2

(Environment x SES interaction)

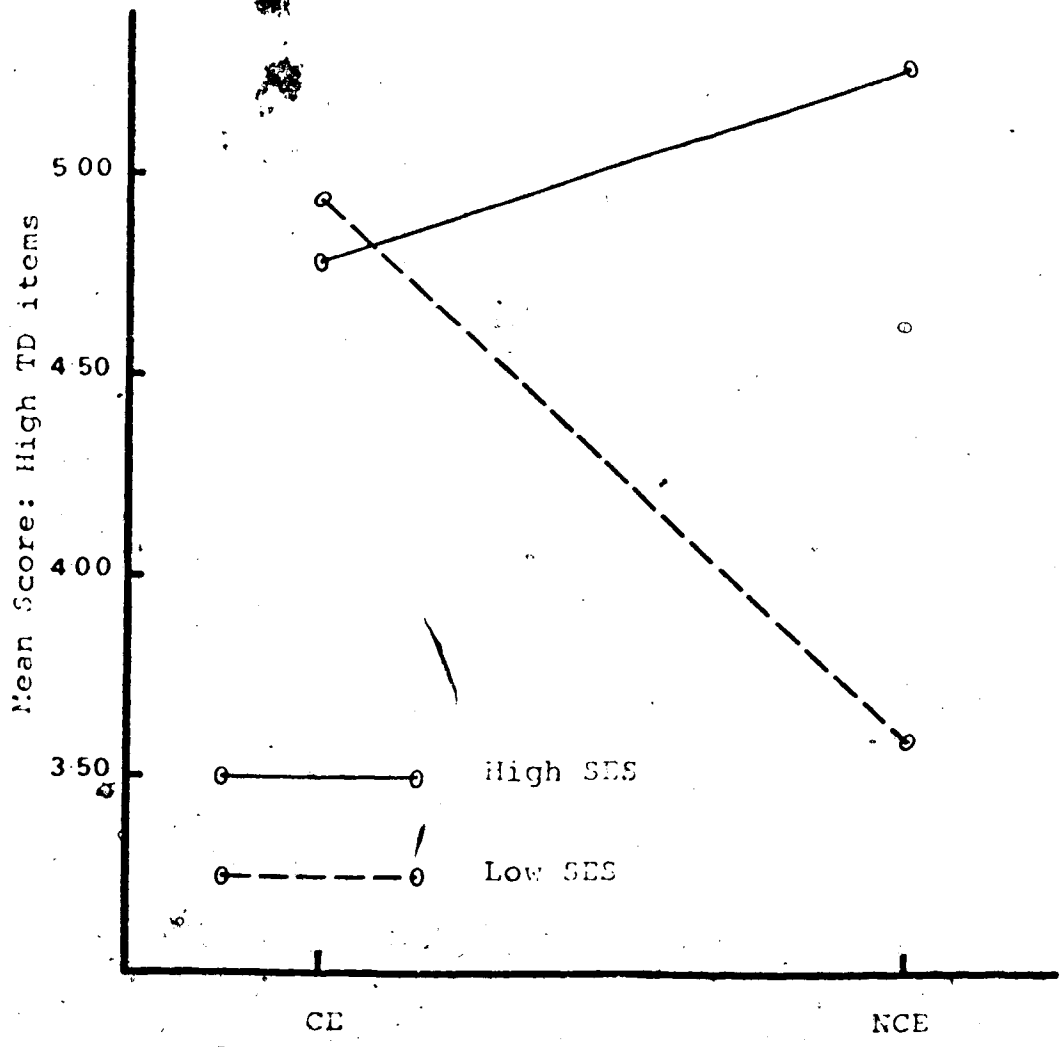


Table 10. Summary Table for Newman-Keuls

tests on means for Environment x SES interaction

NCE-Low 1	CE-High 2	CE -Low 3	NCE-High 4 ^a	r	Critical value(.05)
1	1.28*	1.34*	1.72**	2	1.06
2		.06	.44	3	1.28
3			.38	4	1.40

* * p < .05

** p < .01

maintained approximately the same level of performance for informational feedback as for monetary reward. Low SES subjects dropped in level of performance without the money as a reinforcer. Terrell et.al. found a similar effect on a discrimination learning task; the lower class group performed significantly better in the Material Reward condition than under Non-Material Reward. This finding reinforces the view expressed in Chapter Two indicating the possible confounding effects of SES in this study.

No similar manipulation of reward conditions was a direct intention here, though this may have occurred inadvertently when prizes were offered in the CE. It is important to note that this interaction was restricted to the High TD items. It appears that on these difficult tasks the low SES group in this study found the extrinsic motivation of the prize conducive to better performance.

Environment, Achievement Motivation and Test Anxiety

Though Figure 1 has already been discussed at length in reference to the predictions made by Atkinson et.al it requires some further comment. The CE produced a relatively consistent pattern of performance for all four groups, High Ms Low TA, High Ms High TA, Low Ms Low TA and Low Ms High TA on the Med. TD tasks. This result reflected two opposing tendencies. For two groups, the High Ms Low TA and Low Ms High TA, the CE inhibited performance. For the other two groups this environment had the opposite effect- it

facilitated their performances. For the High Ms High TA this last effect was in the opposite direction to that expected, given the assumption that the anxiety attached to the CE would significantly handicap performance. To gain a clearer insight into this effect it would be necessary to have some knowledge of the anxiety levels during the experiment as distinct from the trait measures already included. The Low Ms Low TA is similarly without precedent in the literature of both anxiety and achievement motivation. Tentatively it is suggested that this group was helped by the presence of the extrinsic reinforcer in the CE, and found the NCE to be without challenge.

Environment, Test Anxiety and SES

The significant interaction of these variables has not received any comment in the literature reviewed. From Figure 3 it appears that the effect of the CE was strongest for the low Anxious group; they scored at highest and lowest levels in this environment, the High SES group finding this better than the NCE. This pattern was reversed, almost symmetrically, for all groups in the NCE. In that environment the High SES were placed at the extremes, the High SES scoring better than the Low SES.

Environment and Task Difficulty

The simple interpretation of the Competition x Task Difficulty interaction, which suggests that competition becomes less effective with increase in difficulty,

Figure 3a.

(Environment x Test Anxiety

x SES interaction)

