

THE EFFECTS OF ANXIETY, MOTIVATION, AND LEVEL
OF ABILITY ON ACADEMIC ACHIEVEMENT.

by

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ABSTRACT

This research discusses the various theoretical approaches to the conception of anxiety as a motivational determinant of academic achievement. In particular the theoretical model and experimental investigations of three major research programmes are compared and contrasted:- Drive theory and activation concepts of emotionally based drive; the investigations of situationally specific anxieties, notably test anxiety; and the approach-avoidance achievement motivation model of Atkinson and McClelland.

The aim of this investigation was to attempt to clarify the interaction between intellectual capacity, anxiety and performance, both in terms of anxiety to achieve success, conceived as a positive drive, and anxiety to avoid failure, seen as a negative drive. Drive theory assumes the non-specificity of drive in relation to performance, stressing the strength of the drive involved as the important variable. Achievement motivation theory stresses the directional component of drive, that is the relative strength of fear of failure and hope of success. It was predicted, (following drive theory conceptions of level of task complexity, and theoretical conceptions of subjectivity probability of success), that anxiety would have a differential effect on academic

performance, according to the ability of the subjects. The suggestion that for subjects of superior ability anxiety would have a facilitating effect was investigated. Techniques of measuring motivational strength and direction were analysed and some attempt at clarification of these techniques was conducted.

Three samples were tested at three age levels assumed to be particularly stressful in the British educational system, pre-eleven plus (one hundred and fifty subjects, male and female); pre-G.C.E. (one hundred female subjects) and pre-first year undergraduate examinations (seventy female subjects).

It was found that anxiety and achievement-need have a differential effect on academic performance according to the intellectual ability of the subject. For subjects of high ability, the strength of the drive was found to be the important variable, while for subjects of average ability the direction of drive, or the overall motivational-orientation was found to be of most importance. The results are discussed in relation to theories of emotionally based drive and the risk-taking model of achievement motivation.

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PART I

The Introduction

INTRODUCTION

In recent years the concept of anxiety as an important motivational determinant of academic success or failure has become generally accepted, but although recognised as an important factor, definitions of anxiety vary considerably. The importance of the concept of anxiety is reflected in the fact that it is seen as a central construct in many differing theories, from Freudian psychoanalytic theory to Hullian learning theories. There are however, some major conceptual problems which affect the generality and comparability of research findings.

Firstly, there is some confusion caused by the use of anxiety both as an hypothetical construct and as an empirical construct. Used as an empirical construct, anxiety is seen as a descriptive label for a class of related responses, such as physiological responses and statements of an unpleasant affective state. Anxiety is used as an empirical intervening variable in studies such as those where scores on anxiety questionnaires are found to be functionally connected with a preceding variable, such as experimental instructions, and a following variable such as task performance. The term is used merely as a reference to scores on the questionnaire. When anxiety is used as an hypothetical construct it is assumed that the

construct, anxiety is an entity that actually exists, within the framework of a theory. This anxiety is measurable in various observables, other than those observables that led to the hypothesizing of the construct. An example of this would be that anxiety inferred from scores on a questionnaire is conceived of as having certain other predictable concomitants, such as interference on a complex learning task, which follows from the role of the construct in its theoretical model.

As a hypothetical construct, anxiety can be seen as a hypothetical trait, or enduring feature of the personality. That is, that a subject is chronically anxious and that this is an enduring facet of his personality. Or anxiety can be seen as a hypothetical process-variable, or state anxiety, which suggests that the subject is anxious now, in response to certain experimental conditions, designed to arouse anxiety reactions in subjects.

Anxiety has also been described as a drive or a motivational construct and in this context it is often described as emotionally based drive. Within this conception is the notion of nonspecificity of drive with its idea of anxiety as a generalized energizer. However, there are investigators who refer to a difference between generalized and situationally specific anxiety. The argument seems to be

concerned with differences in the source of the anxiety rather than the kind of anxiety response experienced. From this brief introduction it can be seen that there are theoretical problems to be encountered when using the term anxiety to describe or explain motivational determinants of behaviour. These problems will be dealt with fully in the text.

The possible relationship between anxiety and academic achievement has been of interest to both educationalists and academic psychologists. Many of the theoretical conceptions mentioned above have been utilized to describe motivational effects on academic performance. These factors have been variously referred to as anxiety, test anxiety, need achievement, neuroticism and drive level, all of which have been discussed as possible important elements in the success or failure of any one student. The major assumptions put forward by several investigators would seem to suggest that anxiety, as a negative drive, causes performance decrement in academic achievement situations, while need achievement, as a positive drive causes enhanced performance in such situations.

Four major research programmes will be discussed in this inquiry. Firstly, the laboratory investigations of drive level and complex learning performance, which have been conducted by the Spence group since 1952. Attempting to incorporate anxiety within the general framework of Hullian learning theory, they have developed a model which conceives

of anxiety as an emotionally based drive, which combines multiplicatively with habit to give performance in learning situations. This drive is said to be measurable by means of the Taylor Manifest Anxiety Scale (1953) and differences in emotionality on this scale are used to predict differing performances. The prediction is, that in simple learning tasks, where only one response is probable, high drive will lead to rapid learning of that one response and thus, high anxious subjects will be more successful at such tasks than low anxious subjects. In more complex tasks, several competing responses are triggered in response to the learning situation and high drive will tend to combine multiplicatively with an incorrect response higher in the habit-family hierarchy than the correct response. Thus in such situations, high anxiety will be detrimental to efficient performance and low anxious subjects will be more successful at these tasks.

From the theories concerned with concepts of activation or arousal, several similar ideas have arisen concerning the generalized energizing function of anxiety. Notable the idea of a non-monotonic relationship between anxiety and performance has been suggested. Thus, it is suggested that there is an optimal level of arousal needed for efficiency at any one task. Arousal levels of above or below this optimal

amount lead to performance decrement. It is also suggested that the more difficult the task the lower the level of arousal needed for efficient performance. (Yerkes-Dodson, 1908). In the context of academic achievement, it has been suggested that too much anxiety will cause confusion and inadequate performance, while too little anxiety will lead to poorer performance, probably through insufficient effort. Thus an optimal level of arousal is suggested for academic tasks.

A third area of research which will be discussed is the research undertaken by Professor S. B. Sarason at Yale, who has developed scales to measure situationally specific anxieties, such as "test anxiety" and "lack of defensiveness" (1952-1966). Sarason regards test anxiety as a situationally specific measure of debilitating anxiety of particular relevance to academic testing situations. The prediction is that high test anxiety scorers will be under-achievers. Sarason's more recent work has been concerned with extending his research to investigate grade school children over long periods of time.

Finally the other area of important research which will be investigated is the work on need achievement. Of principal interest is Atkinson's (1958, 1966) experimental analysis

of the effects of need achievement, although much earlier work has been conducted by McClelland. Atkinson sees the motive to achieve success and the motive to avoid failure as of utmost importance as motivational determinants of academic success, and it is the overall achievement orientation of a subject which is the important factor in this success. These concepts are discussed fully in the text.

From these principal areas of research, several major theoretical issues have been isolated and applied to the research findings of this study. These are discussed fully in the section on the aims of this inquiry. Briefly, however, there is the question of direction and strength of drive. Drive theory stresses the non-specificity of drive, i.e., that it is the strength of the drive which is the important factor. Direction, or the kind of drive involved, is not seen as important. However, the Atkinson work stresses the directional factors of drive level, and indeed to Atkinson it is the overall directional orientation which is of paramount importance. Whether drive level in academic achievement situations works as a non-specific energizer or a directional energizer is investigated in this study.

Another important theoretical issue discussed and investigated, is the question of individual differences in the effects of motivation on performance and principally the

importance of intellectual capacity and its interrelation with anxiety and performance. The concept of level of difficulty of task, important in drive theory models and Atkinson's risk taking model, is investigated in terms of differing intellectual capacity for the performance task required. The work of C. D. Spielberger (1962, 1966) is discussed in this context. Also the problem of whether anxiety can facilitate academic performance is discussed in this research, principally with subjects of very high academic ability.

Finally attempts have been made in this study to clarify some of the major difficulties encountered in scoring projective and questionnaire measures of anxiety and need achievement. A new measure has been introduced together with simpler forms of quantification of older measures. Attempts have been made to extend the research findings with American College males, to British children, both male and female.

The principal aim of this study has been to bring together some of the major theoretical concepts from varying research programmes; to attempt to investigate the interrelation of these concepts, and to extend the range of generality and comparability of the research findings.

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PART II

CHAPTER I

THEORIES OF ANXIETY

Chapter I
Theories of Anxiety

The concept of anxiety has frequently been proposed as a central explanatory variable in personality theories. Most of the major theoretical considerations of personality have included a conception of anxiety, often disguised under another name, but still clearly recognizable as anxiety. Before proceeding to discuss the relationship of anxiety and performance, some of the major theoretical conceptions should be considered. The literature on the nature of anxiety is quite extensive, displaying the different foci of attention, from the clinical research into anxiety states to the sociological concern with the nature of anxiety in the modern world. Only those principal theories of anxiety which directly relate to the subsequent empirical research will be considered in this section. Many of the empirical studies on anxiety employ and demand a knowledge of several theoretical approaches which will be reviewed here.

I. The Psychoanalytic Approach:

Freud provided the first systematic attempt to distinguish between anxiety as a state in itself, and anxiety as a symptom of a wider mental disorder. His conception of anxiety-

neurosis provided an important spur to clinical studies of anxiety reactions. Although interest in anxiety had early philosophical antecedents, Freud may be regarded as the first person to attempt to explicate the meaning of anxiety within the context of psychological theory, (Freud 1936).

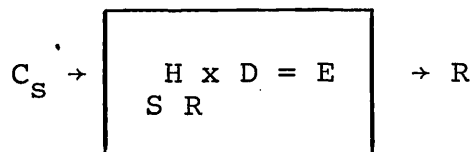
Freud defines anxiety as an affective state, that is something felt, an unpleasant feeling or condition. His definition of this unpleasant state includes "all that is covered by the word nervousness, apprehension or anxious expectation". The birth trauma provides the original and "prototypic" anxiety experience for man; the first real danger situation he must face. Freud regards this initial anxiety experience as adaptive in that it mobilizes the organism, by means of the automatic physiological responses of anxiety, to survive the ordeal. Following this initial experience the organism is said to respond to later situations of excessive stimulation with further anxiety. Freud conceives of anxiety as the response of the ego to stimulation it is unable to control. Although this anxiety may be adaptive in response to some situations of increased stimulation, it is in itself an unpleasant state and the organism seeks to minimise or avoid the anxiety reaction.

As a result of subsequent learning, the organism comes to respond with anxiety to the expectation of danger or threat, that is it feels anxious in case something should occur. This

expectancy or apprehension is said to enable the ego to respond in advance and therefore protect itself from further real, or imagined painful stimulation. When the danger or anticipated danger is real, then the response of anxiety can be said to be adaptive behaviour on the part of the organism. However, this adaptive process can be upset, either by excessive stimulation from the instincts, the id, or by excessive stimulation from the conscience, the super-ego. These sources of excessive stimulation are said to produce new kinds of anxiety, neurotic anxiety when the stimulation is from the id, and moral anxiety when the pressure is directed from the superego. In summary, real or objective anxiety is regarded by Freud as a necessary part of life, as an "intelligible reaction to danger"; an adaptive process. This objective anxiety has its origins in reality, operating through the ego. When the anxiety has unreal origins it is termed neurotic anxiety which often appears as "free floating general apprehension or dread". Moral anxiety, resulting from the superego, is a form of anxiety produced by internalizing punishment, resulting in shame or guilt. The principal factor differentiating between objective and neurotic anxiety would appear to be the source of the perceived threat, whether it is from the external or real world, or the internal fantasy world.

II. The Theory of Emotionally-Based Drive

This theory of anxiety has developed from Hullian S-R learning theories, largely due to the work of Kenneth and Janet Taylor Spence. In the Hullian model (Hull, 1943), anything that takes place between S, the stimulus, and R, the response, is known as an intervening variable. All motivational factors are intervening variables. The distinction is made between learning and performance. The performance is the response, it can be observed, and reported upon, sometimes measured. The learning is not observable, it happens within the organism and is therefore also an intervening variable. Hull's system produced a model of $H \times D = E$ that is habit multiplied by drive equals the tendency to make responses. It can be expressed diagrammatically as:-



where C_s = Conditioned stimulus

R = response

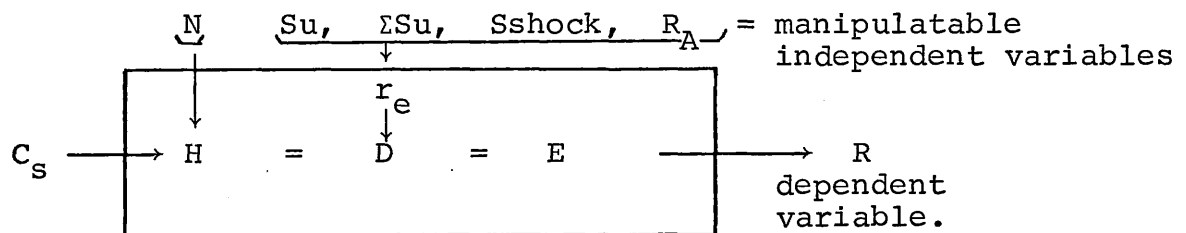
SHR = habit strength

E = tendency to respond

D = level of drive

Hull's theory involved several different measures of drive strength, which evolved from his experimental work on learning. However, for the purpose of this review, it is enough to state that to the basic $H \times D = E$ equation, Hull and Spence added a further factor, r_e or emotionally based drive. By this it was assumed that level of drive is a function of the magnitude of a hypothetic mechanism r_e , a persistent emotional response aroused by aversive stimuli. This idea of anxiety is similar to that proposed by Miller (1951) and Mowrer (1939), when working with the acquired drive of fear in avoidance conditioning.

Taylor Spence (1966) represents this diagrammatically as:-



- where N = The number of paired conditioning trials
- Su = The unconditioned stimulus
- ΣSu = The number of prior presentations of Su
- S_{shock} = Shock unpaired with the conditioning stimulus, or with Su
- R_A = Scores on the M.A.S. or some other measure of subject's emotional responsiveness.

Several assumptions can be made from this model, if it is accepted that r_e has the same properties as have been found with overt responses to noxious stimulation. Firstly, since the strength of reflexive responses to noxious stimulation has been found to vary with the intensity of the stimulation, it would follow that the strength of the hypothetical emotional response, r_e , and hence the level of drive (D), should be a positive function of the intensity of the unconditioned stimulus in classical aversive conditioning. This leads to the further assumption that performance, as reflected in frequency of conditioned responses, will vary positively with the intensity of the unconditioned stimulus. Individuals differ in the strength of their reflex responses to a given intensity of noxious stimulation and therefore it is assumed that individuals will vary in the strength of r_e and thus in level of D, under a given set of experimental conditions. Again it follows that the more emotionally responsive individuals would show higher performance levels in classical aversive conditioning than the less responsive. It was to distinguish between these two groups that the Taylor Manifest Anxiety scale was introduced, which will be discussed in the chapter on measurement of anxiety.

This theory of drive is concerned only with simple conditioning but it is assumed that more complex learning is

involved in academic work. Spence has extended the theory to include more complex tasks. In classical conditioning a single response to a simple stimulus is being acquired. In complex tasks, selective learning is required where a number of stimulus items are present, each of which may evoke a number of competing responses with varying habit strengths. This inter-response competition is one of the factors that makes complex learning complex. If the initial habit strength of the correct response is stronger than that of the competing responses, the multiplicative relationship between H and D in determining E (excitatory potential), implies that the higher the level of D the greater the difference between the E values of the correct and incorrect responses. Therefore, when the correct response is initially strong the performance should be positively related to D, just as in classical conditioning. However, if the correct response is initially weaker than one or more of the incorrect responses, the higher the drive level, the poorer the performance during the early stages of learning. As learning progresses the habit strength of the correct response would be expected to increase, and eventually to exceed that of the incorrect responses. Therefore, the high drive group should be inferior in performance at the beginning of the task and become superior at a later stage.