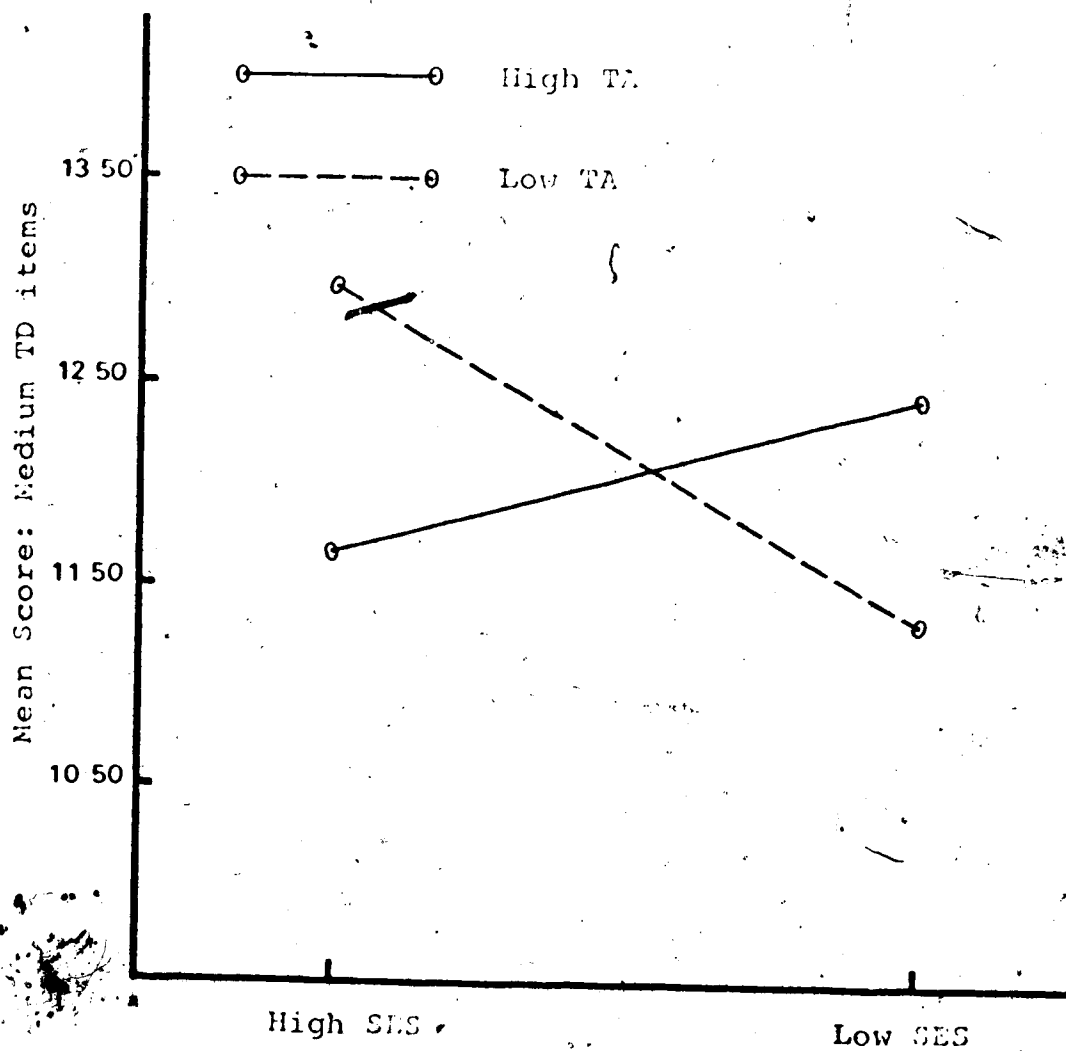
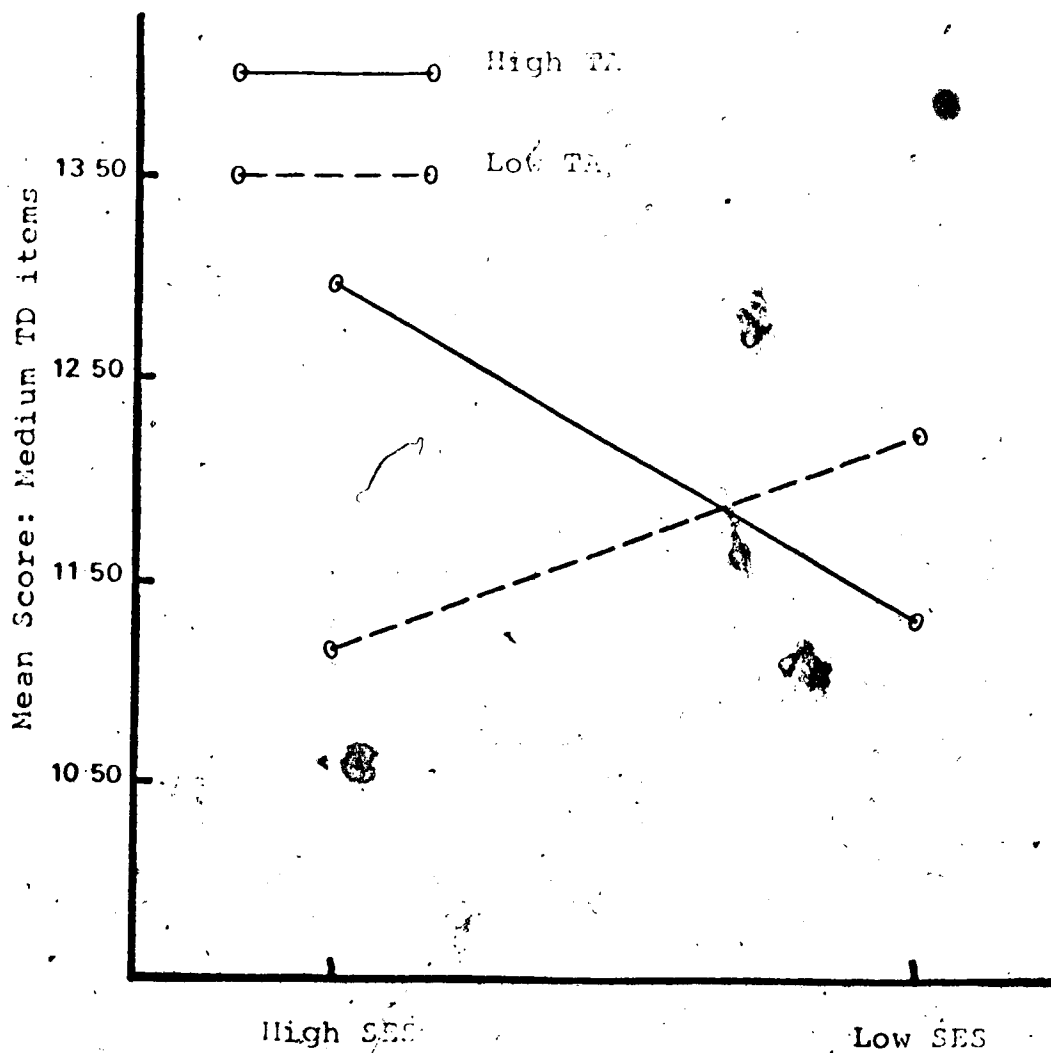
COMPETITIVE ENVIRONMENT

Figure 3b.

(Environment x Test Anxiety
x SES interaction)

NON-COMPETITIVE ENVIRONMENT



received no support from the results of this study. Clearly this relationship needs to be given much greater study in the classroom so that there is more strict control over experimental conditions than was possible in this study. The lack of significant main effects for Environment, and the rather isolated interactions, prevented the emergence of any trend which might have given indication of the role of competition. Clifford (1972) suggested that intrinsic motivation, characteristic of the NCE, would become more important than extrinsic motives with increase in difficulty of task. Insofar as the best performance on High TD items was in the NCE her prediction is given some support, though only for the direction of the findings, not for their significance. And such weak support can only be maintained for half of the experimental population, the High SES. The three-way interactions do not clarify the nature of the interaction of the two variables, both because of the relative scarcity of such interactions, and because of their disordinal nature. Within this study the effects of competition must be confined to the specific groups already mentioned in the discussion of the interactions.

Environment and Test Anxiety

The relationship assumed to hold between Test Anxiety and competition was not present. In fact the lack of significant main effects and first-order interactions

involving Test Anxiety does little to further knowledge of its effect upon classroom achievement. The detrimental effect of High TA expected in the CE did not appear and suggests that two basic assumptions be questioned:

1. The assumption that Test Anxiety was actually higher in CE than in NCE; the alternative interpretation is that both environments were similar in level of Test Anxiety, either high or low.
2. The assumption that anxiety is characteristic of competition. Perhaps the effect being confused with anxiety in this experiment was instead due to arousal.

The resolution of the problem is complicated by the problem of measuring anxiety. One could use the Trait-State measures of Spielberger. Yet this still leaves the difficulty of distinguishing the arousal effect, measured by some physiological index, from the anxiety effect inferred from another physiological instrument.