In their experimental investigations, Taylor and Spence (1956 - 1958) used paired-associate learning because such learning involved inter-response competition. They drew up two kinds of tests, a non-competitive list of paired associates, where each stimulus-response item was paired with its synonym. The subjects were required to learn the synonyms. This was a more or less non-competitive response situation as the correct response was the most likely response, that is the response with the initially stronger habit strength. In this test it was typically found that high anxious subjects performed better than low anxious subjects. However, in the second test a list of paired associates with a high level of response competition was devised. The words were also synonyms but each word was paired with a word, other than its own synonym. In this case the initial habit strength of the response term, paired with a given stimulus, was weaker than the strength of one or more competing responses. Here it was typically found that subjects with low levels of anxiety perform better than high anxious subjects. However, from the theory it would be expected that if training was continued for a sufficient period of time, the high anxious subjects would become as efficient if not more efficient than low anxious subjects. (Spielberger, Chapter III).

This result of Taylor Spence has been used to support the Yerkes-Dodson law (though not by Spence) and an inverted 'U' shaped relationship between drive and performance. That is, that the more difficult the task, the lower the level of drive needed to provide efficiency. However, it must be pointed out that the Taylor Spence theory refers only to inter task response competition and not necessarily to complexity or difficulty of that task compared with others. It is probably true that, other things being equal, tasks of increasing degrees of inter task response competition could be described as becoming more complex, but varying response competition is not the only way of varying complexity. Therefore, it should not be assumed from the Spence experimental evidence with response competition tasks, that anything has been proven concerning the effects of drive level on the performance of difficult or complex tasks. The results only apply to difference in degrees of response competition and not to some vague measure of difficulty or complexity. Difficulty or complexity of task, it is assumed, can be increased without increasing the response competition involved in the task. This is an important point because several workers have used the Spence results as examples supporting a curvilinear relationship between anxiety and performance while the theory itself predicts a linear relationship (This will be discussed in the section on activation theories).

Manifest Anxiety and Response Interference

The conception of response interference has been introduced by Janet Taylor Spence to explain deterioration of performance under high drive conditions. Child (1954) suggested this hypothesis as a possible alternative to the original S-R interpretation of the Taylor-Spence findings but the later writings of Spence have included this concept within the general framework of the theory. The hypothesis is that task-irrelevant responses, which may interfere with efficient performance, are more easily aroused in high anxious than in low anxious subjects. Within the framework of Hullian theory this hypothesis would emphasise not D , a general energizing drive with an essentially multiplicative function, but another concept within the S-R framework: S_D or Drive Stimulus. S_D is regarded as having the capacity to evoke responses, "both learned and unlearned, covert and overt" (Hull, 1943) and is more nearly specific to a given drive so that it can provide for discrimination between drives as well as reinforcement. Like D , the strength of S_D is a function of r_e , the anxiety factor. Whether an increase in D and S_D facilitates or deters performance depends, in part, on whether the response tendencies elicited by S_D are compatible or incompatible with the response being acquired or performed.

Among the responses aroused by S_D , associated with r_e in human subjects are those described as task-irrelevant, (e.g., "heightened autonomic reactions or covert verbalizations

reflecting self depreciation, anger and desire to escape"). If these tendencies are more easily aroused in high anxious subjects it would lead to the prediction that the performance of high anxious subjects would be inferior. High anxious subjects tend to react emotionally to experimental situations and therefore both D and S_D would be higher for them than for low anxious subjects. If S_D is greater than D , subjects would perform badly, that is, if the deteriorating effect of S_D is greater than the facilitating effect of D , subjects performance will be impaired.

This hypotheses of S_D and task-irrelevant responses does not adequately deal with all the data, as the superiority of high anxious subjects on low competition tasks is not explained. It could be that the neutral test conditions under which these experiments have been conducted were not sufficiently stressful to affect the subjects, but Taylor does say that in cases where stress is deliberately introduced, this hypothesis of task - irrelevant responses may be applicable. It is this concept which is used by the Mandler, Sarason workers to explain differences in performance of high and low test anxious subjects. (Mandler and Sarason, 1952).

In summary of the Taylor-Spence theory it may be said that it is a theory of emotionally based drive. Drive is conceived as a non-directive energizing force which is a function of the magnitude of r_e , an emotional response aroused by aversive

stimuli. From their experimental results it is seen that when a simple non-competitive response is required, high drive has a facilitating effect, the higher the drive level, the more efficient the performance. When the element of competitive responses is introduced the effect of drive is that, in a low response competition situation, high drive is still positively related to performance. When the task has high competitive response qualities, low drive facilitates performance. It is also postulated that in response competitive situations, high drive leads to the likelihood of task-irrelevant responses which interfere with performance efficiency.

III. Activation Theories and Anxiety

The activation, or arousal concept of motivation has exercised an important influence on recent experimental work with anxiety and a discussion of this concept would seem necessary before embarking upon a review of experimental research. It will be seen that both the S-R theorists and Eysenck's factor theory employ some notion of arousal level in connection with anxiety.

Malmo (1966) mentions a terminological confusion between "activation" and "arousal". This confusion has arisen because of the accepted pattern of using the terms as synonyms. However, Feldman & Waller (1962) have shown that the terms

should be separated, "activation" being confined to the EEG changes observed, and "arousal" being used in connection with changes along the sleep - waking continuum, as reflected by the subject's behaviour. These authors have demonstrated that the two kinds of phenomena are not always associated, and therefore a terminological distinction would appear reasonable. However, as this distinction is not made by the principal workers in this field, exact terminology cannot easily be employed. The terms most commonly used have been "energy mobilization" (Cannon, 1929, Duffy, 1941, 1962), degree of arousal (Duffy 1941, Freeman 1948 Hebb 1955) and activation (Lindsley 1951). All of these terms, although not exactly synonymous, refer to the factor which represents the excitation level of an organism.

The Arousal Concept and the Reticular Activating System

A concept of excitation has existed in most theories of motivation, but notable early contributions to the subject have come from Cannon (1929) and Duffy (1941 onwards). These contributions were largely ignored until the mid-fifties when important neurophysiological discoveries led to awakening interest in arousal theories. One of the most interesting of these discoveries was the reticular activating system, a full description of which can be found in Hebb (1955) and Lindsley (1957 Nebraska Symposium).

The neurophysiological explanation of arousal takes into consideration both the primary sensory system and the reticular activating system (RAS). Both these systems are sensory systems but appear to function quite differently. The primary sensory system conducts nervous impulses from the various sense organs to the thalamus and from there to the specific sensory areas of the cortex. Conduction is fast, direct and specific, so that inputs to this system serve as cues or messages. This "cue function" (Hebb 1955) is characterized chiefly by organization in which ordering and timing of events is important. In mammals it is probable that it is largely dependent upon the cerebral cortex, together with related subcortical neural mechanisms which are organised for the mediation of sequential timed responses.

The reticular activating system (RAS) consists of the reticular formation in the medial brain stem and parts of the hypothalamus, subthalamus and ventromedial thalamus. Impulses in this network are conducted over "devious multisynaptic pathways" and are transmitted diffusely to all parts of the cortex. It is a non-specific system because it receives impulses from all sense modalities. It has been said to have an "arousal function" by Hebb (1955) and its activity characterized by diffuseness rather than organization. There is also a feedback of activity from the cortex to the RAS. It is believed that the RAS serves to tone up the cortex with

a background supporting action that is necessary if the messages of the "cue function" are to have their effect.

Changes in the diffuse background activation of the cortex seem to affect the way in which the incoming primary sense impulses are dealt with. Low activation, which can be demonstrated by slow large E.E.G. waves, is typically associated with sleep, and high activation (fast, small E.E.G. waves) is associated with excitement. Moruzzi and Magoun (1949) have demonstrated that stimulation of the reticular region of the midbrain had the effect of changing cortical E.E.G. activity from a synchronous, relatively high amplitude pattern to one characterized by low amplitudes and fast frequencies. This is the same E.E.G. change, in fact, which is known to occur when a resting subject is unexpectedly exposed to an arousing stimulus (Lindsley 1951). It would seem then that level of arousal depends in some way on the RAS and it has been demonstrated that damage to this area produces a permanent comatose animal (Magoun 1958). The evidence, so far, is still in many ways incomplete and it would seem likely that future research will produce evidence that the RAS is not an homogenous system, but consists of a number of subsystems with distinctive functions. Jasper (1963) has presented evidence that the mechanism is probably not entirely unspecific and he emphasized the inhibitory side of the RAS function.

The descending brain-stem reticular system has been demonstrated to have both an inhibiting and facilitating function (Magoun 1958). Magoun has demonstrated that the D. RAS is divided into a midbrain part and a bulbar part: facilitating effects have been experimentally demonstrated for the former and inhibitory effects for the latter. Magoun demonstrates this by showing that the amplitude of reflexes (such as the knee jerk) is increased by stimulating the facilitatory area and decreased by stimulating the inhibitory area. Malmo (1966) provides evidence that in psychoneurotic patients (anxiety states), there may be a defective regulatory control of these mechanisms.

Arousal and Performance

From the neurophysiological findings further activation theories have developed. Notable among the early attempts to incorporate the RAS into a motivation theory, was Hebb's (1955) article. "Drives and the CNS" ("conceptual" nervous system). Hebb proposes that the arousal system is synonymous with a general drive state, and with the discovery of the RAS, drives "assume anatomical and physiological identity". The RAS does support the notion of drive as a nonspecific energizer, and that learning is dependent on drive level (S-R theory), would also be supportable (no drive, no arousal, no learning). Hebb and other theorists (Duffy 1962, Malmo 1966) use the evidence of the RAS to support a Yerkes-Dodson Law interpretation

of activation and performance. The major hypotheses of this theory are as follows:- Firstly, there is an optimal condition, or level of activation for best performance; secondly, on either side of this level performance is relatively impaired; and thirdly, impairment of performance increases with the distance from the optimal level of activation. In other words an inverted U relationship is suggested between activation and performance. From this theory one would expect an organism to be most efficient when the level of arousal is moderate. Too little arousal, when the bombardment of the RAS on the cortex is weak, leads to inefficiency. When arousal is too high the greater bombardment of the RAS on the cortex may interfere with the delicate adjustments of the cue function and perhaps to the facilitating of irrelevant responses (see chapter on S-R theories). Schlosberg (1954) did discover that when arousal is at a high level it is rewarding for this to be lowered, and when arousal is at a low level it is rewarding for it to be raised. This leads to Hebb's theory that the "organism is stimulus hungry", that is the organism will seek stimulation if it falls below the optimal level. This explains the positive attraction of risk taking and certain levels of danger, seen in higher animals. Too much arousal, however, is seen to have an inhibitory effect causing inappropriate responses and at the extreme end of the continuum, total immobility.

Activation and Performance, a Non-Monotonic Relationship?

There is a growing body of literature, which assumes that the neurophysiological conception of arousal brings together the Malmo et al. (1957) conception of a U shaped relationship between arousal and performance, and the S-R emotionally based drive theory. The reasons for this assumption are twofold. Firstly, Hebb's influential 1955 article did attempt to show how the two theories were parallel. Secondly, the results of the Taylor Spence experiments with paired-associate learning and drive level, have been used to demonstrate the working of a Yerkes-Dodson Law. Closer inspection of the two positions, however, will reveal inconsistencies.

Hebbian activation theory assumes that the RAS functions like a non-specific drive, and anxiety is one activator of this system. Hence differing levels of anxiety are synonymous with differing levels of arousal or drive. This would be acceptable to the S-R theorists. However, according to activation theories a non-monotonic relationship is assumed between performance and drive level. An inverted U shaped or curvilinear relationship is predicted: the more difficult the task the lower the level of arousal required for efficient performance, and the more simple the task, the higher the level of arousal necessary for efficiency. Hebb would explain this relationship in terms of the activity of the RAS and would interpret the Spence results in accordance with his theory.

However, it must be remembered that Spence's tasks were designed to demonstrate differences in response competition and not differences in difficulty (see before).

The Spence interpretation of the data is somewhat different from the above and, in fact, Taylor Spence (1966) does insist that the data can be explained without recourse to a prediction of a curvilinear relationship between anxiety and performance. The Hull/Spence theory states that there is a positive monotonic relationship between the experimental variables and drive, and between drive and excitatory potential, but that performance in different behavioural situations depends not only on the drive factor but also on the nature of the interaction of this variable and others in the situation. Thus, the two aspects of drive theory used by the S-R theorists do not imply a non-monotonic relationship between anxiety and performance. The relationship between drive level and performance is necessarily a positive relationship because the very core of the Hullian theory demands a multiplicative function of drive and habit strength. In a complex situation the initial response is likely to be an early response in the habit family hierarchy. If this is incorrect, high level of drive would serve to increase the probability of its occurring and hence the difficulty of the correct responses occurrence. This is essential to the multiplicative relationship of the intervening variables. The Spence theory also incorporates

the response interference notion, high drive level leading to the production of task-irrelevant responses. Once again the relationship of drive to performance in this case does not necessitate a non-monotonic relationship. Taylor Spence, in her later work (1966) suggests that there is evidence to support both views but that until a theory can be produced which accounts for all the empirical findings, both theories are assumptions and possibly only two of a number of alternative possibilities.

In summary, it may be said that the data demonstrating that high levels of anxiety are facilitating for easy, non-competitive tasks and debilitating for more complex tasks has been used to support two theories. The S-R theory explains the data in terms of high drive giving rise to ~~task~~ irrelevant responses, and to the function of drive which combines multiplicatorily with habit strength. The activation theorists would explain the data in terms of a curvilinear relationship between arousal and performance, arousal explained in terms of the functioning of the reticular activating system of the brain stem.

IV. Factor Analytic Concepts of Anxiety

1. R. B. Cattell

The technique of factor analysis was, and has remained the foundation of R. B. Cattell's theoretical position. Cattell's work in the last decade has often been concerned with the relationship of anxiety to motivation and performance and it is this aspect that we will consider more fully. Cattell's concept of State Anxiety and Trait Anxiety will be considered later in a separate section on this problem.

Cattell has developed several hypotheses concerning the relationship of anxiety to motivation. The basic hypothesis is that:-

'Anxiety arises from a threatened deprivation of an anticipated satisfaction, when the threat does not carry complete cognitive certainty.'

(Cattell 1966)

From this statement it must follow that Cattell regards anxiety as characteristic of more highly educable organisms. To experience this anxiety the organism must be able to conceptualize, symbolize and anticipate the deprivation to come. This leads to a state where fear of this anticipated deprivation is greater than the actual threatened experience. This basic hypothesis leads to the Cattellian equation

$$A_1 = f(ED) \quad (1)$$

that is that some component of anxiety (A_1) will be proportionate to the strength of the ergic tension (E) and to the doubt concerning its satisfaction. This doubt element in Cattell equations is of interest to later research. By doubt Cattell is referring to a composite function of two elements, V_o , the objective uncertainty, and F, the degree of failure of the organism to control cognitively the signs that could narrow uncertainty. However, Cattell believed that it was necessary to introduce another variable of uncertainty, V_e , which refers to a subjective ergic variability; the subjective uncertainty in the situation. This leads to a modification of the original equation to express the uncertainty or doubt factor more clearly. The total uncertainty would, therefore, be the sum of the uncertainty of the objective outcome, the uncertainty of the individual's own impulses, together with the individual's degree of ability in appraising them. This leads to the equation

$$A_1 = f (E) (V_e) (V_o F) \quad (2)$$

where the parentheses merely serve to separate the signs, not as algebraic symbols.

The term E in the equation refers to the ergic tension of any one erg. An erg is defined as an innate source of reactivity, functioning rather like a drive, directed towards a certain goal and accompanied by a certain affective quality. Ergic tension refers to a personality trait which approximate

to a totally aroused state of ^unexpressed drive tension. Cattell mentions some ten different ergs, which he believes can be objectively measured under certain conditions. This ergic tension, E at any given moment is drive strength minus current gratification: In his later works, Cattell distinguishes between the actual level of gratification and the anticipated gratification-versus-loss level, or subjective anticipation. A more powerful need will generate more anxiety.

On the nature of anxiety and fear, Cattell originally suggested no specific relation of the anxiety erg and the fear erg. Cattell defined the fear erg as the erg of danger-avoidance an adaptive erg; whereas anxiety was conceived as an experience in its own right, which was usually generated by experience of motivational uncertainty but was not motivationally purposive. However, in his most recent writings he tentatively suggested that anxiety is derived in some sense from the fear erg; and that Anxiety could be a derivative emotion from the primary emotion of fear. In highly developed organisms fear may arise, not only in response to real danger, but in response to deprivation of any ergic satisfaction. This leads Cattell to the second hypotheses, valuable to this research:-

that "Anxiety is the expression of the erg of escape in response to threatened further ergic deprivation of any kind."

In Cattell's equatic presentation this leads to the addition of the term.

$$A_2 = f (E/R) \quad (3)$$

where E/R = the ratio which the anticipated actual level of reward bears to the ergic tension level. Therefore, A_2 is a function of the anticipated absolute level of gratification. Whereas A_1 in equation (2) is a function of the anticipated uncertainty of the reward. Finally, Cattell includes the concept of individual difference in the strength of the fear erg. Therefore,

$$A_2 = f (E_f) (E/R) \quad (4)$$

where E_f is the individual's sensitivity to threat of any kind. As a final refinement Cattell offers the suggestion that the proper magnifying item is really a temperamental rather than dynamic term, which he terms the threctia factor [H- in the 16 P.F. shyness and high responsiveness to threat].

Thus equation (4) could alternatively be written

$$A_2 = f(E/R) (1/H)$$

Therefore, Cattell's final (1965 - 1966) formula for anxiety is:-

$$A = A_1 + A_2 = f (E) (V_e) (V_o F) + f (1/H) (E/R)$$

where $1/H$ the threctia temperamental factor can be substituted for E_f a dynamic measure of sensitivity to threat.

This rather laborious presentation of Cattell's anxiety formulation has been presented because of it's possible links

with the Spence-Taylor, S-R theory and the Atkinson risk-taking theory which will be discussed later. It also serves to illustrate Cattell's basic theoretical postulates, which in the majority of his writings are expressed in a symbolic form.

From the development of the above theoretical model and his own experimental evidence Cattell has recently put forward some general assumption concerning the functioning of the anxiety erg: the following are of interest to the present research -

Firstly, an individual will tend to experience more anxiety in an uncertain environment, with unpredictable rewards and high deprivation; than in a more predictable environment with a high satisfaction rate. Cattell supports this assumption with data from Cattell and Schelker (1961), that there is a higher anxiety rate in cultures at a lower level of economic security and a higher level of cultural conflict.

Secondly, Cattell suggests that a higher total ergic tension score will lead to higher anxiety. That is an overall high level of unexpressed drive level leads to high anxiety. Cattell has shown this in his factor analytic work. (Q4 is consistently positively correlated with anxiety + .7)

Thirdly, from equation (3) it must follow that high scores on the ergic tension score for fear, will correlate with high anxiety scores, or with high H scores (susceptibility to threat).

The relationship of H scores and fear scores has been found to be highly significant ($r = .5$).

Fourthly, Cattell suggests that high anxiety should be correlated with higher guilt - proneness (O) and possibly with higher (G), the super ego factor. The relationship between O and G is by no means clear but Cattell et al. have found that in school children, high G is consistently associated with low anxiety. (Cattell, 1956).

In summary of Cattell's overall position it may be said that, two major theories have been presented, namely that anxiety is a function of uncertainty of reward, and that it is a function of magnitude of anticipated deprivation of any or all ergs.

H. J. Eysenck's Theory of Anxiety

Eysenck's theory of personality, like that of Cattell is predominantly a factor analytic theory, although there is evidence that his more recent work has been less closely associated with these earlier factor-analysis studies and is increasingly reflecting his interest in Pavlovian inhibition theory, modern S-R theory and behaviour therapy. For the purpose of this review only those aspects of Eysenck's theory and research, which deal with anxiety and performance will be considered. Eysenck's main theories in this field were originally presented in systematic form in "The Dynamics of

"Anxiety and Hysteria" (1957). In spite of this title he does not deal directly with the concept of anxiety, or its relationship to performance. Eysenck includes anxiety under the wider headings of introversion and neuroticism. Anxiety would appear to be assumed to play a part in the relationship of the build up of inhibition to learning and performance. A review of Eysenck's work in this field is contained in Eysenck (1967).

Briefly, Eysenck posits four principle dimensions of personality, all of which are virtually independent of each other, neuroticism, introversion/extraversion, psychoticism and general intelligence. Eysenck attempts to relate neuroticism with autonomic drive and introversion with a tendency to generate inhibition slowly. It is these two Eysenckian postulates that brings his theorizing into relationship with Spence/Taylor S-R theories of emotionally based drive and Atkinson's achievement theories (see later). In Hullian theory performance is said to be a function of drive and habit. Taylor's work ascribes differences in learning, or rate of conditioning to the drive properties of the individual, while Eysenck concentrates on the habit properties. Using a Pavlovian formulae, Eysenck states that:-

"Individuals in whom excitatory potentials are generated quickly and strongly are introverted in personality. Conversely individuals who

generate weak excitatory potentials slowly and who generate strong inhibitory potentials quickly tend to be extraverted in personality." (Eysenck 1957, p. 115).

From Eysenck's 1957 theory one would expect three main differences in performance of introverted and extraverted subjects, differences in regard to verbal and performance intelligence, learning speed, and preference for speed and accuracy, and work decrement.

A. Intelligence

The literature which covers the relationship of intelligence, and "types" of intelligence, and the introversion, extraversion type theory is somewhat confused. In general Eysenck and supporters state that neurotic introverts are more intelligent than neurotic extraverts. (Cattell 1950, Eysenck 1947). The evidence from normal subjects is somewhat limited, but Furneaux (1957), found that neurotic - introverts did well on selection intelligence tests. While Broadbent (1958) found no correlation between introversion and intelligence with his students. Lynn and Gordon (1961) also found no significant correlation between either neuroticism or introversion and intelligence. Himmelweit (1946) has shown that introverted neurotics have good vocabularies in relation to their scores on the Raven's Matrices, while in extraverted neurotics the reverse is the case.

Eysenck suggests that vocabulary is acquired by conditioning and that high verbal ability in introverted neurotics would be a result of their conditionability accelerating their verbal skills. A positive correlation between neuroticism and attainment in University students was found by Furneaux (1957, 1961) and Lynn (1959) found that University students obtained a higher score on tests of neuroticism than did other young people of comparable age. This would suggest that neuroticism was a factor in educational success. However, only English studies would tend to support the view that neuroticism is a positive aspect in the relationship between neuroticism and attainment. In America there is some evidence, (Bendig 1960) that there is a negative relationship between neuroticism and attainment. Cattell and Warburton (1961) using both American and English subjects, suggest that there is no difference between the two cultures on mean scores on neuroticism tests. In view of the correlation of neuroticism and anxiety measures; this confusion is of interest to the present study.

B. Learning Speed, Accuracy and Efficiency

Eysenck's work provides evidence that introverts form conditioned responses more quickly than extraverts (Franks 1957, Eysenck 1959). He believes that it follows from this that introverts would have larger vocabularies than extraverts, since learning the meaning of a word is a conditioning process.

It would also follow that in learning tasks introverts would be more efficient. The evidence on this point, however, would seem to suggest that introverts tackle tasks slowly and accurately while extraverts are quick but inaccurate (Himmelweit 1946, Drew Colquhoun and Lacy 1958, Lynn and Gordon 1961).

C. Work Decrement

Evidence has been provided that extraverts are inferior to introverts in tasks requiring sustained work or attention. Eysenck suggests that both groups begin as efficiently as each other, but after some time, extraverts tire, and become inattentive producing an overall work decrement. Broadbent, (1958) using vigilance tasks, has provided support for these hypotheses, also Eysenck (1959) with an auditory vigilance task and Lynn (1960) with an inverted alphabet printing task, have supported the hypotheses. Furneaux (1956), using the Nufferno intelligence tests, has shown that extraverts took proportionally longer on the later items in the test. Furneaux has also shown that extraverts devote less time to private study. The overall evidence would, therefore, suggest that extraverts may be at a disadvantage in intellectual tasks where sustained effort is required, firstly, in examinations where extraverts would be, in effect, less efficient at the end of the examination period; and secondly, in preparing for examinations where they would be less capable of sustained private work, over long periods of time.

Neuroticism and Performance

Differences in strength of neuroticism would also be expected to influence academic performance. The relationship of neuroticism to intelligence has been briefly touched upon. Two other relationships are important for the present study:- The relationship of neuroticism to persistence and the relationship of neuroticism to learning speed and the optimal level of performance.

Eysenck suggests that neuroticism is related to persistence. If this is so it would be reasonable to suppose that the relationship between neuroticism and academic success could be connected with this persistency factor. Lynn and Gordon (1961) have shown a positive correlation between introversion and persistence.

Neuroticism and the Yerkes-Dodson Law

The relationship of neuroticism to learning efficiency is of considerable importance to the present study. Eysenck utilizes the Yerkes-Dodson Law in this context which states that the optimum drive required for efficient learning is inversely related to the level of difficulty of the tasks. Considerable evidence has been provided by the Taylor/Spence workers (reviewed elsewhere) that highly anxious subjects are better at tasks with non-competitive responses while low anxious subjects are better at more response competitive tasks. Since neuroticism is highly associated with anxiety one would

expect a similar relationship, and would predict a curvilinear relationship between neuroticism and performance. Lynn and Gordon's (1961) study did show a curvilinear relationship between neuroticism and Raven's Matrices results (eta just significant at the .05 level) but Ley et al. (1966) could not duplicate this finding, or the finding that moderate levels of neuroticism would be a facilitating factor in performance.

The Lynn-Biggs Controversy

The confusion apparent in Eysenckian theories as to what exactly Eysenck means by anxiety, lead to the Lynn-Biggs controversy of 1961, and is of some importance to the present work. Biggs (1961) criticised Eysenck's theory concerning the Yerkes-Dodson Law and argued that Eysenck's theory demands the prediction of a linear relationship between anxiety and level of performance not a curvilinear relationship. Bigg's argument is as follows:- Eysenck has defined Anxiety as

"a conditioned fear response, attached to
previously neutral stimulus."

Therefore, anxiety is a function of rate of conditionability. Biggs assumes that any two things which condition will be correlated. The theory states that extraverts are hard to condition, therefore, it would follow that they would be low in anxiety and that anxiety and extraversion would be negatively related. Similarly, it would follow that introverts, with their easier conditionability, would be more anxious and

introversion and anxiety would be positively related. So from the theory one would expect introverts to have higher anxiety scores, and better performance on performances which are related to conditioning. Therefore, one would predict a direct linear function between both introversion and anxiety and any performance which relies on conditioning to any extent. That is, the higher the anxiety the more introverted the subject and, therefore, the more easily conditioned learning will take place. Basically Bigg's criticism is based on the assumption that any two variables that are conditionable will be directly related to each other, so that anxiety and rote learning would be positively related.

Lynn believes that this assumption is mistaken. Because A (Anxiety) correlates with B (introversion) and B correlates with C (conditionability), it does not necessarily follow that A must correlate with C.

The controversy has arisen because of the failure of the Eysenckian theory to state positively the position of anxiety within the model. It appears quite conceivable to the present writer that both a linear and a curvilinear relationship could be predicted in different circumstances. If, as Biggs states, anxiety and any other conditionable behaviour are related, one would expect a linear relationship between them. There is evidence to support this assumption from the S-R theorists. Rote learning is a conditionable performance, and relatively

easy for most subjects and it has been found that high anxiety (or neuroticism) is positively related to efficient performance on this kind of task (Taylor 1956). However, if the task is more difficult it would presumably be a task involving other factors than direct conditioning, notably response competitive tasks, and in this case it is conceivable that the curvilinear relationship would hold true. The Yerkes-Dodson Law, it must be remembered, comprises two factors, both the amount of drive and the level of complexity of the task.

In reply to the Lynn-Biggs controversy, Eysenck (1963) has stated that anxiety and neuroticism are not interchangeable terms. Anxiety is regarded as a mixed concept being related both to neuroticism and introversion. However, he still describes anxiety as a conditioned fear response, particularly characteristic of dysthymic neurotics, (i.e., high on neuroticism and introversion) and, therefore, does not answer the Lynn-Biggs question as to the relationship of anxiety as a conditionable response to other conditionable responses.

Recently attempts have been made to discover relationships between introversion/extraversion and arousal. Notably ~~Co~~coran (1965) demonstrated that in tests of arousal, introverts behaved in a manner typically expected of highly aroused subjects and extraverts as less aroused subjects. Eysenck (1967) also postulates that introverts and extraverts are characterised by differing levels of basal arousal, high

arousal typifying introverts and low arousal extraverts. The inter-relationship of these factors would seem, therefore, a fruitful avenue of further investigation. Reports of Eysenck's work in this field are to be produced later this year.

V. Anxiety as a Personality Trait or a Transitory State

The ambiguity of the term "Anxiety" has led to a controversy which is of particular importance to those who attempt to measure anxiety and has been recognised as a problem by many experimental researchers in this field. This ambiguity concerns the nature of anxiety within the total framework of the personality. If we make the statement "the subject is anxious" one of two very different meanings can be implied. Firstly, the statement could mean that the subject is anxious now, probably in response to a particular threat or condition. Thus, we are implying a transitory state, a response to a certain set of stimuli, which one would expect to fluctuate when the condition changes. In this sense anxiety is a response to aversive stimuli. Alternatively, the statement could be interpreted to mean that the subject is an anxious person, that is, his level of anxiety is chronically higher than that of most other people, that anxiety is one of his personality traits. Cattell and Scheier (1958, 1961) have identified these two factors which they labelled trait anxiety and state anxiety. The trait anxiety factor was seen as measuring stable

individual differences in a unitary, relatively permanent, personality characteristic. State Anxiety was regarded as a factor, based on a pattern of variables, which covaried over occasion of measurement, defining a transitory state of the organism. The trait anxiety factor included "ergic tension", "ego weakness" and "guilt proneness". Physiological variables were associated with state anxiety but not with trait anxiety. Therefore, the subject could very well score highly on state anxiety (that is he is anxious now in this set of circumstances) and low on trait anxiety (if his personality trait of anxiety was low).

Empirical work on state and trait anxiety has demonstrated this difference. Work with the transitory state anxiety has been chiefly concerned with the behaviour of subjects under stress and has used the measurement of physiological signs as a means of testing this. Empirical research with trait anxiety has been concerned with investigating the difference between groups of subjects who are presumed to differ in anxiety level, not just in the experimental situation, but permanently. The empirical work which will be discussed, that utilizes some form of anxiety questionnaire to distinguish between high and low anxious subjects, rest entirely on accepting some conception of anxiety as a personality trait.

It is generally assumed that subjects with high scores on the MAS or the TAQ are chronically more anxious than low scorers. However, recent findings are tending to demonstrate the fact that high MAS scorers react with higher anxiety levels in stressful situation but not in the absence of stress (Spielberger and Smith 1966). This would suggest that these anxiety measures, measure anxiety - proneness. Thus, high MAS scorers would be seen as generally more disposed to respond with state anxiety in stressful conditions (Spielberger 1966). This conception would be in keeping with Atkinson's motivation theory (see Chapter IV) where motives are seen as latent until the cues of a situation arouse them. In this context anxiety could be regarded as latent until a stressful situation arouses it. Anxiety would then be regarded as an acquired behavioural disposition, like need for achievement, state anxiety would refer to an empirical process which is taking place now and trait anxiety would indicate a latent disposition for reaction to occur if the situation is stressful.

Such a conceptualization of anxiety has been put forward by Spielberger (1967). He also believes that it is necessary to distinguish between state anxiety and trait anxiety. In Spielberger's system the A trait, a personality variable, is conceived as an acquired behavioural disposition, or motive that predisposes an individual to regard a wide range of objectively non-dangerous circumstances as threatening in

nature, and the A-state is regarded as the disposition to respond to these situations with A-state reaction, disproportionate in intensity to the magnitude of the objective danger. Spielberger puts forward a two-fold anxiety theory, involving two concepts A-trait and A-state, conceived as independent of the threatening stimuli which evokes A-states and the defensive processes which are used to avoid them. Spielberger proposes that the arousal of anxiety of A-state involves a process of temporally ordered events. The process can be initiated in several ways, either by an external stimulus, or an internal cue. If the stimulus situation is cognitively appraised as dangerous or threatening then the Astate reaction is evoked. By means of sensory and cognitive feedback mechanisms, this A-state reaction may activate a defense mechanism designed to reduce or avoid the A-state. The A-state may also activate cognitive defensive processes which have been found, in the past, to reduce A-states by altering the cognitive appraisal of the situation; that is reappraising the danger situation to make it less threatening.