Achievement Motivation

The implications for achievement motivation theory discussed so far may be summarized as follows:

1. The achievement-related situation, as defined by Atkinson, is not solely competitive. The results did, however, show that the two environments influenced performance of different achievement motivation groups differentially.
2. The superior performance of the High Ms Low TA group

over the Low Ms High TA was not found.

3. The greater preference of the High Ms Low TA group for intermediate achievement risks, in contrast to that of the Low Ms High TA group was also not present. Further there were indications that risk-preference, as defined within the theory, may in fact be specific to both the task and the environment.
4. The predicted differences in persistence on initially preferred tasks where probability of success was $> .50$ were absent for the High Ms Low TA and Low Ms High TA subjects.
5. The interaction of Achievement Motivation and SES was not predicted because SES was not originally included in the experimental design. The results, graphed in Figure 4 show that the Low SES performed consistently at both High and Low Ms levels on the High TD tasks. The performance of the High Ms High SES was, in contrast, significantly better than that of the High Low SES ($p < .05$), the Low Ms High SES ($p < .05$) and the Low Ms Low SES ($p < .05$).

Attempts at explanation of these findings suggest that instrumentation be considered as a source of invalidity, especially in the case of the measurement of achievement motivation. It is possible that protocols were incorrectly scored, though the training sessions and reliability coefficients quoted in Chapter Three indicate that scoring procedures were acceptable on all Criteria set out in the

Figure 4.

(Achievement Motivation
x SES interaction)

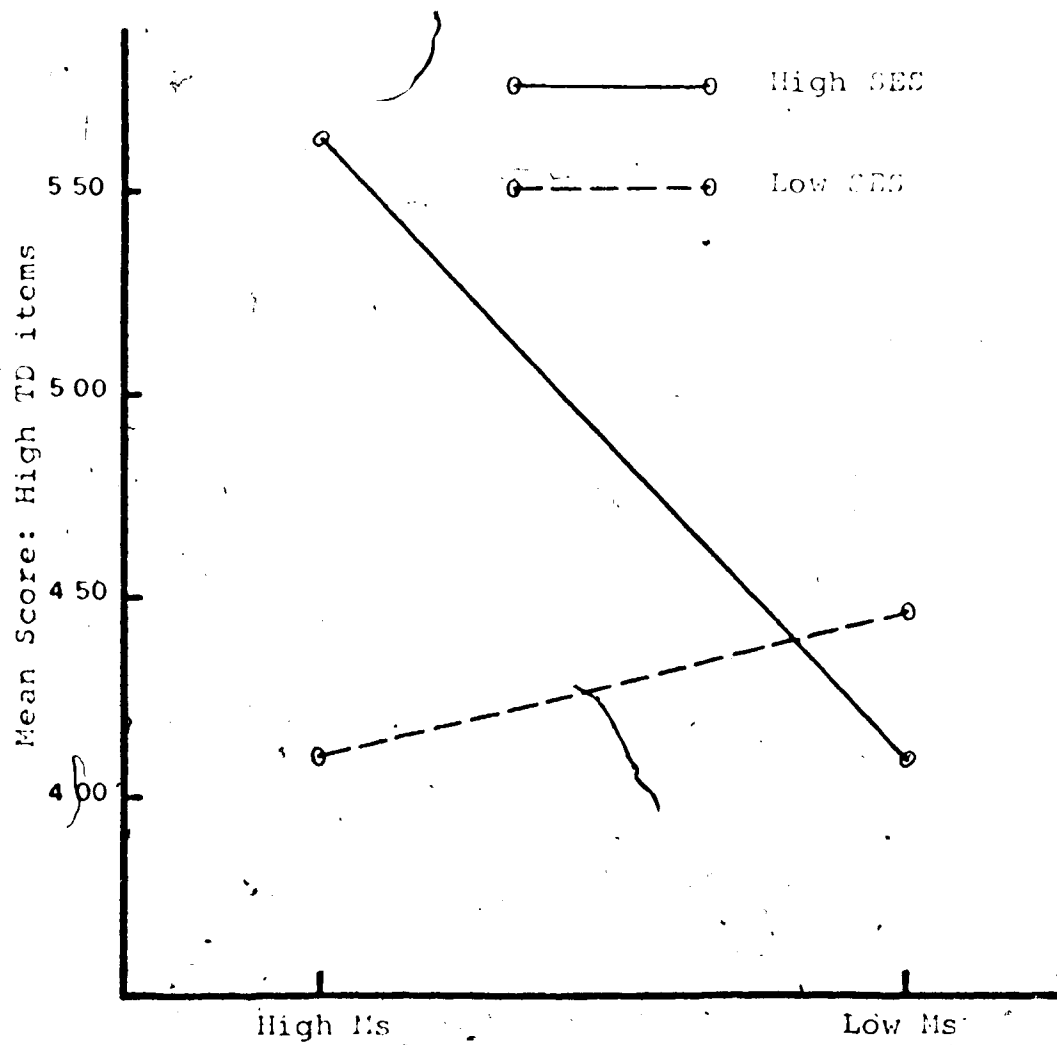


Table 11. Summary Table for Newman-Keuls tests
on means for Achievement Motivation x SES interaction

High Ms Low SES 1	Low Ms. High SES 2	Low Ms Low SES 3	High Ms High SES 4		Critical value(.05)
	.06	.40	1.52*	2	1.06
		.34	1.46*	3	1.28
			1.12*	4	1.40

* $p < .05$

manual, and were carried out in a manner compatible with that used in comparable studies. Potentially more potent is the criticism suggesting that the method used to split the sample into High and Low groups by division at the median, produced an artificial set of High and Low Achievement Motivation subjects. This procedure is, however, that used in similar studies; further if this criticism is accepted as a source of invalidity it must also be levelled against the other research involving achievement motivation. These issues are quite distinct from a general measurement problem inherent in the use of projective techniques. The repercussions for the theory are clearly documented in the studies by Entwisle (1972) and Clarke (1973). Briefly these latter two reviews suggest that much of the inconsistency in results for achievement motivation studies can be attributed to the low reliability of the fantasy-based measure used in such studies.

More serious points of argument can be raised about some substantive issues in the theory of achievement motivation, and while these are not new in the literature they are reinforced by the results of this study.

1. Nature of the Task

This question has already been raised in previous discussion, but two further points are of interest. First, confusion arises when studies are compared because different studies used different tasks, and though the theory claims to generalise to the general class of

activities known as achievement-related, it seems that it does not always do so. Thus the symbolic processing tasks used here produced different patterns of performance to those of other skill tasks, such as volleyball toss (de Charms and Dave, (1967).

A second point of contention is that raised by Kogan and Wallach (1967) in reference to the different results obtained for skill and chance type tasks. They show that while the evidence from the Atkinson, Bastian, Earl and Litwin(1960) study, involving a chance task(imaginary bets), supported the predictions from the theory on risk-preference, the findings of Littig(1963) and de Charms and Dave(1967) did not follow the same pattern. The de Charms and Dave study is particularly relevant because it, was allowed SS to compete against their own known standard of excellence, without knowledge of other performances. The results did not indicate that the High MS Low TA preferred moderate risks, or that the Low MS High TA group chose extreme risks. Thus the suggestion made earlier that risk-preference may be task- and situation- specific emerges as a plausible rival hypothesis for the explanation of these results.

2. Standard of Excellence

Definition of the standard of excellence to be used in achievement motivation studies is not clear and is further complicated by comparison of the results in this study with those of de Charms and Dave. Still to be answered is the

question of which standard to use, the individual's own or that of the group? De Charms and Dave used only the former while it could be argued that both sets of standards were employed in this study. However both studies failed to confirm the predictions made from the theory. Perhaps the NCF did not represent the individual standard well enough to allow valid comparison on this point. This certainly could be the subject of a further study.

3. Specification of Risk

One other possible source of confounding is pointed out by Kogan and Wallach (1967). They point to the failure of most achievement motivation research to distinguish between subjective and objective probability of success. The implication here is that a task rated as difficult for 50% of Grade 5 students in Edmonton may not be rated as difficult by individual student X. Thus there is no acknowledgement of the role of individual ability in deciding level of risk attached to a task.

Test Anxiety

The important implications of this study for work on test anxiety have already been mentioned. They will be summarised in this section.

1. The assumption of greater anxiety being present in a competitive environment must be regarded as unproved.
2. The predicted interaction between Test Anxiety and Task Difficulty, suggested by the findings of Tennyson and Woolley (1971) was not found. The different

conceptualisations of anxiety by Sarason and Spielberger could account for the different findings. It is suggested that the Trait-State paradigm of Spielberger would be a more powerful means for investigating the relationship between competition and anxiety.. The intuitively attractive relationship between the norm-referenced evaluation of the CE and anxiety was clearly not present here.

Socioeconomic status

The widespread use of SES in educational research has its disadvantages. The major problem is that the conglomerate nature of this variable leaves the researcher unsure as to what exactly in SES causes its effect, for income, years of education, and employment situation are all included in its definition. Given that proviso, it is clear that it did exert strong effects within this study.

Limitations of the Study

Several limitations of this study have already been mentioned in the discussion of results; the anxiety level of the CE, and the problem of subjective and objective probability, were both important limitations. The use in this study of a novel task may well have made the environments atypical, and thus not truly representative of classroom conditions. In the matter of research design the use of a third environment, competitive without any prize,

would have enabled more exact ascription of treatment effects. The wider question of the effectiveness of the experimental manipulation must also be considered. Although instructions had been used effectively in other studies involving competition, (Madsen, 1972, Wankel, 1972), the lack of significant differences for any effect on the Low TD tasks suggests that the two sets of instructions were probably not sufficiently different. The time over which the experimental sessions ran is also of importance; perhaps insufficient time was allowed for the instructions to take effect. One other uncontrolled source of influence in this experiment could have been the initial differences between schools in degree of competitiveness. A final limitation is shared with other studies of achievement motivation; that is the failure to develop hypotheses for the Low Ms Low TA and High Ms High TA groups. There is however some theoretic justification for this, in that these groups are not seen as the extremes in levels of achievement motivation, and being more 'neutral', are less likely to show different patterns of behavior than the other two groups, though the data of this study would not support further neglect of these two groups.

Implications for Further Study.

Several areas of further investigation are suggested. The conceptual scheme based on the differentiation of interpersonal and intrapersonal competition is still

largely unexplored. It is not clear from this study what power this distinction has. The two types of competition should be more precisely defined and subjected to empirical study.

The operation of anxiety in 'test-like' and competitive situations needs to be examined more closely, employing measurements during the competitive treatment.

The long-term effects of classroom competition are not well covered in the literature and need greater elucidation.

Finally, the theoretical details of parts of achievement motivation theory need further empirical investigation. The problem of measurement of motives is well documented; the findings of this study suggest that further work is needed to clarify the risk-preference and persistence components of the theory.

Concluding Discussion

Initially, the main interest of this piece of research was the use of competition as a motivational technique in the classroom; subsequently much attention was also given to the theory of achievement motivation, particularly to its apparently competitive nature. The results showed competition to be much more complex and subtle in operation than either common-sense psychology or the experimental literature predicted. Within this study competition showed few significant outstanding effects, or defects. Overall it

did not differ in effect from the non-competitive environment, though at the end of the study the affective consequences of competition are largely unknown. Thus there is no simple main effect for competition, except on persistence. It must be recognised as a useful motivational technique for significant groups in the population on difficult tasks; its inhibitory effect on other groups must also be recognised. As an atmosphere for evaluation, competition may indeed be accompanied by disadvantages as claimed within the literature of Mastery Learning (Block, 1971), though these would not seem to be as drastic as suggested by some of the claims made within that literature. In support of Mastery Learning, and in particular, criterion-referenced evaluation, it could be argued that the NCE, claimed to be without the stress of the CE, was an equally productive environment.

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APPENDIX A

Achievement Motivation Test

I'm interested in storytelling and I'd like you to write some stories for me. I will give you an idea for a story, and then I'd like you to write a story about that idea.

Make up a story with a beginning and an end just like the ones you are reading in school.

I will give you some questions that will help you to write each story.

Let's practice on this one:

"Tell me a story about a boy who has just left his house."

These questions will help you to get some ideas:

1. What is happening in the story?
2. What is the boy thinking about? How does he feel?
3. What will happen? How will the story end?

Now you can see how stories can be told. So write a story about each of the following ideas.

Your stories could be about 10 - 12 lines long.

Use the questions above to help you with each story.

These are the topics for your stories:

- A. Tell me a story about a boy who is in school.
- B. Tell me a story about a group of children playing
- C. Tell me a story about a boy at home who is making something.
- D. Tell me a story about two children on a rainy day.

APPENDIX B

THE TEST ANXIETY SCALE FOR CHILDREN

1. Do you worry when the teacher says that she is going to ask you questions to find 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 lessons?

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 are taking 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?

APPENDIX C

INSTRUCTIONS

HI! This morning I would like to have you do some problems.

There are 3 sets of problems and though they all look much the same they do differ because some are easier than others.

DON'T OPEN THEM YET, JUST HAVE A LOOK AT THE FRONT COVERS OF THE # BOOKLETS YOU HAVE.

See one is labelled EASY. That contains problems which are pretty easy for Grade 5s

Another one is labelled MEDIUM. it contains problems which about 50 % of Grade 5s get right.

The last one is labelled DIFFICULT. That means that not many Grade 5s get them right.

I WANT YOU TO TRY ALL OF THE PROBLEMS.

We 'll work through some examples in a minute. I DON'T WANT YOU TO WRITE IN THE BOOKLETS!

Put all your answers on the answer sheet.

Have a look at the answer sheet. See it has spaces for EASY, MEDIUM AND DIFFICULT AND IT HAS UP TO 6 POSSIBLE ANSWERS FOR ANY QUESTION. THERE IS ONLY ONE RIGHT ANSWER FOR EACH QUESTION.

(** Do some examples of 'If #3 was the right answer for Q. 12 where would you put the cross.)

NOW on the front of each booklet you'll see that I would like you to write your FULL name and school.

Then I want you to show me in which order you did the problems. SO IF YOU STARTED ON THE MEDIUM ONES FIRST YOU WOULD PUT 'FIRST' ON THAT SHEET. IF YOU THEN DID THE EASY YOU'D PUT 'SECOND' ON THAT AND 'THIRD' ON THE DIFFICULT SHEET. ANY QUESTIONS ?

DO WHICHEVER ONE YOU PREFER AS THE FIRST ONE

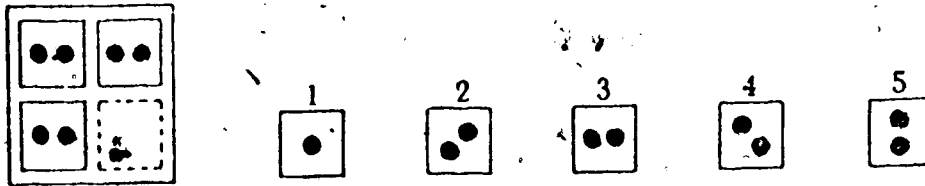
I ALSO WANT YOU TO FILL IN THE TIME AT WHICH YOU START AND FINISH EACH BOOKLET

e.g. 9.15. if you start at . 9.15. ANY QUESTIONS ABOUT THIS

LET'S DO SOME EXAMPLES. LOOK AT THE PAGE LABELLED EXAMPLES.