According to Spielberger's theory the A-trait reflects individual differences in anxiety proneness. Levels of A-trait are not expected to influence A-state responses to all stimuli but only to those which have evolved a moderate or large threat value.

To test Spielberger's hypothesis it would be desirable to devise a situation which employs stimuli that produce different changes of A-state in individuals who differ in A-trait. Most experimental evidence deals either with A-trait or A-state but very rarely with both. Generally, it has been found that differences in the task performance of high and low A-trait individuals are most often found under conditions of failure or ego-involvement conditions which evoke fear of failure, such as academic achievement situations.

Theories of Anxiety: Summary

This brief account of some principal conceptions of anxiety serves to highlight several areas of confusion which deserve further investigation. The first major area of interest, initially discussed by Freud, is whether anxiety is neurotic or objective. According to Freud objective anxiety is adaptive and desirable, but neurotic anxiety is non-adaptive and unpleasant and it is this which the organism seeks to reduce. For the purpose of this research the question is raised as to whether anxiety in academic situations is objective or neurotic. If objective, then Freudian theory would include a concept of adaptive anxiety, that is, anxiety in this setting would be a useful response. If anxiety in the academic situation is regarded as neurotic, then anxiety is an unpleasant state of the organism which will seek to reduce this state and restore equilibrium.

This concept of adaptive or maladaptive anxiety can be seen running through the other theories, and leads to the problem of drive level and performance. The activation theories regard anxiety as a drive and would predict a curvilinear relationship between anxiety and performance, incorporating a Yerkes-Dodson Law effect explained in terms of the neurophysiological conception of drive performance. Eysenck would also include such a curvilinear prediction in his theory. The S-R theories predict a monotonic relationship between anxiety and performance explained in terms of the multiplicative function of anxiety and habit strength. Both the activation theorists and the S-R theorists tentatively include a conception of task-irrelevant responses to explain decrement of performance of high drive subjects in complex learning situations. The S-R theorists explain this in terms of drive multiplying with the incorrect, but more likely to occur, response and thus initially strengthening an incompatible response. Activation theorists explain this in terms of too much activation of the RAS interfering with the delicate cue function of the primary sensory system and hence facilitating task-irrelevant responses. Mandler and Sarason also include a notion of task-irrelevant response to explain their research findings.

Cattell introduces the conception of doubt, in anxiety producing situations, the doubt in the situation, both of objective uncertainty, and subjective uncertainty would be similar to Atkinson's conception of anxiety in risk-taking situations (Chapter 4) Cattell's inclusion of the thrextia factor, or individual susceptibility to threat, would also appear a similar concept to Atkinson's inclusion of uncertainty and subjective structuring of the threat in academic uncertainty.

Eysenck and Cattell introduce the factors of Introversion, Extraversion and Neuroticism. Although there is some terminological confusion as to the nature of anxiety and neuroticism, both have used a concept of anxiety or emotional responsiveness within their intellectual framework.

Finally, Cattell and later Spielberger's distinction between trait and state anxiety is important in terms of what tests of anxiety actually set out to measure. A distinction between being anxious now, or state anxiety in response to some perceived threat (subjective or objective) and chronic anxiety is an important contribution to this field of psychological theory.

This review of theoretical contributions will be referred to continually in the remainder of this study and it is hoped that the review of principal theoretical positions will lead to a clearer understanding of difficult empirical approaches.

Chapter II

The Measurement of Anxiety

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Introduction

In the preceding chapter on theories of anxiety, many theoretical contributions of considerable importance were omitted from the review, because they did not directly relate to the present research. Similarly, in the field of measurement of anxiety, only those methods which fall within the scope of this inquiry will be considered. There are seven principal types of data which can be considered as measures of anxiety. These are data from introspective reports or questionnaires, physiological measures, clinical observations, responses to stress, task performance, molar behaviour (gestures, tics, stuttering, etc.) and projective measures. Only two measures will be considered in any detail; projective measures will be reviewed in the chapter on need achievement and questionnaire measures will be reviewed here.

Several assumptions about the nature of anxiety must be made if a questionnaire measure is to be employed. Firstly, it must be assumed that anxiety is an overt experience, and is, therefore, capable of being noticed by the subject. Secondly, it must be assumed that the subject is capable of distinguishing between his different affective states, and, thirdly, that the subject is motivated to report accurately and honestly on these

states. Some questionnaires require the subject to report what these states will be in the future, were in the past, and even to predict the possible effects of such feelings on various performances. The use of questionnaire measurements must assume that the subject is willing to, and capable of, complying with these requirements. Whether this assumption is valid or not will be discussed after some principal anxiety scales have been reviewed.

Some Principal Questionnaire Measure of Anxiety

1. The Taylor Manifest Anxiety Scale (M.A.S.)

The Taylor M.A.S. has been utilized in the research studies, not only by the Spence team themselves, but by many other research workers in the field. It has become one of the generally accepted tools for measuring anxiety as a personality variable, despite the fact that the research programme for which the scale was devised was not primarily concerned with anxious individuals. From the theoretical implications of the Hull-Spence theories of emotionally based drive, attempts were made to distinguish between individuals who differed in emotional responsiveness and, therefore, presumably differed in drive level. The implication is that the M.A.S. measures state anxiety rather than the wider trait anxiety that anxiety tests are usually employed to test (Spielberger 1966), the assumption

being that high-scoring subjects as a group will have higher drive level in certain situations, than low scorers on the test. Hence, the M.A.S. was designed to distinguish between individuals with differing levels of emotionally based drive and not between two distinct groups on personality traits.

The M.A.S. was devised then in the context of the S-R drive theory, as one method of distinguishing between subjects differing in emotional responsiveness. The rationale behind the development of the scale was based on two major pieces of empirical evidence. Firstly, from the research with avoidance conditioning and fear (Miller 1951), evidence was found to support the hypothesis that conditioned anxiety producing stimuli evoke internal emotional responses which increase drive level. Secondly, clinical evidence was accepted of symptoms of anxiety patients, which appeared similar to the overt behaviours elicited by the conditioned as well as the unconditioned stimulus in experimental studies of acquired fear. A series of items, judged by clinical psychologists to describe both physiological reactions and accompany self-reports of worry, anxiety, self-doubt, etc., were selected from the Minnesota Multiphasic Inventory (M.M.P.I.) to form the Taylor Manifest Anxiety Scale (1953). It was assumed that the degree to which an individual admitted to exhibiting these manifest symptoms of anxiety would be related to strength of emotional responsiveness and hence to strength of drive.

The final M.A.S. consisted of fifty manifest-anxiety items, sometimes administered with up to one hundred and seventy-five buffer items, both taken from the M.M.P.I.. The scale has been demonstrated to have test/retest reliability of .81 to .89, with intervals ranging from three weeks to seventeen months, and mean scores for male and female subjects were not significantly different. Various attempts have been made to modify the M.A.S. for use with children, the most successful attempt has been that of Castaneda and McCandless (1956). Both the original M.A.S. and the children's version are widely used in empirical investigations which will be discussed separately.

Construct Validity of the M.A.S.

Before passing to other measures of anxiety the construct validity of the M.A.S. should be briefly discussed. Taylor has stated that items were selected on the bases of clinical observations but there is no evidence that the items were further scrutinised for their logical relation to Hullian theory, from which the test is said to derive. When the actual content of the test items are investigated the problem of their relationship to drive theory becomes even more puzzling. Why should answering false to such statements as "I have very few headaches", "I am very confident of myself", score towards a higher drive score, and answering true, constitute a

reference to lower drive level? The relationship of such questions to clinical anxiety is reasonably clear but not to drive theory requirements. Jessor and Hammond (1957) have pointed out that answering true to an item reporting diarrhoea and to one reporting constipation both indicate higher drive than answering false, or answering one true and one false. The judges rated the items in terms of clinical descriptions of anxiety but not in terms of predictive value in relation to drive theory. The only really logical basis for the use of the M.A.S. to measure Hullian drive level lies in the success of the experimental results, if negative results had been achieved one assumes that the validity of the M.A.S., rather than Hull's theory would have been questioned. An important methodological issue is raised here. "When a construct implies a relationship between variables, these variables must be designated independently of any test of that relationship" (Cronbach and Meehl 1955). However, in the M.A.S. studies, the scale has been employed to establish the validity of the construct D and simultaneously to establish the construct validity of the scale. Under such conditions failure to obtain predicted data can be regarded as evidence for either an absence of construct validity of the scale, or a criticism of the theory construct.

To establish construct validity of the M.A.S. further investigations need to be undertaken of the diverse properties of the construct. It would be necessary to obtain more information as to whether M.A.S. scores rise if anxiety is experimentally increased, also Farber (1953) suggests that more work is needed with the reinforcing properties of M.A.S., within the framework of Hullian theory. Construct validity of a test also requires that other inferences " can not be equally applicable from the results". However, several investigators have alternative explanations as to what the M.A.S. measures, as we have seen.

In summary, it may be said that the M.A.S. does provide a crude tool for measuring some forms of anxiety, and it is probable from item analysis and from the extremely high correlation of M.A.S. scores to scales of neuroticism (especially the psychasthenic Pt scale of the M.M.P.I.), that it measures some form of obsessive compulsive anxiety. (I. G. Sarason 1959). However, the scale has only a tenuous relationship with the Hullian drive construct, a connection which Taylor does not appear to clarify in any of her more recent works.

2. General Anxiety and Neuroticism Scales

It has already been stated that the M.A.S. correlates highly with other tests of general anxiety and neuroticism. Several of these general anxiety questionnaires have been

utilized in the research, important contributions coming from Eysenck and Cattell.

(i) Eysenck's Personality Scales

Eysenck's personality scales have become popular in British research, probably due to the fact that the scales are assumed to result from empirical work from which an explicitly stated theory emerged. Much of this theoretical work has been based upon the application of his questionnaires, firstly, the Maudsley Medical Questionnaire, which was replaced by the Maudsley Personality Inventory, the M.P.I., which in turn has been superceded by the Eysenck Personality Inventory, the E.P.I. A junior version of this inventory has recently been published by S. Eysenck (1965).

Eysenck's questionnaires have developed out of his factor analytic studies, which have produced the well-known two factor axis analysis, the unstable-stable axis and the introversion-extraversion axis. These two principle factors have remained consistent throughout Eysenck's very prolific research. Attempts have been made to validate these factors by investigating different groups of subjects, whom it could logically be assumed would differ on these factors. Reliability studies using the scales report split-half correlations and a repeat correlation of between .8 and .9.

Eysenck described the neurotic as a person whose emotions are "labile, strong and easily aroused; they are moody, touchy, anxious, restless and so forth". The non-neurotic, stable individual is described as an individual whose emotions are less easily aroused, people who are "calm even-tempered carefree and reliable". The M.P.I. is designed to measure these differences in neuroticism and hence contains a general anxiety factor. Its use in many studies, including Eysenck's own as a measure of drive level, is open to the same criticism as the use of the M.A.S. in this context.

(ii) Cattell's Anxiety Scales

Cattell's factoranalytic investigation of anxiety involved the analysis of "eight hundred kinds of responses, described by serious psychological reports as anxious". The resultant factor analysis from the Q-data (questionnaire data, rather than objective or performance data) resulted in twenty-five factors of which the most stable have been produced as a standardised test, the 16 P.F. Test. For the purpose of this review it is interesting to note that two of Cattell's second order factors are the invia-exvia, an introversion, extraversion factor and a neuroticism anxiety factor. This would be in accordance with Eysenck's factor studies. The other principal discovery for the purpose of this research was the state anxiety, trait anxiety concept already reviewed.

From the use of the M.P.I. and the 16 PF scales, Cattell and Eysenck have achieved very similar results. Both isolate an introversion, extraversion factor (Eysenck 1947, Cattell and Scheier 1961) and both isolate a neuroticism factor, although the factor is referred to as regression by Cattell, rather than neuroticism "because it seems to have the character of regressive loss of interest and capacity to mobilise rather than the actual dynamic conflict commonly thought of as the neurosis itself".

(iii) The Sarason General Anxiety Scale

S. B. Sarason and co-workers at Yale have produced a general anxiety scale in order to investigate the relationship between general anxiety and Test anxiety. Versions for both adults and children have been produced. They were designed to accompany the administration of the test anxiety questionnaire which will be discussed shortly. Incorporated within the general anxiety scale are certain lie scale items, also to be discussed. These general anxiety scales were devised because of the difficulty of working with children with questionnaire measures. The other important general anxiety scale devised by these workers has been the D.S.C. (defensive scale for children), which is used in conjunction with the lie scale. I. G. Sarason has incorporated many of these items into a questionnaire he terms as "autobiographical survey" (I. G. Sarason 1962). This contains items on Test Anxiety, Need for

Achievement, General Anxiety, Lack of Protection, Defensiveness and Hostility.

An S-R Inventory of Anxiousness

This inventory represents an attempt on behalf of its authors, Endler, Mc. V. Hunt and Rosentain (1962) to distinguish between the stimulus situation and the response situation in anxiety scales. It was designed to provide an analysis of the variance which is attributable to subjects, to situations and to modes of response, and to the interaction among these variables. Eleven situational variables (i.e., "You are alone in the woods at night, or you are entering a final exam, or you are going to meet a new date"), fourteen responses of both positive and negative excitement, and physiological indices (enjoy the challenge, avoid the situation, experience nausea, etc.) and a five step response tendency scale were provided. It was found that the variance from situations was four times the variance from individual differences among subjects in one sample and eleven times more than individual differences in another. This would seem to suggest that knowing the situation is more important for predicting anxiety reactions than knowing personal idiosyncracies. Thus, support for situationally specific scales would seem to be indicated.

The Test Anxiety Questionnaire

So far the questionnaires we have referred to have been measures of generalised anxiety. They have, however, been employed in empirical investigations of the effects of anxiety on academic performance. But it would not seem unreasonable to suppose that a specific form of anxiety may be evoked in an examination setting, conceivably a fear of failure anxiety. If this is so, a questionnaire designed to measure such a situationally specific anxiety could be devised, and it would be expected to correlate with measures of general anxiety, but only moderately, thus demonstrating the independence of the specific anxiety from a more generalised state.

S. B. Sarason and his co-workers at Yale, notably Mandler, have devised such a questionnaire measure of "Test Anxiety" (Mandler and Sarason 1952). This questionnaire was specifically designed to measure possible anxiety reactions which could occur in test situations. Both adult and child versions are available. The questions are principally concerned with the student's subjective reactions before, during and after a test situation, and include items on "uneasiness, acceleration of heart beat, sweating, emotional interference and worry" (see appendix). A satisfactory distribution of scores was obtained and the reliability of the scale (corrected split-half) was represented by a co-efficient of .91.

Test Anxiety and General Anxiety

A considerably body of research has accululated concerning the relationship between test anxiety and other measures of anxiety. The principal work in this field has stemmed from the research of S. B. Sarason et al. (1952A, 1952B, 1953, 1955, 1960, 1964) and of I. G. Sarason (1959A, 1959B, 1960, 1961A, 1961B). It was generally found that Test Anxiety scores correhted with scores on general anxiety, but only to a moderate degree, and also that test anxiety scores are superior predictions of performance in a test situation than general anxiety scales (I. G. Sarason, 1959A). I. G. Sarason has found that T.A. scores correlate with M.A.S. scores $\cdot 41$ (1959A) and $\cdot 46$ (S. B. Sarason and Gordon 1955), a significant but moderate correlation which he claims lends support to the use of Test Anxiety scales as independent measures. An interesting finding in this study (I. G. Sarason 1959A) was that, although M.A.S. scores correlate $\cdot 55$ with the Edward's social desirability score, T.A. scores correlated $\cdot 41$. He tentatively suggests from his finding, which was repeated with several samples, that admitting to anxiety in test situations is less damaging to the self-image than admitting to anxiety in generalised situations. This finding gives further support for the use of the T.A.Q. as a separate measure of specific anxiety. Finally, in all the Sarason studies there emerges a consistent negative relationship between intelligence measures and T.A.Q. scores, but there was no significant relationship between such measures and M.A.S. scores.