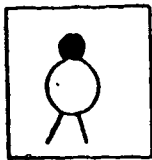
THE PROBLEMS CAN BE OF THREE DIFFERENT TYPES . LET'S PRACTICE EACH TYPE BEFORE YOU START . SO THAT YOU WILL KNOW WHAT TO DO.

Example

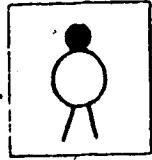


IN THIS TYPE OF PROBLEM YOU HAVE TO PICK OUT THE PICTURE (1,2,3,4,5,6) WHICH GOES IN THE EMPTY BOX. IN THIS EXAMPLE #3 PICTURE COMPLETES THE PATTERN. SO # 3 IS THE CORRECT ANSWER.
YOU WOULD PUT A X UNDER # ON YOUR ANSWER SHEET

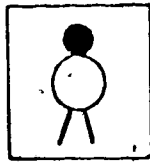
EXAMPLE
1



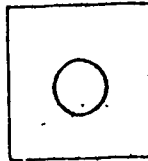
2



3



4



5



IN THIS TYPE OF PROBLEM YOU HAVE TO PICK OUT WHICH PICTURE IS DIFFERENT IN SOME WAY FROM ALL THE OTHERS. IN THIS EXAMPLE IT'S # 4 BECAUSE IT DOESN'T HAVE A HEAD OR LEGS.

SO # 4 WOULD BE MARKED X ON YOUR ANSWER SHEET.

Example



1



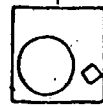
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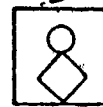
3



4



5



IN THIS TYPE OF PROBLEM LOOK AT THE PICTURE ON THE LEFT: SEE IT HAS A DOT INSIDE THE CIRCLE AND ALSO INSIDE THE SQUARE .

NOW FIND A PICTURE ON THE RIGHT (1,2,3,4,5,6) WHERE YOU COULD PUT THE DOT IN THE SAME POSITION • INSIDE THE CIRCLE AND INSIDE THE SQUARE - SEE IT'S # 3
SO # 3 WOULD GET A X ON YOUR ANSWER SHEET.

Competitive Instructions

I am testing all the boys in this school and also in some other schools on these problems so I WANT TO COMPARE YOUR SCORE WITH THE SCORES OF ALL THE OTHER BOYS HERE AT

So try to do your best so that you will score better than the others.

I will be putting up a list of the results later on, (Tomorrow) so try your best so that your name will be near the top of the list. I will also be leaving some prizes to be given to the boys at the top of the list.

O.K. Remember to try all the problems

Don't interrupt any other boys while they're working

Put all your answers on the answer sheet

Bring up your answer sheet and the booklets when you are finished and then sit quietly (read your library book) until I tell you to go

ANY QUESTIONS? IT'S NOW () . REMEMBER TO FILL IN THE FRONTS OF
THE BOOKLETS - Name

School

Order

Time started and time finished.

Non-Competitive Instructions

I am interested in seeing how you can do these problems so I would like you to try all of them.

I'm only interested in how each individual tackles the problems.

I'm not going to have time to COMPARE your answers with those of any other boys. So don't worry about how anybody else does the problems.

Don't worry about who finishes first because time is not important for these problems.

Remember that I won't be comparing your result with that of any other boys, because I'm only interested in how your individual answers.

I haven't got time to bring you a list of scores. So there won't be any winners or losers in this, and there won't be any prizes.

I will discuss the problems with you when we are all finished if you want to do that.

So don't worry about anyone else.

Just see if you can do the problems

O.K. Let's get started. ANY QUESTIONS?

Remember. Try all the problems.

Put all your answers on the Answer

Sheet.

Fill in the order.

Fill in the time

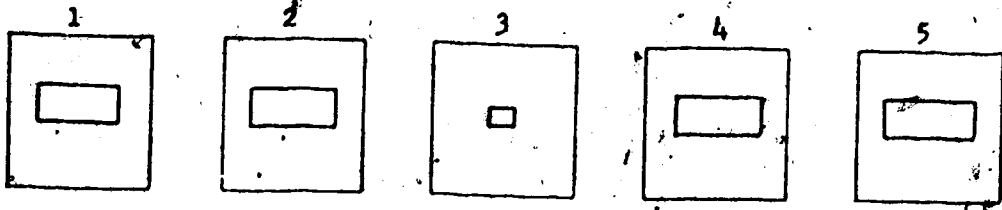
APPENDIX D



CHOOSE ONE PICTURE WHICH IS DIFFERENT IN SOME WAY FROM ALL THE OTHERS

AND WRITE ITS NUMBER ON THE ANSWER SHEET

EXAMPLE



THE ANSWER TO THIS EXAMPLE IS : 3

1.

2.

3.

4.

5.

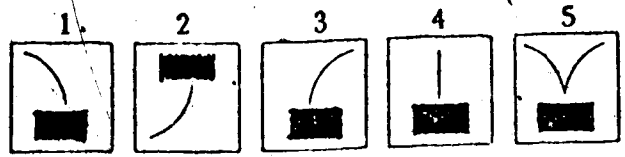
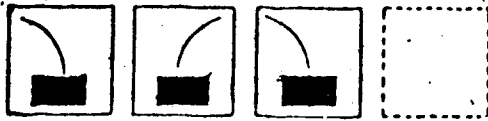
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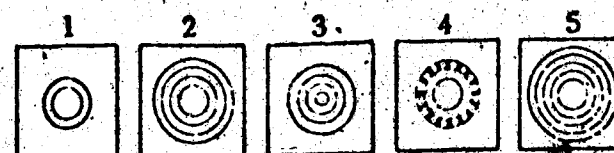
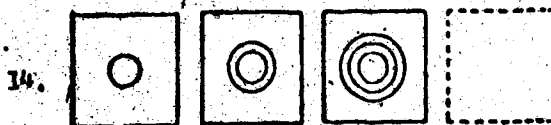
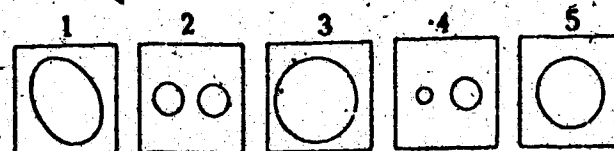
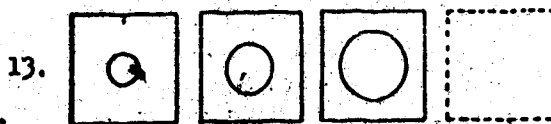
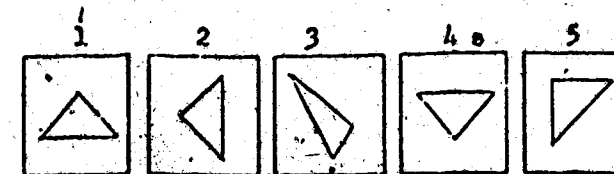
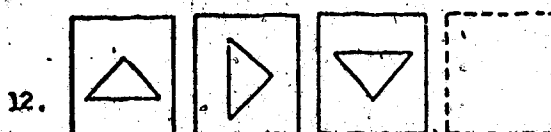
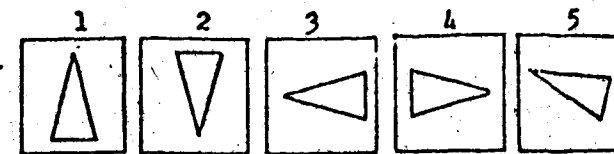
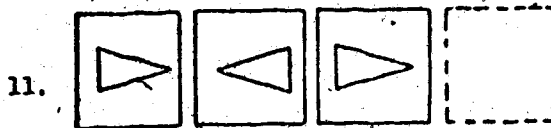
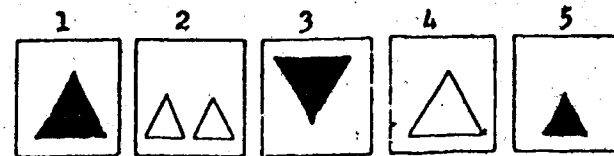
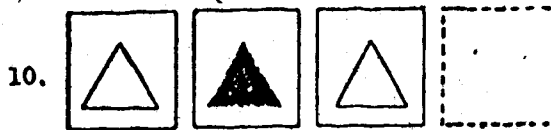
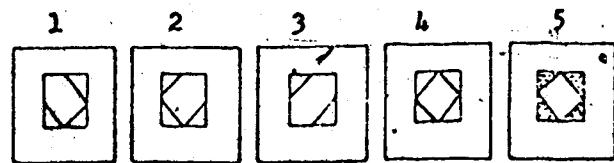
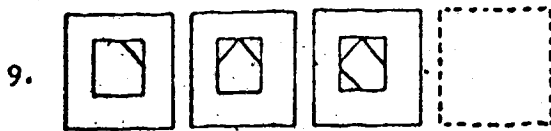
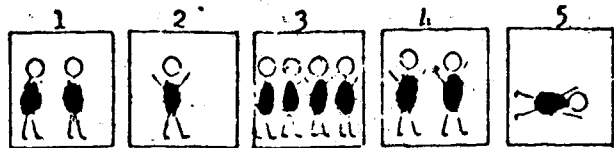
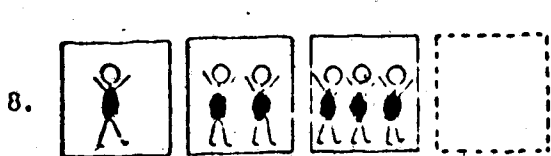
PICK OUT WHICH ONE(1,2,3,4,5,6) WOULD LOOK RIGHT IN THE EMPTY BOX