(I. G. Sarason 1956 A, Schultz and Calvin 1955). From their work with younger children, S. B. Sarason and the Yale workers have found a consistent relationship between scores on the T.A.S.C. (Test Anxiety Scale for Children) and on the G.A.S.C. (General Anxiety scale for Children). This correlation was found to be lower for English than for American children. They also provide confirmatory evidence of significantly better predictive value of the T.A.S.C. with school marks and I.Q. (S. B. Sarason et al. 1960, 1964). There would seem to be sufficient evidence that the T.A.Q. score is reflecting a more situationally specific measure of anxiety, than general anxiety scales.

Reservation Concerning the Use of Anxiety Scales

1. Validity

The reliability of the principal scales has been reasonably established but it is the validity of such scales which is frequently questioned. Quite simply there is a need for more knowledge of what anxiety scales actually measure. Do they measure anxiety, or the extent to which the subject will admit to anxiety? Are high anxiety scorers really more anxious or just more perceptive of their own responses, more honest, or more inclined to "blame" themselves? The problem is even more fundamental than this, for a test is said to be valid in so far as it measures what it is supposed to measure. But we have seen

that it is not at all clear what the anxiety measures are supposed to measure. Vernon (1964) has suggested that a test should be required to measure only itself and its validity can be established by its correlation with other observable measures of the same variable. It has been noted, however, that the principal anxiety scales do intercorrelate positively but not highly with one another. Factor analysis often reveals that the anxiety factor is composed of many factors not principally connected with anxiety. Also, high correlations have been observed between measures of anxiety and measure not presumed to stand directly for anxiety, such as neuroticism (for example the M.A.S. score correlates more highly with the psychasthenic measure of the M.M.P.I. than with itself!). This confused position demonstrates that there is considerable uncertainty concerning what anxiety scales are currently rating.

A step towards validation would be provided if anxiety scores could be correlated with physiological measures of anxiety. I. G. Sarason (1960) found very little relationship between anxiety scales and physiological indices of anxiety. Negative findings of a relationship between M.A.S. and physiological indices have come from Raphelson (1957) and Silverman et al. (1956). Runquist and Ross (1959) did find a low but significant correlation (+ .22) between G.S.R. and heart rate and M.A.S. scores but the available data, so far, is not too encouraging for those who would provide validation for anxiety questionnaires by correlation with physiological

measures of anxiety.

The Concept of Defence

The problem of defensiveness in anxiety scale scores is usually more applicable to low scorers than high scorers. If a subject scores highly on an anxiety scale it is usually assumed that he is providing a reasonably honest self-report. However, when a subject gains a low score the problem of interpretation must incorporate a concept of defence. The subject may obtain a low score because he is genuinely low in anxiety symptoms, it may be a genuine self-report. However, his low score may be attributable to high defensiveness, that is, he is so anxious that he cannot admit to his anxiety. For this reason the later work of S. B. Sarason et al. (1964) has included scales of defensiveness and lie scales. From the Sarason research it can be seen that there is evidence that low anxiety scorers included some subjects high in defensiveness. This concept of defence, together with the more general criticism of personality questionnaires, and the contaminating effects of social desirability provides an even more complex picture of questionnaire scores of anxiety.

The construct validity approach (Cronbach and Meehl 1955) has been used to attack individual anxiety scales. Most of these criticisms have been aimed at the Taylor M.A.S., probably because this scale, more than any other, claims to have its roots in empirical theory. Some of the major

methodological criticisms of the Taylor M.A.S. have already been reviewed.

In conclusion, it must be said that the use of anxiety questionnaires to measure drive level, arousal, specific anxiety or general emotionality, is open to serious attack. Use of such tools continues for two main reasons. Firstly, the ease of administration for pencil and paper tests are easy to administer and this must remain an important factor when considerable numbers of subjects are sought who cannot be tested in the laboratory (school children). Secondly, the functional validity of these tests must recommend that they continue to be used until better methods are available. The functional validity of anxiety scales will be discussed in the following chapter.

CHAPTER III

ANXIETY AND ACADEMIC PERFORMANCE

Chapter III

Anxiety and Academic Performance

Introduction

The relationship of Anxiety measures to academic performance has been the subject of much research in recent years. Many of the studies were badly controlled and conceptual difficulties (such as the failure to pay sufficient attention to the difference between attainment measures, and intelligence measures) have lead to a greater confusion of contradictory results. The findings of Eysenck and Cattell on the relationship between neuroticism and intro/extraversion and attainment were reviewed in the section on Theories of Anxiety. This section will be concerned only with studies of anxiety and performance. The Spence group have not investigated the effects of anxiety on real life performance, preferring to confine their attention to laboratory performance measure, but others have utilized the M.A.S. to predict academic attainment. Because of the great numbers of experiments in this field only two main research areas will be investigated in detail:- The Yale Project on the influence of T.A.Q. scores and attainment, and Spielberger's use of the M.A.S. to predict academic performance level.

General Results with the use of the M.A.S. and T.A.Q.

Before proceeding to discuss the Sarason and Spielberger works in detail, some general findings which serve as a background to their research will be discussed.

The M.A.S. has been used to distinguish between high and low anxious subjects and the relationship of this measure of anxiety to intelligence and performance has been investigated. With adults it has been found that M.A.S. scores are not related significantly to measures of intelligence (I. G. Sarason 1956, Schultz and Calvin 1955). A slight negative correlation, however, has been found between M.A.S. scores and intelligence measures by Grice (1955) and Spielberger (1958) when the sample included a large number of lower intelligence subjects. Using the children's version of the Taylor M.A.S., designed by Casteneda et al. (1956), it was found that there was no significant relationship between M.A.S. scores and intelligence. When the effect of anxiety on academic attainments is considered the picture is somewhat different. Using children, Casteneda and McCandless (1956) have demonstrated that of thirty computed relationships between M.A.S. scores and various achievement areas, one relationship was zero, one was positive at the 0.5 percent level, but the remainder were negatively related to anxiety, and thirteen of these reached statistical significance. The relationship of Manifest Anxiety scores and performance with adult subjects is more complex and this will be demonstrated in the review of Spielberger's work.

Test anxiety has been found to relate negatively to measures of intelligence, a consistent low negative correlation being reported by I. G. Sarason (1956 A) and S. B. Sarason et al. (1952 A 1952 B) with adult subjects. The same pattern of results has been found in children (S. B. Sarason et al. 1960, 1964). Also, a negative relationship of Test Anxiety to measures of academic achievement, such as grade point average, has been demonstrated by I. G. Sarason (1959 A). However, working with pre-eleven plus children in England, both Griffiths (1963) and Sarnoff et al. (1959) found no relationship between scores on the T.A.Q. and performance in the 11+ examination. The focus of the Yale group has been towards testing school children and their more recent work will be reviewed next.

The Sarason Yale Project

Test Anxiety and Performance in School Children

The more recent work of S. B. Sarason and the Yale Group has as its focus of interest a slightly wider investigation of, not only the effects of anxiety on performance, but the causes and possibly the cures of such anxiety. Parental attitudes, teachers' opinions and social class have all been investigated fully and reported in Sarason's book "Anxiety in Elementary School Children" (1960). The Yale researchers have also embarked on a series of longitudinal studies in Hamden Connecticut, which began in 1958 and a first report was published in 1964, with further reports expected in 1967.

Five main lines of investigation are being followed in the longitudinal studies. Firstly, they intend to concentrate on children in the earliest grades and investigate their progress throughout their school careers. Previous work had concentrated on older children. Secondly, from this investigation they hope to gain information concerning the possible changes in anxiety level over time, reflecting changes in experiences of the children within the school setting. It would also be interesting to note if the high anxious child necessarily remains so throughout his school life. The third major reason for undertaking a longitudinal approach, is to investigate further the relationship between anxiety and performance both in male and female children. In most previous work the relationships between anxiety and performance were supported far more frequently for male than for female subjects. This male/female difference is a common feature in personality research and the subject will also be discussed in relation to projective measures of need achievement (Ch. 4). Sarason et al. attempt to explain the sex difference on anxiety scores as follows:- Females obtain higher scores on the T.A.Q. than males (Sarason 1960); two reasons for this are that the sources of anxiety tapped are paradoxically those experienced far more frequently by male than by female children, but admission of high anxiety by a boy is, in our culture, a more valid sign of conflict and personal difficulty than a similar admission by a

girl. Hence, the general use of male subjects in many empirical studies (Sarason S. B. 1952 A, 1952 B, 1960, Sarason I. G., 1963, Alpert and Haber 1960, etc.). From a longitudinal study of both sexes, Sarason hopes to gather information concerning the nature and development of anxiety in girls and in boys. A fourth reason for undertaking a longitudinal study was to investigate more fully the problem of distortion of self-report on a paper and pencil test (such as the T.A.Q. and T.A.S.C.). In this context lie scales and defensive scales could be investigated and their relationship to anxiety and performance over time considered. The final major reason for the longitudinal approach was the concern of the authors, in conjunction with the education authorities to develop a procedure to screen those children who would become problem children later in their academic life, and hence to help them before the problem becomes too well established.

Interesting as these studies are, for the purpose of this present research only a small by-product of the results will be discussed in detail. The relationship of anxiety to intelligence measures, and anxiety to performance measures has been investigated and although inconsistencies are apparent, a persistent low negative correlation between T.A.Q. measure and performance has been found (Sarason I. G. 1963). However, very little evidence concerning the relationship of anxiety to performance when intelligence level is held constant, has been

provided. The importance of holding intelligence level constant in these experiments has been demonstrated by Spielberger (1958, 1962, 1966) and can also be defended on purely logical grounds. The anxiety a child feels in an examination setting must, to some extent, be a reflection of previous experience in such settings. For most children this previous experience would depend on their intellectual ability. Some difference might be expected, and should, therefore, be investigated, between a bright child's anxiety and a dull child's anxiety in academic achievement situations. Sarason had largely ignored this relationship before 1960, but within the general framework of the longitudinal studies, this has been investigated. The main question is whether the effects of anxiety generalized across different intelligence levels. Feldhausen and Klausmeier (1962) obtained correlations between anxiety (C.M.A.S.) and I.Q. for three differing I.Q. groups (56 - 81 low, 90 - 110 medium, 120 - 146 high). They found no difference of anxiety level between the average and high I.Q. groups, but the anxiety level of the low I.Q. group was significantly higher than the other two. The present writer would question the reliability of anxiety scores obtained by questionnaire methods from children with such low I.Q.'s (56 - 81). This study would lend some support to the view that level of ability does not materially effect the amount of anxiety experienced in examination situations. Sarason et al.

have investigated this problem by using subjects matched for I.Q. but differing on anxiety scores. They found no evidence of an interaction between anxiety level and intelligence level, and it would thus appear that level of ability does not influence level of anxiety. Therefore, bright children, as well as dull children, may experience examination anxiety.

From Sarason's use of matched samples, one interesting finding has emerged. Sarason has consistently found that when pairs of subjects are matched for I.Q., but differ on anxiety, the high anxious subjects performs at a lower level than the lower anxious subjects. This is the only attempt of the Yale workers to investigate the possible three-way interaction of intelligence anxiety and performance.

Sarason has introduced a concept of ^{lack of} "task-irrelevant response" to explain cases where high anxiety does not cause performance decrement.

"When a stimulus situation contains elements which specifically arouse test anxiety this increase in anxiety drive will lead to poor performance in individuals who have test-irrelevant (incompatible or interfering) anxiety responses in their response repertory. For individuals without such responses tendencies these stimulus elements will raise their general drive level and result in improved performance."

(Sarason et al. 1952, p. 561)

This somewhat circular argument, also utilized by the Spence group (see Ch. 1) introduces the idea of anxiety as a facilitating, as well as debilitating, influence on performance. This side of the circular argument is used mainly by Sarason et al., to explain results which do not confirm the more generally expected debilitating anxiety effects. The emphasis on the deteriorative effects of test anxiety is reflected in the items of the T.A.Q. which are unidimensional, that is anxiety responses are either debilitating or not. So from the T.A.Q. score, high anxiety refers to high debilitating anxiety while a low score could refer, either to no anxiety, or to facilitatory anxiety. The confounding of the two alternatives of facilitatory effects of anxiety and no effects of anxiety on academic performance leads to the failure of the Sarason group to investigate the possible difference between the anxious students, whose anxiety helps performance, and the students who are not really anxious at all.

The principle attempt to correct this defect in the T.A.Q. has come from Alpert and Haber (1960) who have devised a scale of facilitatory anxiety which they included in a general achievement anxiety test (A.A.T.). This facilitatory scale consists of such terms as "nervousness while taking a test helps me do better" etc.. However, results from Alpert and Haber's (1960) empirical studies failed to get the predicted negative correlation between facilitating and debilitating

anxiety. It would seem that the same individual could possess both facilitating and debilitating anxiety, which would be activated by different situational cues.

This brief summary of the Sarason et al. work with the T.A.Q although doing little justice to the scope and depth of the studies over the past fifteen years, does high-light the major unsolved question which is of interest to this study. What is the nature of the interaction of anxiety and performance when intelligence level is held constant? Do subjects with differing levels of I.Q., but similar anxiety scores, perform differently? This aspect of study has been undertaken by Spielberger, at Duke University.

Anxiety Intelligence Level and Performance

Charles SPIELBERGER

Spielberger's interest in anxiety and its effects on performance began in 1955 when he was associated with the Duke University Psychology Department and Psychiatric out-patients clinic. He noticed that during examination periods the number of students reporting emotional disturbances rose considerably and many complained that acute anxiety was detrimentally affecting their academic performance. Spielberger investigating the literature, was struck by the seeming inconsistencies of the results, some investigators reporting a negative relationship between anxiety and performance, some a

positive, and others no relationship at all (see previous review). He also noted the inconsistent evidence on the relationship of anxiety to intelligence. Grice (1955) and Kerrick (1955), working with M.A.S. scores of Air Force basic trainees, found a negative correlation between anxiety and intelligence scores and Grice reported that the inferior performance of high anxious subjects, relative to low anxious subjects, on a complex reaction time task, could be attributed as readily to lower intelligence as to the effect of higher drive. However, Farber and Spence (1955), over a period of years, had found no relationship between M.A.S. scores and intelligence scores of college students. Having the anxiety and intelligence score of a large number of students available, Spielberger decided to investigate further the effects of intellectual ability and anxiety and performance.

Spielberger's systematic investigations began with the administration of the M.A.S. to all students enrolled in the introductory psychology course from 1954 until 1957. The A.C.E. examination (a scholastic aptitude test used in America as an index of intelligence in college students) was also administered routinely. A Pearson product - moment correlation between M.A.S. and A.C.E. scores was computed for the total one thousand one hundred and forty two students, treating male and female as separate samples. The correlation between M.A.S. and A.C.E. for the total sample was - .02, for males - .06, for females .01

respectively. Thus, M.A.S. and A.C.E. appeared unrelated in this sample.

However, on closer examination certain trends in the patterning of results became apparent. This was especially clear for male subjects. As mean A.C.E. increased, the size of the negative correlation between M.A.S. and A.C.E. decreased monotonically from $-.34$ to $.04$. This was discovered by taking the individual semester-samples and examining the trend. The standard deviation for A.C.E. scores in each semester-sample was approximately equal, suggesting that the magnitude of the negative correlation between M.A.S. and A.C.E. scores, was determined by the proportion of subjects in each sample with low intelligence.

Group	N	MEAN ACE	MEAN MAS	PEARSON V
Spring 1955	72	111.4	13.1	$-.34$ p < .01
Spring 1956	79	116.8	11.3	$-.21$
Spring 1957	101	120.5	15.5	$-.16$
Fall 1954	140	120.3	12.4	$-.13$
Fall 1955	122	124.2	12.0	$-.08$
Fall 1956	160	124.6	14.8	$.04$

Spielberger suggests that a small negative correlation between anxiety and intelligence may be found for male students if the sample covers a wide enough range of intelligence and contains a large proportion of lower intelligent subjects. As the proportion of subjects with low ability decreases, the anxiety/intelligence correlation will also decrease from negative to zero. This result would account for empirical

findings such as the Grice (1955) finding of a negative correlation, because his sample consisted of Air Force trainees, which would be expected to contain a large proportion of lower level intellectual ability. However, the most important outcome of this initial study was to focus attention on the necessity of taking intellectual ability into account when selecting high and low anxious subjects and considering academic achievement.

Anxiety and Academic Performance

From the work of Spence and the drive theorists, it has become apparent that the level of difficulty of the task is an important factor to consider when investigating the effects of anxiety. It has generally been assumed that academic performance and learning tasks, such as those involved in examinations, are difficult tasks for students to perform. However, this concept of difficulty is essentially a vague concept referring to average difficulty for a given population of students. It would seem reasonable to suppose that a task which is difficult for the average student may be comparatively easy for the very bright student and extremely difficult for the poor student. If task difficulty is an important factor, then it must be determined in academic situations partly by the intrinsic complexity of the material, and partly by the intellectual ability of the student. Therefore, in experiments of this nature intellectual ability must be taken into consideration.

Spielberger's more recent experiments are attempts to investigate this function of intellectual level and anxiety and performance. (Spielberger 1958, 1959, 1962, 1966). Using the results obtained from all entrants into the introductory psychology course, as above, for whom M.A.S. and A.C.E. scores were available, Spielberger also took grade point averages (G.P.A.) as a measure of academic performance. It had already been demonstrated that there was no overall relationship between A.C.E. and M.A.S. scores for these subjects. Subjects scoring in the lower and upper twenty per cent of the M.A.S. range were designated high anxious and low anxious respectively. Only male subjects were used in these experiments. There were one hundred and forty high anxious and one hundred and forty four low anxious subjects in this sample. These subjects were further sub-divided into five levels of academic ability, on the basis of their A.C.E. (intelligence) scores, each level consisting of approximately twenty per cent of the samples. The I.Q. range for these five sub-groups was I = 62-102. II = 103-116. III = 117-126. IV = 127-137. V = 138-174. Mean G.P.A.'s for the high anxious and low anxious students at each of these levels were then determined. It was found that when the entire sample was considered there was no difference of high and low anxiety subjects with respect to performance measured by the G.P.A.'s.

When the results of the top and bottom twenty per cent (level I and V) were excluded from the samples, the results from the remaining sixty per cent clearly showed that high anxious students were obtaining poorer grades than low anxious students. There appeared to be no significant difference between high and low anxious subjects in performance, in either the top or bottom twenty per cent. However, Spielberger (1962) has produced some evidence, not significant statistically because of the small sample, that in the high intelligence group V high anxiety students were performing better than low anxiety students. In summary, it may be said that high anxious subjects in the broad middle range of ability obtained poorer grades than low anxious subjects. In the lowest intelligence level (Group I) grades were uniformly low, irrespective of anxiety level, poor academic performance presumably resulting from limited intellectual ability. This finding would be difficult to interpret from Drive Theory, but may be an artifact of the intellectual situation, low grades resulting from a floor effect so that students could not perform better or worse than this level. In the high intelligence group Spielberger only had nine subjects (1962) and their performance was of the expected high level. The mean G.P.A. score for high anxious subjects in this group was 3.01 as compared with a mean of 2.70 for low anxious subjects. Thus, lending very tentative support to the possibility that high anxiety may have a facilitating

effect on students of very high academic ability.

On the last point concerning the effects of anxiety on very high ability students, Spielberger and his associates carried out another investigation, with slightly larger samples (1966). It was observed that the median A.C.E. score for the top level of ability was 150. Mean G.P.A. scores were calculated for subjects above and below this median in Group V. It was found that the performance of the very brightest high anxious students was superior to low anxious subjects of comparable ability, as would be predicted by drive theory. However, there was considerable individual variation and the necessarily small total of subjects in this sample, once again led to statistical non-significance in the result. (The sample for this investigation was twenty two high anxious subjects and twenty two low anxiety subjects.)

Anxiety and Performance, Laboratory Investigations

Much of Spielberger's work on student anxiety has been concerned with the possibilities of therapy in this field. Interesting as this is, it does not fall within the scope of this investigation. However, another aspect of Spielberger's work is interesting in the context of anxiety and academic performance. This work investigates the actual effects of anxiety on performance at laboratory performance tasks, specifically serial rote learning. This aspect of Spielberger's work has been reported in detail in a paper presented to the

American Psychological Association at Los Angeles (1964) and is to be published this year (Spielberger 1967).

Drive theory would predict that the performance of high anxious subjects would be superior to that of low anxious subjects in learning a serial word list in which correct responses were dominant relative to incorrect responses, and inferior for lists in which competing erroneous responses were stronger. Several investigations have provided some measure of support to this hypothesis (Deese Lazarus and Keenan (1959), Lazarus, Deese and Hamilton (1954), Montague (1953), Spence and Taylor (see Ch. 1)). Spielberger's investigations were aimed at replicating these findings and considering more closely the relative strength of correct and incorrect response tendency changes during learning, as a function of practice. It will be remembered that drive theory would predict that in response competing tasks, low anxious subjects would perform more efficiently initially, but with practice the strength of correct responses would be expected to increase over trials relative to that of incorrect response tendencies. If D remains constant, the difference between high and low anxious subjects in response - competitive learning situations should gradually diminish, and eventually the high anxious subjects should become superior to the low anxious subjects. Spielberger also incorporates knowledge concerning the "serial position effect" on learning serial lists into his design. Words in the middle

of a serial list are said to be learned more slowly than those at either extreme, and it would seem reasonable to suppose that such middle list words elicit more competing erroneous responses than words at the beginning of a list. Therefore, Drive Theory should predict that high anxious subjects, with their higher drive, would learn words at either extreme more easily than low anxious subjects.

The investigation of these hypotheses was undertaken by Hicks (1960) using the same technique as Montague (1953). The stimulus material consisted of a practice list and a test list. The practice list contained eight C.V.C. nonsense syllables of ninety per cent association value and low intra-list similarity. The test consisted of twelve C.V.C. nonsense syllables of low intra-list similarity and 42.7 per cent association value. Both lists were typed in capital letters on an endless white tape and presented on two standard Hull-type memory drums. The subjects were twenty four male undergraduates in the introductory psychology course who had obtained extreme scores on the M.A.S., either high or low. The instructions were standard for serial anticipation verbal learning tasks; six trials were given with the practice list and a maximum of twenty five on the test list. From the study it was found that the performance of high anxious and low anxious subjects did not differ over trials and no analysis of serial position phenomenon was thought necessary.

This result was somewhat disappointing for Spielberger who attempted to explain this in terms of the reactive/chronic dichotomy of anxiety. That is, that anxiety measured by the M.A.S. was a reactive anxiety rather than a chronic anxiety, and high anxious subjects were not sufficiently roused in the experimental situation. Spielberger and Hicks repeated the experiment under more stressful conditions (Spielberger 1964, 1967). Stress was introduced by suggesting that the learning task was one designed to measure their intelligence. There were twenty subjects in this experiment. The results from this investigation demonstrated that indeed performance of high anxious subjects was inferior to low anxious subjects initially but improved to become superior later in the learning process. Also, with regard to the serial-position effect, it was demonstrated that the influence of anxiety level was different for words at different positions in the list. Hard words were those in the middle of the list, and easy words those at the extremes. High anxious subjects began by performing badly on both hard and easy words as compared with low anxious subjects. In the middle of the test period high anxious subjects were superior on easy words but inferior on hard words. At the end of the testing session, high anxious subjects were superior to low anxious subjects on both types of words. This confirmation of Drive Theory would tend to confirm Spence's (1958) emotional reactivity hypothesis and suggest that some

form of ego-stress is necessary before the effects of anxiety on performance can be fully demonstrated. The only deviant subjects in this experiment were two high anxious subjects who began the experiment by performing almost perfectly and continued so. It was found that both these subjects had very high A.C.E. (intelligence) scores, and again brought up the question of the effects of anxiety on very superior students.

A further study reported by Spielberger's associates was that conducted by Denny (1963) using a concept formation task, Denny established that there was a floor and ceiling effect for his task; low intelligence subjects rarely scored the worst possible score and high intelligence subjects rarely achieved the best possible score. High intelligence subjects scored significantly better than low intelligence subjects, thus, the test was sensitive to the range of intelligence of the sample. He found that in the low intelligence samples the high anxious group performed less well than the low anxious group. However, in the high intelligence group, high anxiety appeared to be having a facilitating effect. On the assumption that the concept formation task was less difficult for subjects in the high intelligence group, their superior performance would be in line with predictions from Drive Theory.

Thus, Spielberger's empirical findings are generally in support of a Drive Theory interpretation of anxiety. The results which suggest that there is a slight negative relation

between anxiety and intelligence do make results from experiments where subjects have not been selected on the basis of intelligence and anxiety open to misinterpretation. Also, Spielberger would seem to demonstrate a reactive interpretation of what the M.A.S. measures rather than a chronic interpretation.

Some Studies Using Spielberger's Analysis

There have been very few studies reported which employ the kind of interactive analysis utilized by Spielberger, of the relationship between anxiety, intelligence and performance. Both in the field of anxiety, and achievement need (see next chapter), subjects are still selected on the basis of high and low motivational strength while intellectual level is largely ignored. Not only would Spielberger's investigations demonstrate the fallibility of this, but also the consistent theoretical attention to the level of difficulty of the task (Taylor Spence (1966) and risk level; Atkinson (1958, 1966), the subjective probability of success; Cattell (1965)) would demand that academic performance situations should be seen in terms of intrinsic difficulty, plus subjectively viewed difficulty, plus intellectual level and actual difficulty. Two recent publications have included an analysis of intellectual level as well as anxiety level in their investigation, Paul and Eriksen (1964), Ley et al. (1966).

Paul and Eriksen (1964) have attempted to demonstrate the effects of anxiety on real life examinations. Using one hundred and eighteen female students enrolled in an introductory psychology course they divided their sample into high and low anxiety on the T.A.Q. (Mandler and Sarason 1952). On the day of the experiment subjects met in informal groups (17 - 20's) to discuss the effects of "people's attitudes and reactions to different examination situations". It was revealed that a technique was being developed to help students overcome problems of anxiety in examinations. At the end of this informal session subjects were given a brief thirty five item test of the material covered in the lecture that day, "just to see how much students remembered outside the examination setting". An additional item was included which asked subjects if they felt anxious during this "experiment". Particular care was taken to stress that performance on this experimental test would in no way affect their course grades and that information collected would be treated in strictest confidence. Subjects' performance on a comparable half test taken that morning in examination conditions was obtained. Subjects were also divided on the basis of their I.Q. level. The results demonstrated that the T.A.Q. score was significantly negatively related with I.Q. measures and also with scores in the course examination, there was a slight negative correlation between T.A.Q. and anxious examination scores. It was found that high anxious subjects

performed relatively better on the non-anxious examination, but this was not a strongly significant difference ($p < .05$). When the results were analysed separately for the top and bottom fifteen per cent on intelligence scores and the middle seventy per cent, or broad middle range of intelligence, a significant ($p < .002$) interaction between anxiety level and differing performance in the two situations was obtained for the middle seventy per cent range of intelligence. High anxious subjects were performing better in the low anxious examination situation. Paul and Eriksen interpret this result in terms of an inverted - U relationship between anxiety and performance. For the average low anxious subjects the amount of drive present in ordinary course examinations is about the optimal level for that task. If, however, this tension is decreased, the level of drive becomes less than optimal and performance efficiency decreases. For high anxious subjects the level of anxiety in ordinary course examinations is above the optimal level with subsequent performance decrement. If this anxiety level is lowered, as in the non-anxious test-situation, performance improves.

The second study which includes a Spielberger type analysis of results is that reported by Ley, Spelman, Davies and Riley (1966). This study was an investigation of a possible curvilinear function in anxiety and performance relationships. The subjects were one hundred and forty four volunteers with a median age of 46.5 years. No relationship was found between

level of ability and anxiety measured by the M.A.S. and the Progressive Matrices. However, these investigations were looking for a relationship between anxiety and intelligence level, while the Spielberger work is concerned with anxiety and intelligence level related to academic performance, and the significant negative relationship they found between M.A.S. scores and Matrices scores for the total sample would be in keeping with Spielberger's findings.

Other than the research undertaken by Spielberger's own doctoral students, and the above reports, no other studies using the Spielberger analysis of anxiety intelligence and performance, have been discovered by the present writer.

CHAPTER IV

THE ACHIEVEMENT MOTIVE

Chapter IVThe Achievement Motive1. A History of the early work on the Achievement Motive

One of the most prolific and better documented areas of research into motivation and performance is the area of study concerned with the Achievement Motive. David McClelland and co-workers began, in 1948, to combine the idea that human motivation is expressed in free - associative thought, with experimental methods of manipulation and controlling the strength of motivation. McClelland based his system on Murray's Thematic Apperception test. This in turn evolved from psychoanalytic literature, with its recognition of the importance of fantasy production in revealing underlying motivation. Murray's conception of psychogenic needs included a need for achievement which could be aroused from within by "internal visceral processes" or from without by the effect on the person of the immediate situation, which he called press. (Murray 1938). Murray and his co-workers devised the Thematic Apperception Test, which has become one of the standard clinical tools for assessing the underlying needs of the individual.

McClelland et al. began their investigation into the effects of experimentally aroused motivational states on thematic apperception, with a study of the effects of varying amounts of

food deprivation on imaginative production. It was found that the longer the period of food deprivation the more frequent the production of food related imagery scored in the T.A.T. protocols (Atkinson 1954). There are obvious theoretical pitfalls in accepting the idea that a socially determined need and a biological drive can be similarly treated. Robinson (1961) presented several arguments against this assumption, notably that, unlike hunger, there are no known biochemical or neuro-physiological factors associated with the activation of achievement motive. Secondly, the achievement motive is not a need, in the sense that a subject can be deprived of successful achievement related behaviour for varying periods of time and the effect of such behaviour be studied. However, McClelland and Atkinson, took the results of these early experiments as an encouragement to the belief that thematic apperception content was indeed sensitive to motivational influence, and initiated a programme of research on the need to achieve. This is fully described in "The Achievement Motive" (McClelland, Atkinson et al., 1953). The test devised by McClelland et al. is a modified version of the T.A.T. and is termed a measure of need achievement after Murray's terminology; shortened by the majority of later workers to n.Ach. Like the T.A.T., the n.Ach test sets before the subjects the task of producing imaginative stories in response to a set of pictures, in order to elicit projection of underlying needs. In the case

of n.Ach, the stimulus pictures used are such as to bring about associations with achievement themes and the scoring systems measure achievement related responses only.

The design of the original experiments on achievement motivation required the creation of experimental situations which would presumably raise or lower the intensity of inferred need for achievement, before male college students were asked to write the imaginative stories. The experimental situations differed mainly in the instructions given to the subjects; instructions designed to be of differential achievement arousing properties. The first condition, the relaxed condition, presented the task to the subjects as the tool of a graduate student, which was in the developmental stage, strict anonymity was observed and the subjects were, therefore, supposedly minimally "ego-involved". The neutral condition was when the task was introduced seriously as designed by the Psychology Department to develop some norm. The third condition, "Achievement Oriented condition", presented the tasks as measures of intelligence and creative imagination. Emphasis was placed on "doing one's best". Names were put on all forms and it was implied that result would be "available" to course instructors.

Scoring categories were developed on the basis of those content elements which occurred more frequently in the stories of subjects when the achievement motive had been experimentally

aroused, compared with the stories of subjects in the neutral or relaxed groups. These categories were then adapted as indicators of achievement motivation in the stories and were summed to give the n.Ach score (details of original scoring procedure can be found in Atkinson 1958 - see also Appendix A).

A multiplicity of investigations summarised by McClelland (1953) and Atkinson (1958) attempted to support the empirical validity of the test by relating performance on the n.Ach test to other fields of behaviour. If it could be shown that individual differences in n.Ach score were systematically related to differences in other respects, and that these differences were best interpreted as being motivational in character, then the empirical validity of McClelland's argument would be strengthened. Generally, it would be expected that increased motivation would lead to better, faster, or otherwise more efficient performance. Workers in this field, quoted by Atkinson and McClelland, have shown that high n.Ach scores are associated with fast learning, higher response output, and greater perseverance. One of the most intensive study of this nature was that of Lovell (1952) quoted by both Atkinson (1958) and McClelland (1953). Lovell's college student subjects were set two kinds of problems. In a simple arithmetic task it was found that high n.Ach subjects solved more problems at every point in the test; giving them an

overall significantly greater output than that for the low n.Ach subjects. In a learning situation, a scrambled word test, there was a statistically significant tendency for the high n.Ach groups to show superior learning compared with the low n.Ach group. N.Ach scores have been related to the speed of recognition of achievement - related words (McClelland and Liberman 1949) and the recall of incompleting and completed tasks (Atkinson 1953). Subsequent research has validated n.Ach scores against academic grades, level of aspiration tests, intelligence and social class membership.