AND WRITE ITS NUMBER ON THE ANSWER SHEET.

EXAMPLE



THE ANSWER TO THIS EXAMPLE IS : 3



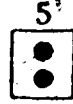
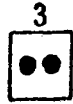
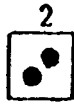
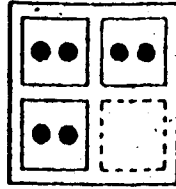
WRITE ALL YOUR ANSWERS ON THE ANSWER SHEET.

PICK OUT THE ONE (1,2,3,4,5,6) WHICH WOULD LOOK RIGHT IN THE EMPTY BOX

AND WRITE ITS NUMBER ON THE ANSWER SHEET

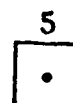
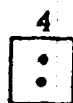
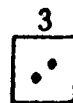
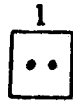
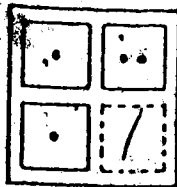
Example

WRITE ALL YOUR ANSWERS ON THE ANSWER SHEET.

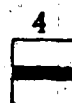
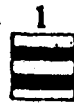
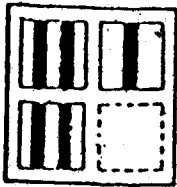


THE ANSWER TO THIS EXAMPLE IS : 3

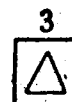
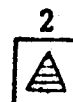
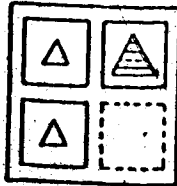
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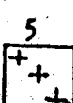
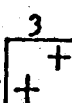
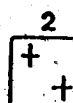
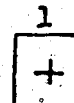
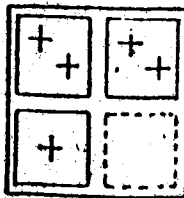
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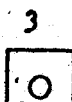
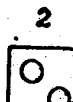
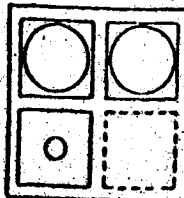
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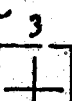
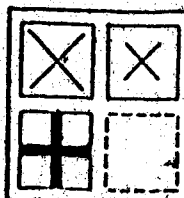
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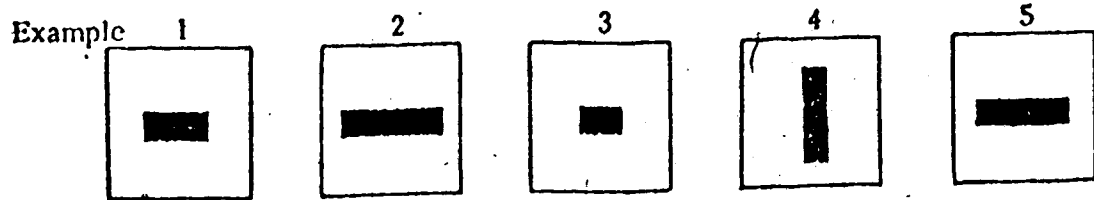
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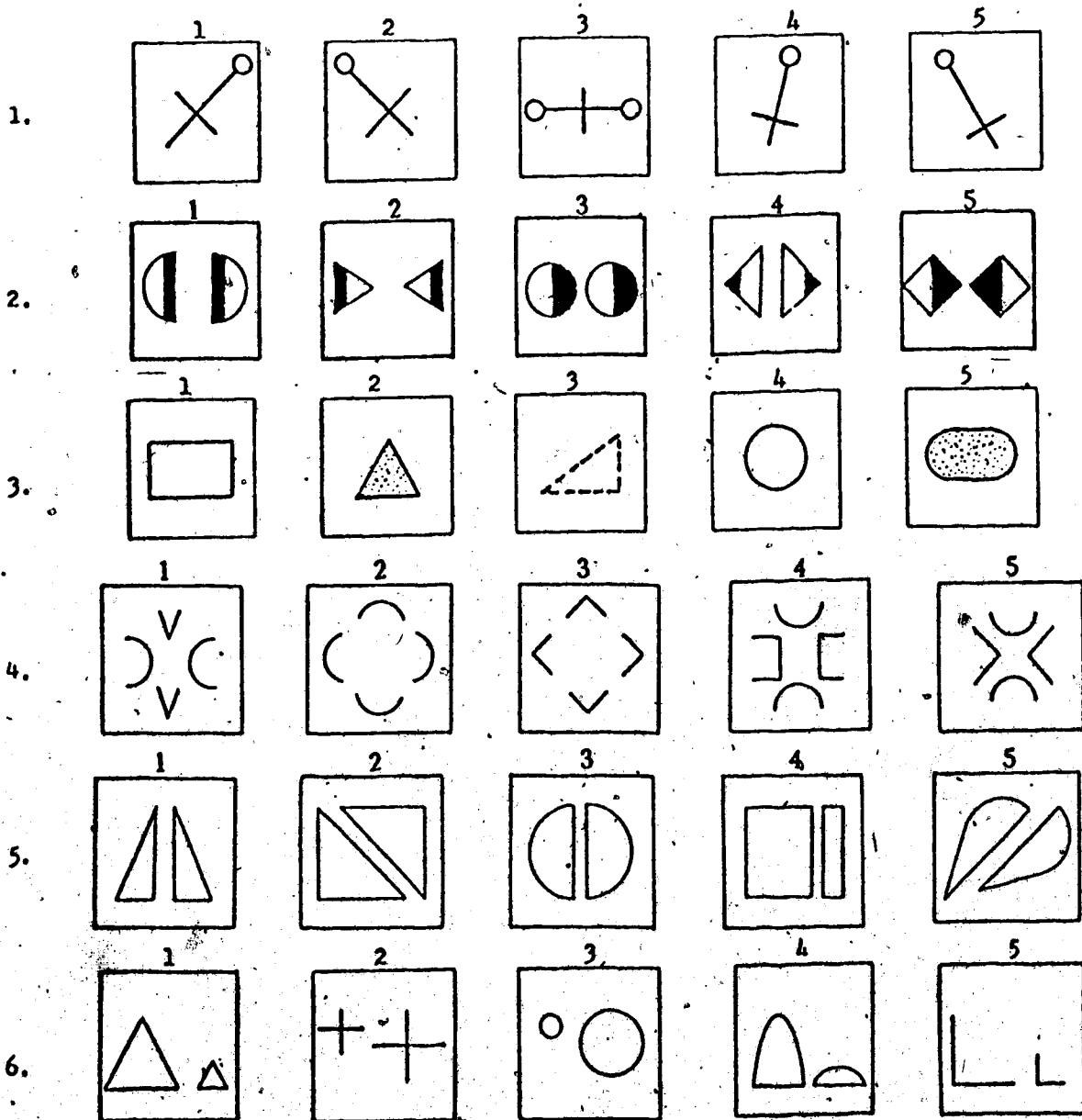
20.



CHOOSE ONE PICTURE WHICH IS DIFFERENT IN SOME WAY FROM ALL THE OTHERS
 AND WRITE ITS NUMBER ON THE ANSWER SHEET



THE ANSWER TO THIS EXAMPLE IS : 4



WRITE ALL YOUR ANSWERS ON THE ANSWER SHEET.

LOOK AT WHERE THE DOT IS IN THE PICTURE ON THE LEFT.

NOW FIND A PICTURE ON THE RIGHT (1,2,3,4,5,6) WHERE YOU COULD PUT THE DOT IN THE SAME POSITION.

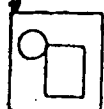
Example



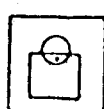
1



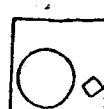
2



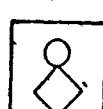
3



4



5



THE ANSWER TO THIS EXAMPLE IS : 3

7.



1



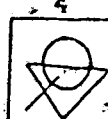
2



3



4



5



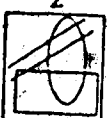
8.



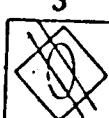
1



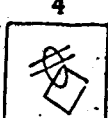
2



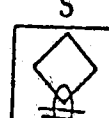
3



4



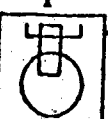
5



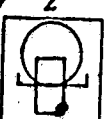
9.



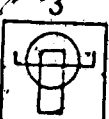
1



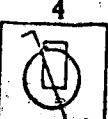
2



3



4



5



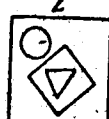
10.



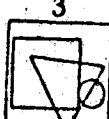
1



2



3



4



5



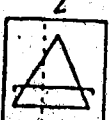
11.



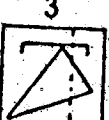
1



2



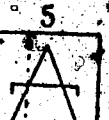
3



4



5



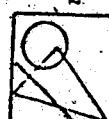
12.



1



2



3



4



5



13.



1



2



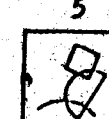
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4

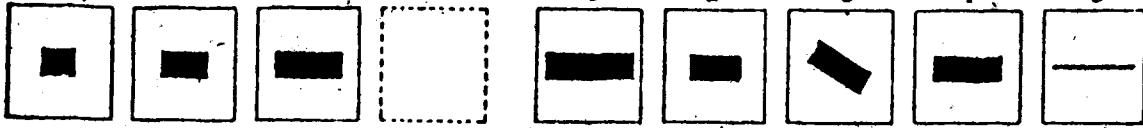


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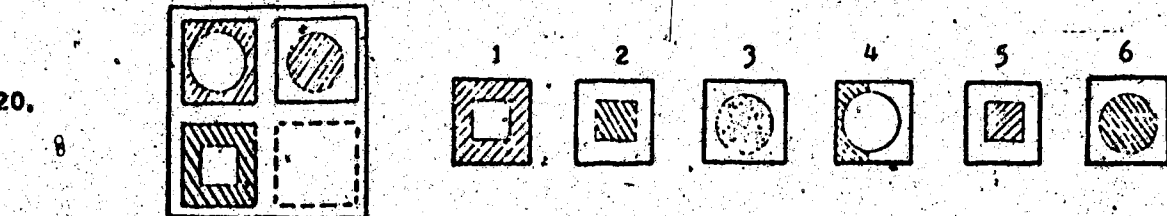
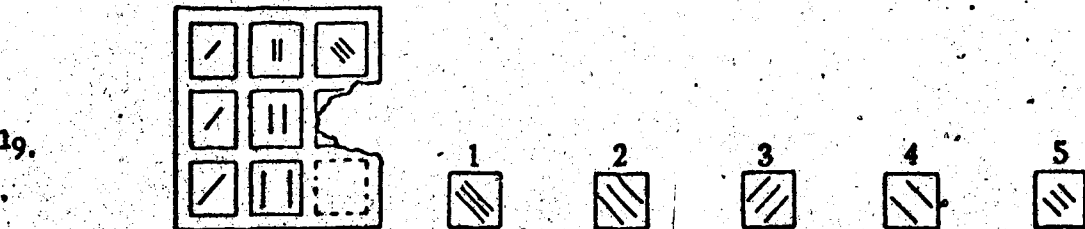
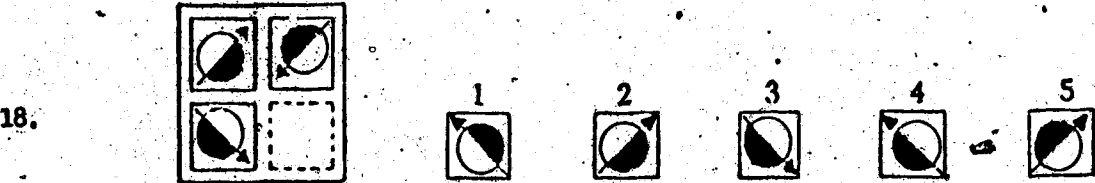
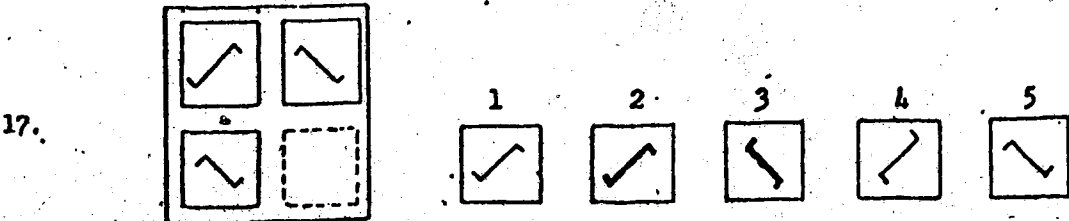
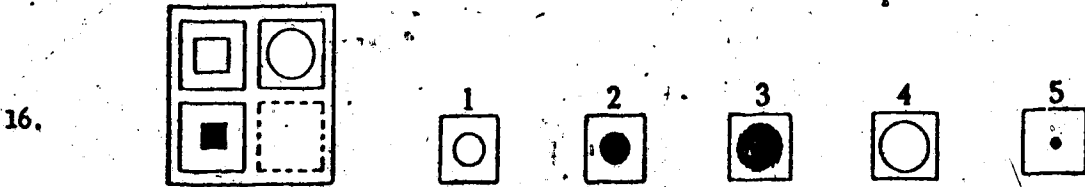
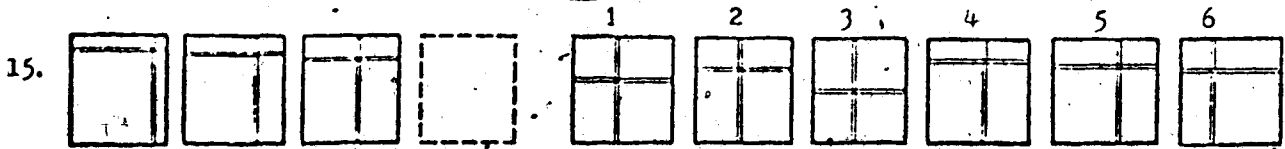
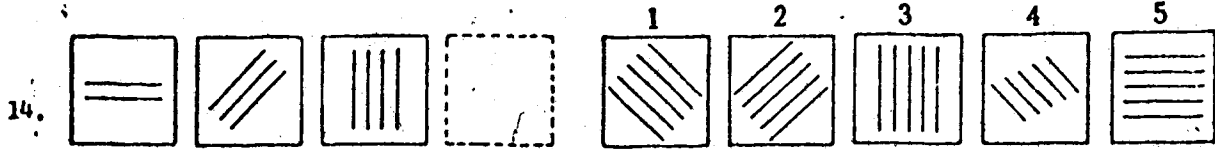