Following the publication of the first book of research on Achievement Motivation, (McClelland 1953) interest in this field proliferated. The second phase of work has been surveyed in "Motives in Fantasy, Action and Society" (Atkinson 1958) and more recently the reports of the research of the Ford Foundation project at the University of Michigan (1958 onwards) have been published in "A Theory of Achievement Motivation" ed. Atkinson and Feather (1966).

The main direction of research in the last decade is two-fold, following the now differing fields of interest of the two major leaders of research. McClelland himself has turned his attention to the social origins and consequences of achievement motivation. His work has been mainly concerned with exploring the relationship between n.Ach and social class, educational level, religion and entrepreneurial activities,

expressing Max Weber's "Protestant Ethic" in terms of achievement motivation. McClelland (1961) in "The Achieving Society" has systematically elaborated this interest in the social issues of achievement need.

Atkinson has retained a concern with methodology and his work at Michigan has now become largely concerned with the relationship between motive to achieve success and motive to avoid failure. Atkinson has also been concerned with attempts to provide a theoretical model of achievement motivation (Atkinson 1957). One of his major contributions has been an attempt to clarify some of the language difficulties involved in much of the discourse. Significantly he posits a distinction between "Motive" and "motivation". Motive refers to a latent disposition to strive for certain kinds of satisfaction. In any given instance the motive interacts with expectancies and incentive values and the result is referred to as "motivation". In a situation involving only the achievement motive, the motive strength interacts with expectancy of success or failure and the specific incentive value consequent upon successful or unsuccessful behaviour. Two general classes of motives emerge, approach and avoidance motives, which will be discussed later. This work has gone some way in uniting achievement motive to the pre-war studies of levels of aspiration (Lewin et al. 1944).

Workers have sought to check the validity of the scoring system, notably Sadacca Ricciuti and Clark, under the auspices of the U. S. Naval Office of Research (1957) and Haber and Alpert (in Atkinson 1958) have investigated the relationship between n.Ach scores obtained with different pictures. French (1955) put forward the idea of measuring need achievement with sentence completion tasks and Aronson (in Atkinson 1958) a graphical method suitable for young children and non-literate adults.

Recurrent Problems with Achievement Motivation

1. Achievement Motivation in Female Subjects

Throughout the literature it was noted that n.Ach results with female subjects differed from those of male subjects. This unexplained phenomenon has been overcome by the simple technique of using male subjects exclusively. Although this exclusion of female subjects avoids the problem, it does constitute a formidable restriction on comprehensive theory construction; Atkinson (1958) can be quoted on this subject as saying:

"The confusion among results of studies using the present methods of content analysis with female subjects has produced frank recognition that there are still important questions to be answered before assuming that the measures

presented are equally valid for women.

Under no circumstances should the result of male and female subjects be lumped together until the equivalence of the measure has been amply demonstrated."

However, several studies, reported by McClelland, point to the validity of female scores in terms of "functional significance", i.e., higher n.Ach being associated with superior performance on various learning tasks.

The main area of confusion in the results of female samples is that originally stressed by Veroff et al. (1953). That is, that female subjects fail to show the expected increase in n.Ach scores when exposed to experimental achievement arousal conditions. McClelland et al. (1953), on this problem have stated that the research has ruled out two possible explanations, invalidity of the scoring for women, and scores too high to go higher. He concluded that the usual arousal instruction "simply do not increase achievement striving in women". An additional finding by Veroff and subsequent investigations is that, in neutral conditions, the n.Ach scores of females are consistently, and significantly, higher than males. It has been suggested that a "sociometric" factor, social acceptability might be influencing the achievement arousal results of female subjects.

One research result, that of Angelini (1955) in Brazil, using college women, found the required significant increase in n.Ach. following instructions which appeal to intelligence and leadership ability, but explains this difference in terms of the greater difficulty experienced by Brazilian girls in obtaining higher education, leading to greater competitiveness in them than in the American college subjects.

Robinson (1961) attempted to vary as many factors as possible to obtain a maximum difference between relaxed and achievement orientated scores for women. Using one hundred and seventeen female student teachers (British) he managed to produce suitable conditions in which the nAch. scores of his female subjects did not differ from those of his male subjects. Bruckman (1964), again in Britain, obtained a mean n.Ach. score for boys of 6.48 and for girls 7.32 a slight, but not significant, superiority for girls. The subjects were, however, considerably younger than those hitherto used; their ages ranging from nine to eleven years. Also, in her achievement "Attitude Questionnaire" (Bruckman 1964) she did obtain a sex difference in content of significant items, indicating that for boys achievement attitudes and values are based more on vocational striving, while for girls they are more school centred.

Lesser et al. (1963) took two groups of female subjects: overachievers, obtained from the Hunter School for intellectually gifted girls, and underachievers. The overall effect of the experimental achievement arousal condition for all girls was nonsignificant. What did emerge, however, was a somewhat unexpected second-order interaction effect. The achievement motivation score of achievers increased significantly in response to achievement orientated condition, when they produced stories to pictures of females. However, it was to pictures of males that the underachievers produced achievement motivation increases. Lesser et al. tentatively suggests that the achieving girls perceived intellectual achievement goals as a relevant part of their own female role; while underachieving girls perceived intellectual achievement goals as more relevant to the male role than to their own female role.

Substantially the same unresolved state of affairs concerning female subjects and n.Ach. scores remains today, with Atkinson and co-workers using only data collected from male subjects and thus avoiding the problem and a comparative few researchers producing ambiguous and often contradictory results from female subjects. In general, we know very little about the operation of achievement motivation in female subjects and specifically their lack of response to experimentally aroused conditions has not been adequately explained.

2. The Achievement Motive in Children

Again in the field of research, with children, the problem of using n.Ach. measures has been recognised and then ignored. Researchers have concentrated on anxiety, dependency or aggression but little empirical work has been produced with achievement motivation. The majority of studies have dealt with college students, a few with high school students, but very little has been accomplished with younger children. McClelland and Atkinson were originally of the opinion that the n.Ach. procedure was not suitable for use with children, except possibly in the Aronson (1958) modification of scoring for n.Ach. from doodles and scribbles. Winterbottom (1958) used a procedure where children told their stories to the experimenter, but Aronson^{so} notes that even with this method it was not possible to study children under eight years old. Cameron (1963) did obtain stories from children as young as five by this method; however, because of time difficulties the number of protocols arrived at by this method was limited. Robinson (1961, 1965) and Argyle and Robinson (1962) used eleven year old boys in a group setting and Bruckman (1964, 1966) used both male and female children, ages nine to eleven, by modifying the instructions, the time allowed and the pictures used. It seems feasible, especially with the later modifications, that n.Ach. scores can be obtained from children over the age of nine, in a group setting, and under nine in an individual setting.

3. The Development of a Questionnaire of Need Achievement

The advantage of a questionnaire measure of need achievement, of easier administration and scoring, has led to a great deal of research, so far rather unsuccessful, into the possibility of producing an adequate questionnaire measure of achievement need.

Atkinson (1958) reported several attempts to produce such a questionnaire but all versions have produced a low or insignificant relationship with n.Ach. projective scores. Strodtbeck (1958) followed de Charms (1965) Atkinson (1958) in suggesting that these questionnaires may have important correlates that are different from those of a fantasy measure. That is, that both types of measure are related to achievement motivation and its correlates, but not necessarily to each other. Strodtbeck and Bruckman (1964) have both produced a scale of achievement values a "V scale" based on Rosen's (1956, 1959) achievement syndrome. Strodtbeck found that over-achievers in his group had higher V scores and higher n.Ach. scores than under-achievers, but the V scores and n.Ach. scores were unrelated.

Robinson (1961) developed an achievement motivation questionnaire which he termed Q.Ach. which in one experiment was found to bear a significant positive relationship to n.Ach. scores but when the same group was retested two years later (Argyle and Robinson 1962) this did not reoccur. Bruckman (1964)

was also not successful in obtaining a relationship between her questionnaire measure of need achievement and n.Ach. scores.

The most encouraging advance in this field has come from Richard Carney and his co-workers at California Western University - unfortunately too late to have influenced this present study. Carney (1965-1966) has produced a questionnaire known as the California Psychological Inventory; the C.P.I. which includes an achievement Orientated factor (A.O.). This factor, A.O., consists of the mean of the standard score from the Dominance, Capacity for Status, Sociability, Social Presence and Self-Acceptance scales. It correlates with the n.Ach measure consistently in the Carney studies. There is also evidence that A.O. scoring under ego-orientated and task-orientated instructions parallels the McClelland n.Ach score under similar conditions. A.O. has been found to be quite stable over a variety of conditions, of experimenters, areas of country and schools. It would, therefore, seem reasonable to suppose that the A.O. scale could provide a promising tool for future research.

In summary, it may be said that attempts to produce a satisfactory questionnaire measure of need achievement have proved surprisingly unsuccessful until the C.P.I./A.O. factor was used by Carney. This new questionnaire is, to date, the most successful attempt to produce a questionnaire measure which correlate with nAch. projective measures.

A Theory of Achievement Motivation

Although the substantial body of research into the validity of n.Ach. measures provides an empirical background for further research this area has been, until recently, rather weak in an overall theoretical background. The work of Atkinson has gone a long way towards meeting this need (Atkinson 1958, 1965, 1966).

Atkinson's theory, originally put forward in 1957, involves a Tolman-like concept of expectancy. He has proposed that n.Ach. scores are indices of individual differences in the strength of achievement motivation, conceived as a relatively stable disposition to strive for achievement or success. This motive is latent, until it is aroused by outside cues which indicate that achievement behaviour is needed. The strength of this aroused motivation is a function of both the strength of the motive and the expectancy of success or failure, and also, a third variable, incentive. Expectancy and incentive are familiar Tolman (1932) variables, but the third variable, motive is not the common conception of non-directive but energizing drive. The Motive is the "affectively toned expectation of either good or bad to come" as compared with the expectancy variable which is cognitive rather than affective, approximating roughly to Tolman's cognitive maps and Hull's habit strength of the 1930's. A motive is conceived as a

"disposition to strive for a certain kind of satisfaction, as a capacity for satisfaction in the attainment of a certain class of incentive" (Atkinson 1957). Atkinson contends that the names of the motives (achievement or affection, etc.) are really names of classes of incentives which produce essentially the same kind of experience of satisfaction ("Pride in accomplishment, or a sense of belonging and being warmly received by others, etc.). Atkinson conceives of motives as relatively stable characteristics of the personality, which have their origins in childhood. The general aim of one class of motives, the approach motives, is to maximise satisfaction (e.g., in achievement motivation this is regarded as a disposition to approach success). The other class of motives is concerned with minimizing pain, avoidance motives (in the context of the achievement motive this manifests itself in a seeking to avoid failure or humiliation). It is this approach/avoidance analysis of the achievement motive, put forward by Atkinson, which is of particular interest to the present research.

Atkinson's theoretical model states that the strength of motivation to perform some act is a "multiplicative" function of strength of motive, expectancy and incentive.

$$\text{Motivation} = (\text{Motive} \times \text{expectancy} \times \text{incentive})$$

However, as J. S. Brown (1961) points out, the use of the multiplicative sign is not intended to parallel Hull's use of

this sign, because Atkinson appears to be saying that a motive facilitates only those "instrumental reactive tendencies that have a terminal member, the goal concept in common with the motive". That is the factors do not really multiply ~~by~~ but "mutually facilitate" the strength of the disposition to respond. This conception of motive functions differently from the completely non-specific drive of S-R behaviour theories. The motive to achieve (M_g) is relatively non-specific in its influence, it combines with the product of expectancy of success and incentive value of success for each of the different paths to achievement available. This non-specific influence of M_s is limited to the class of achievement - oriented activities; activities which can be expected to lead to success, not activities of any other nature (leading to food, affiliation, etc.). For Atkinson, therefore, a motive has a non-specific influence on actions that have the same "functional significance", actions that represent alternative paths to the same general goal. In his more recent writing Atkinson has encouraged the use of the word tendency, when referring to the product of motive, expectancy and incentive.

"This product represents, in the theory language, an active impulse to engage or not to engage in a particular action which is expected to have a certain consequence, thus, we have substituted the term 'tendency' for the term 'motivation' in this summary statement of theory without

implying any change of meaning"

(Atkinson 1966).

Hope of Success and Fear of Failure

Throughout the literature it has been noted several times (Atkinson 1958, 1965, 1966) that the achievement motive is composed of two motive "tendencies": the tendency to achieve success (T_s) and the tendency to avoid failure (T-f). These two motive tendencies, originally referred to as the "Hope of Success" motive and the "Fear of Failure" motive, have alternatively been regarded as parallel and independent of each other (Cooper and Howell 1961) or as interrelated, that is, with the need to escape from failure seen as interfering with a person's performance in achievement related situations. Achievement - orientated behaviour is activity undertaken by an individual with the expectation that his performance will be judged, that is evaluated, in terms of some "standard of excellence". Any situation which presents a challenge to succeed must, by its very nature, present the alternative threat of failure. Therefore, achievement - orientated behaviour must always be influenced by the approach/avoidance conflict, between the two poles of tendency to achieve success and avoid failure. The majority of theoretical work and empirical research in this decade has been focussed on discovering more of the nature of this conflict between the two opposing tendencies inherent in the achievement situation.

The Tendency to Achieve Success (T_s)

This approach motive is considered a multiplicative function of motive to achieve success (M_s), strength of expectancy or subjective probability, that success can be achieved (P_s) and the incentive value of the success in any particular instance (I_s).

Therefore, the equation is formed:

$$T_s = (M_s \times P_s \times I_s)$$

The incentive value of success is assumed to be proportionate to the difficulty of the task (i.e., $I_s = 1 - P_s$). Together, the general motive to achieve (M_s) and the incentive value of success at a particular activity determine the overall valence of success (Va_s). Atkinson is concerned with the inter-relationship of achievement motivation and risk-taking and the situation is always one in which the subject's skill is involved. If a task is easy (high subjective probability of success) its incentive value will be very low. However, if the task is difficult (low probability of success) it will have high incentive value. A subject will be pleased if he gains success at a difficult task. Therefore, in the model the two components; subjective probability and incentive are seen as inversely related to one another.

The Tendency to Avoid Failure (T-f)

The motive to avoid failure (T-f) is said to combine multiplicatively with the expectancy of failure (P_f) and the incentive value of failure (I_f).

Therefore, the equation is formed:

$$T-f = (M_{AF} \times P_f \times I_f)$$

To this is added the conception that the easier the task the more negative the incentive value of failure ($I_f = -P_s$), indicating that the incentive value of failure is always negative: failure is always an undesirable state of affairs and becomes more undesirable as the task becomes easier. Subject's experience greater displeasure when they fail at an easy task. This avoidant tendency always opposes or resists the influence of motivation to achieve success and is, therefore, always inhibitory in character. There was some confusion in Atkinson's early exposition of the theory (1957), concerning the function of the tendency to avoid failure; suggesting that such motivation could function, in certain conditions, to excite achievement-orientated performance. This is, however, refuted in Atkinson's later writings (1966). Here it is stressed that subjects with dominant motivation to avoid failure, would always resist achievement-orientated activity, and that this resistance would be greatest for tasks of intermediate difficulty, (when $P_s = .05$). For it is in these tasks that extrinsic motivation to undertake the task is opposed by the greatest inhibitory tendencies.

Approach-Avoidance Tendencies

In any achievement related situation, in which subjects are attempting to meet criteria of excellence, an individual's behaviour in a performance situation can be neatly summed up as the conflict between T_s and $T-f$. Both motive tendencies are considered to be present in virtually all people, though in different strength from person to person, and are conceived of as inter-related aspects of the same general achievement motive. Whichever motive is the stronger at any given time will determine whether an approach or avoidance activity will be undertaken. For some subjects the motive to achieve success (M_s) will exceed the motive to avoid failure (M_{af}), for others M_{af} will exceed M_s . For a further group of subjects the two motives will be approximately equal in strength, with the result that one does not achieve "stable dominance over the other". Atkinson designates the "resultant oriented tendency" as $T_s + T-f$, which is positive when $M_s > M_{af}$ and negative when $M_{af} > M_s$.