AND WRITE ITS NUMBER ON THE ANSWER SHEET

Example

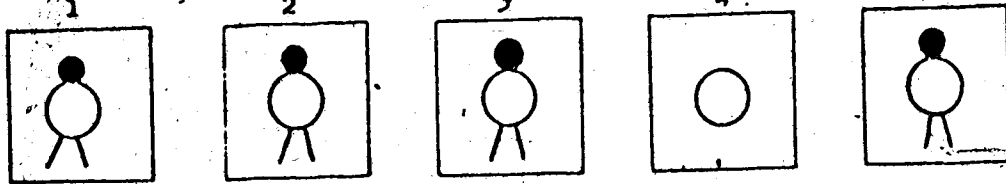


THE ANSWER TO THIS EXAMPLE IS : 1



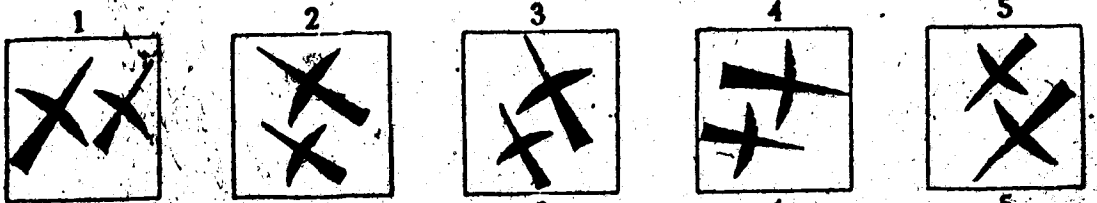
CHOOSE ONE PICTURE WHICH IS DIFFERENT IN SOME WAY FROM ALL THE OTHERS
 AND WRITE ITS NUMBER IN THE ANSWER SHEET.
 WRITE ALL YOUR ANSWERS ON THE ANSWER SHEET.

EXAMPLE

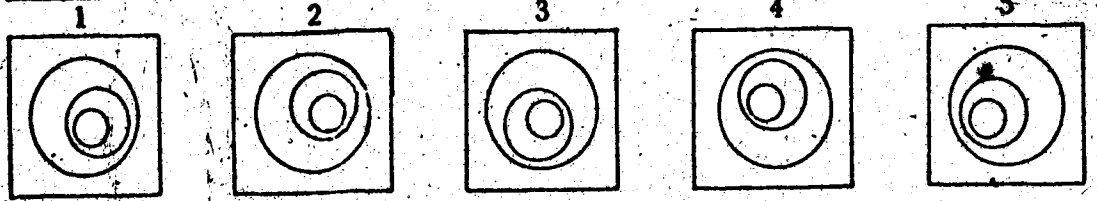


THE ANSWER TO THIS EXAMPLE IS : 4

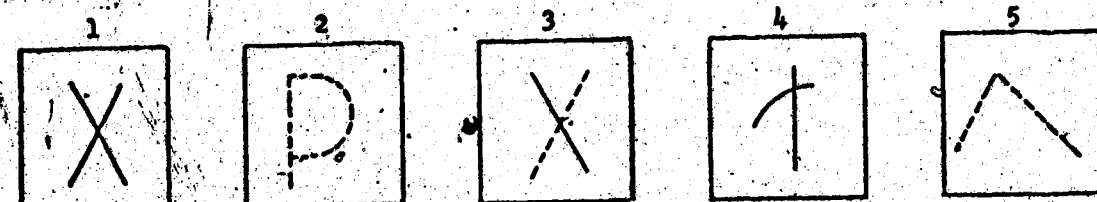
1.



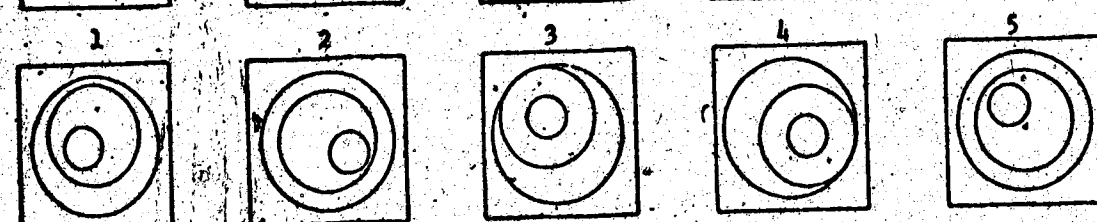
2.



3.



4.



PICK OUT WHICH ONE (1,2,3,4,5,6) WOULD LOOK RIGHT IN THE EMPTY BOX
AND WRITE ITS NUMBER ON THE ANSWER SHEET.

EXAMPLE.



THE ANSWER TO THIS EXAMPLE IS : 1

5. 1 2 3 4 5
6. 1 2 3 4 5
7. 1 2 3 4 5
8. 1 2 3 4 5
9. 1 2 3 4 5 6
10. 1 2 3 4 5 6
11. 1 2 3 4 5 6

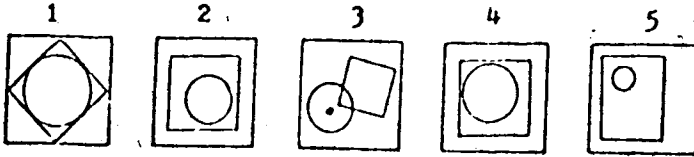
WRITE ALL YOUR ANSWERS ON THE ANSWER SHEET.

LOOK AT WHERE THE DOT IS IN THE PICTURE ON THE LEFT.

NOW FIND A PICTURE ON THE RIGHT (1,2,3,4,5,6) WHERE YOU COULD PUT

THE DOT IN THE SAME POSITION.

Example



THE ANSWER TO THIS EXAMPLE IS : 3

12. 1 2 3 4 5

13. 1 2 3 4 5

14. 1 2 3 4 5

15. 1 2 3 4 5

16. 1 2 3 4 5

17. 1 2 3 4 5

18. 1 2 3 4 5

19. 1 2 3 4 5

20. 1 2 3 4 5

WRITE ALL YOUR ANSWERS ON THE ANSWER SHEET.