Therefore, the resultant motivation =

$$(M_s \times P_s \times I_s) + (M_f \times P_f \times I_f)$$

Atkinson adds to this model the final conception of an extrinsic tendency, that is other factors, environmental and personality factors, which determine behaviour in certain situations. In the equation above the ^{left} ~~right~~ hand component is always positive and the ^{right} ~~left~~ hand section always negative,

as I_f is always negative. If $M_s = M_{af}$ the right hand side would equal zero and subjects behaviour would be determined by extrinsic factors. This would be an unusually perfect balance leading to a state of neutrality of motivation for such subjects. If $M_s > M_{af}$, the resultant motivation will be positive, but strongest when probability of success is of intermediate difficulty. If, however, $M_{af} > M_s$ the resultant motivation will be negative but especially in tasks of especially high or low probability of success. Therefore, for Atkinson the $M_s > M_{af}$ subject is a moderate risk taker, and the $M_{af} > M_s$ subject is an extreme risk taker, either extremely conservative or extremely risky.

In summary, from Atkinson's risk-taking model of achievement-motivation it is suggested that the resultant motivation is consistently positive when $M_s > M_{af}$ of the greatest magnitude when $P_s = 0.5$. When $M_{af} > M_s$ is the resultant motivation, this is consistently negative, and especially so when $P_s = 0.5$. In this case it is suggested that subjects may try to avoid all achievement-related activity if this were possible. However, in academic achieving situations this is rarely possible, for students can rarely "Opt-out" of the achievement situation altogether.

Atkinson's conception of an inhibitory tendency, avoidance of failure, as an integral component of the achievement motive, leads to an appraisal of motivational determinants of academic

achievement in terms of direction as well as strength of drive. The inhibitory function of fear of failure gives a further explanation of the data, which suggests that subjects who gain high scores on anxiety questionnaires perform badly in competitive situations.

Measurement of Hope of Success and Fear of Failure

The theory of approach/avoidance aspects of the achievement motive has, in fact, been developed from the research findings and parallel with research advances. This twin element in the achievement motive was noted by McClelland in 1953 and termed by him:- Hope of Success and Fear of Failure.

"The main source of evidence for this distinction consists of repeated findings that individuals with moderate or low n.Ach. scores often appear fearful or defensively orientated whereas individuals with high scores appear hopeful". McClelland and Liberman's (1949) study with tachistoscopic presentation of achievement words, although open to all the more recent criticisms of perceptual defense experiments, did show th high n.Ach. subjects saw words like success, mastery, etc., most quickly, while low n.Ach. subjects saw words like failure and unable, more quickly.

One of the principal results from the early experiments with Hope of Success and Fear of Failure concepts was the difficulty of measurement with the McClelland scoring systems. The traditional method of obtaining n.Ach. scores is to score

the protocol for presence of achievement imagery and, if this is present, to analyse the story more fully to provide further scores. The further analysis of the stories involves both positive and negative categories. For each picture a total score of twelve can be obtained:- one point for the presence of imagery and one point each for the presence of each of eleven sub-categories. To obtain a two-motive score, the traditional procedure was to divide the sub-categories into positive and negative score. By this method it is usually found that n.Ach. correlates with the fear of failure measure, but as items were scored for fear of failure, only if they received the original mark for achievement imagery present, this would be expected. Bruchman (1964) scored her rejected protocols (those which did not receive a mark for imagery present and should, therefore, not have been investigated further) for fear of failure indices and received valuable information of the fear of failure nature.

This confusion of scoring, inherent in McClelland system, (McClelland was not originally looking for two motives) led to various attempts to produce positive and negative scoring methods. The two main methods are those produced by Moulton (in Atkinson 1958) and Clark Teevan and Ricciuti (in Atkinson 1958, Teevan A and B 1964). The eleven sub-categories in the original scoring system are listed below:

Positive Scoring Systems

1. Achievement Imagery (A_I)
2. Positive Anticipation of success (G.A+)
3. Positive affect associated with achievement (G+)
4. External Assistance for characters in achievement related activity (NUP)
5. Successful instrumental activity leading to achievement I+
6. Absence of a competing theme not related to achievement (Ach. theme)

Negative Aspects of n.Achievement

1. Unsuccessful instrumental activity (I-)
2. Anticipation of failure (GA-)
3. Negative affect in relation to achievement situation (G-)
4. Personal obstacles (personal inadequacies interfering with achievement) B_p
5. Environmental obstacles (external obstacles interfering with achievement) BW

Moulton and Clark et al. have attempted to produce a more adequate scoring technique by adding more negative categories, and ignoring some of the positive categories. If one attempts to obtain the fear of failure, hope of success measures from the same test, one comes up against the difficulty that Moulton and Clark attempted to overcome. Firstly, there are more

positive than negative categories in the traditional system. It has also been found that hope of success scores correlate .88 to .94 with the total n.Ach. scores, because of the presence of more positive categories, and also because of the practice of only scoring for the positive and negative aspects if achievement imagery (A_I) is judged as present. Ricciuti and co-workers have resolved this dilemma by stating that one should score for fear of failure and hope of success in all the pictures. They also suggest that it would be acceptable to score the protocols by just marking the presence or absence of fear of failure or hope of success (See Appendix A).

Teevan, Ricciuti and Clark have, since 1958, proceeded to use other methods than the n.Ach. test and have adopted a level of aspiration technique in an attempt to differentiate the "cautious defensive individual" from the "hopeful person" and have abandoned their attempts to provide a verification of the positive scoring categories and negative scoring categories. Teevan, and his co-workers at the U. S. Office of Naval Research (1964) have subsequently developed an instrument designed to measure fear of failure, termed a measure of hostile press. Their work suggests that the hostile press measure is a measure of fear of failure and the n.Ach. score is a measure of positive striving for success. This is a somewhat unsatisfactory conclusion because it has already been seen that the total n.Ach. score contains a negative element, as well as a positive element.

Atkinson's later work also comes up against this problem. He has proceeded to designate the n.Ach. measure a measure of positive strivings, and the Sarason Test Anxiety measure as a fear of failure measure. The negative aspect of the traditional scoring procedure does cast doubt on a pure n.Ach. score as a measure of striving for success. It would seem necessary, either to devise a new measure of both tendencies, or to score the positive and negative aspect of the projective measure, quite separately.

The Achievement Motive and Test Anxiety

Atkinson and Litwin (1960) introduced the idea of using the projective measure n.Ach. to assess motive to achieve success and the Sarason Test Anxiety Questionnaire to measure motive to avoid failure. It has generally been found that these two measures are uncorrelated among college men when both are administered under neutral conditions. Atkinson and Litwin (1960) report a correlation of $-.15$, Litwin 1966 $-.005$, Mahone 1960 $-.09$, Brody 1963 $-.05$, Smith 1964 $-.11$.

The research programmes of Sarason et al. with the Test Anxiety Questionnaire (T.A.Q.), and McClelland and Atkinson with the n.Ach. measure existed side by side for about ten years. It was generally seen that high n.Ach. enhanced performance in achievement situation, while high T.A. produced decrements (These results have by no means been consistent). The n.Ach. workers have often referred to the fact that low n.Ach. subjects

seemed more fearful of failure (Atkinson 1953), while the T.A.Q. workers tended to regard subjects with low T.A. scores as "less conflicted and more task oriented". The general opinion seems to have been that the two measures were tapping either end of a single motivational variable (Raphelson 1957). Raphelson's study showed a correlation of $-.43$ and also that each measure was related in the expected direction to a physiological index of manifest anxiety in a stressful situation.

However, in 1960, Atkinson and Litwin produced an article which attempted to provide an empirical link between the two fields of research. They conceived of the T.A.Q. measure as a measure of fear of failure and the n.Ach. as a measure of hope of success. From their experiment with the two measures they found that male college students with high n.Ach. scores and low T.A. scores did choose intermediate difficulty of tasks, did obtain higher grades in examinations and did show more persistence. These subjects could be said to have a stronger motive to succeed than to avoid failure. $M_s > M_{af}$. Similarly, they found that low n.Ach., high T.A. scorers performed more poorly in examinations and were less persistent. These would be individuals with $M_{af} > M_s$ that is, their motive to avoid failure is greater than their motive to achieve success.

In these critical studies intelligence was not taken into account, although Smith (1964) did show the importance of taking into account the level of difficulty of the examination for the subjects. O'Connor, Atkinson and Horner (Atkinson 1966, Ch. 15) have investigated the two-fold achievement motive in schools. Their research was concerned with ability grouping in classes, an ability grouped class being one in which the probabilities of success and failure are nearly equal for all students. They found that high n.Ach. students showed greater interest in learning when grouped by ability, but ability grouping did not produce the expected decrement in performance of high T.A. students. This study did show, however, that "expectancy of success is a manipulable motivational variable", demonstrating the motivational significance of intelligence test scores. This would accord with Spielberger's (1962) finding that anxiety appears to have little effect in the performance of high or low grade students. It was the middle range of ability students who showed the expected decrement in high anxious students.

Current Research with Achievement Motive and Test Anxiety

Since this research was planned (1964), two significant tests in this field have been published. The first "An Introduction to Motivation" by Atkinson (1965), contains a re-appraisal of Atkinson's theories; the second "A Theory of Achievement Motivation", ed. Atkinson and Feather (1966),

contains articles of the most important research advances in the last five years. An exceptionally good review of recent advances can be obtained in Atkinson (1966) and the present writer will concentrate of those investigations specifically related to the present research. The better recent studies have been primarily concerned with gambling and risk taking behaviour (Litig 1963) (Brody 1963), as it is in such situations that Atkinson's approach/avoidance model can best be demonstrated. Very little recent research has been conducted with motivation and academic performance and so it is really by studying the conclusions reached, and subsequent additions to the theory that recent research can be of assistance to the present study.

Smith (in Atkinson 1966) has attacked two important underlying assumptions in past research on n.Ach. Firstly, he has been interested in the problem of whether achievement imagery in thematic apperception reflects only achievement motivation. Secondly, he has attacked the "other things being equal" approach, widespread in personality research. That is, can performance scores of subjects, high or low on n.Ach. measures, be compared on the assumption that the two groups are similar in all other important respects? On the first point it has been pointed out that because achievement imagery is produced by achievement motivation, this does not prove that it is produced only by achievement motivation. The analysis of the material

does not include a recognition of the possibility that achievement imagery could represent the "disguised" expression of an unacceptable wish. Thirdly, Brown and Farber (1951) argue that an intervening variable should be defined not solely in terms of responses but in terms of antecedent conditions as well. Smith's results do question the assumption that n.Ach. scores reflect only achievement motivation and that the possibility must at least be entertained, that achievement imagery can be produced by aroused states other than achievement states. Atkinson and O'Connor (1966) also suggest that other motives may be influencing achievement performances. They suggest that a factor such as social approval could be involved.

"Under certain conditions the positive incentive value of social approval may be negatively related to subjective probability of success and that different types of motivation may summate to produce a performance decrement, once total motivation exceeds an optimal point".

If, as Atkinson is suggesting, performance decreases after a certain intensity of motivation is reached another problem becomes apparent. The majority of earlier work on n.Ach. factors has been interpreted on the assumption that there is a positive "monotonic" relationship between strength of goal - directed tendency and level of performance.

In summary, the more recent research appears to have quite accepted the use of the T.A.Q. and the n.Ach. to provide fear of failure, need achievement scores. The general hypothesis is that high n.Ach., low T.A. subjects do well in achieving situations, while high T.A., low n.Ach. subjects do poorly. Atkinson defends the use of the n.Ach. measure as a positive measure, with the following argument: As the tendency to avoid failure is inhibitory, then a high fear of failure subject would display his tendency to avoid failure in the T.A.T. situation. It is assumed that he would avoid achievement orientated thoughts and activities in imaginative stories. As he is not forced to use achievement orientated activity in this situation, he will not do so (inhibitory effect). Therefore, fear of failure symptoms will be less obvious in a T.A.T. story, than would more positive motives to succeed. Therefore, in response to the n.Ach. test, the subject with a tendency to approach success, will express these motives in fantasy, while the subject with a tendency to avoid failure, will inhibit his negative achievement thoughts and produce imagery unrelated to an achievement theme. This hypothesis has yet to be tested experimentally.

Finally, it can be said that the Atkinson position in 1966 is that n.Ach. measures $M_s - M_{Af}$, that is the strength of the approach motive over the avoidance motive. The T.A.Q. he regards as a measure of M_{Af} alone.

PART III

CHAPTER V

THE AIMS OF THE INQUIRY

Chapter VThe Aims of the InquiryIntroduction

The review of the research literature, outlined in the previous section, has been concerned with many aspects of motivation and their relationship with academic performance. Although the separate theories and research programmes have investigated some widely varying aspects of this subject, it can clearly be seen that all major theories return to a few principal areas of interest. It was to investigate principal problems that this inquiry was planned. The main aim of the inquiry was to investigate further the three-way interaction between intelligence, performance and achievement motives. However, in the course of this research other problem areas have arisen and will be discussed. The nature of the material used, and the samples tested has, of necessity, involved the present research in other problem areas of this field; particularly those concerning the relationship of the various measures of motivation, and possible new measures of anxiety and need achievement.

A considerable amount of data was also collected which will not be discussed in this thesis, concerning the social class of the subjects, their position in the family, their level of aspiration, and teacher's ratings of success. The topic of

social class, for me, has been adequately dealt with by many other writers, notably Bruchman (1964). Bruchman's finding, that social class differences in need achievement results disappeared when intelligence was held constant, has encouraged the present writer to set aside this factor for the moment and to deal with it in another report.

The Principal Aims of the Inquiry

1. To investigate the interaction of intelligence, anxiety and academic performance.

It has been demonstrated in the previous section that a high proportion of previous research into motivation and academic performance has not taken sufficient account of the part played by the intelligence level of the subjects. That this is an important omission can be supported both on theoretical and empirical grounds. Spielberger's (1962) work with manifest anxiety, intelligence and performance has demonstrated empirically that studies of this kind are open to criticism if the intelligence of subjects is not controlled. This has been confirmed by Paul and Eriksen (1964). There have been no attempts to investigate need achievement and performance in a similar way, although Atkinson and many other workers in this field have shown that high need achievement is consistently positively correlated with high intelligence scores. The majority of need achievement studies do not take

intelligence into account when analysing results. Yet there may be a wide range of intelligence scores among those taking introductory courses at an American university, and this does open serious problems when considering the results of such experiments. Spielberger's sample had an I.Q. range of 62-174.

When one considers the major theoretical approaches to anxiety and need achievement, it would appear that, on theoretical grounds the intelligence level of the subjects should be included in the analysis. The Spence drive theory, the activation theories and Atkinson's risk-taking model all include the notion of level of difficulty or complexity of the performance task. Inherent in these theoretical approaches is the concept that drive level will have a differential effect on performance, depending on the complexity of the task. Academic achievement situations are regarded by most researchers as "difficult" tasks but on strictly a priori grounds. However, the level of difficulty of any intellectual task must vary according to the intellectual ability of the student. Examinations judged as difficult, by the majority of subjects, may be relatively simple tasks for the extremely bright students and nearly impossible for the dull student to perform. Intelligence level of subjects must, therefore, be considered if any conception of task difficulty for the individual is to be employed.

Cattell and Atkinson both stress that anxiety or conflict is aroused in situations with a large element of doubt, both objective and subjective, concerning the expectation of success and the incentive value of success over failure. Once again, studies which use academic examinations as a measure of performance should realise that an examination with high success valence is a situation where doubt about the outcome will be most likely to occur. It is probable that expectancy of failure, or success, and the incentive value of this will be determined, to some extent, by past experience in similar situations. The intelligence level of the subject has contributed to this past experience, helping to establish patterns of success, or failure, in previous situations. Once again, the need to analyse results separately for differing intellectual levels becomes apparent.

It is interesting to note that the same measure of fear of failure could be interpreted differently for intellectually superior and inferior students. For the intellectually gifted examinations should be objectively less threatening, past experience should have encouraged confidence in examination situations. High fear of failure for such subjects could perhaps be interpreted as a neurotic fear, or a fear that the objectively unlikely failure may occur. Failure for clever students would probably be more difficult to accept, much would be expected from them and they would have more to lose.

if they failed an important examination. For less intelligent students fear of failure may be a realistic expectancy of failure and not necessarily a neurotic reaction to examination. Past experience may have taught such students to expect failure rather than fear failure. It would be interesting to see if high fear of failure is associated with high neuroticism for the very intelligent, but not for the less intelligent.

It was decided that on the basis of theoretical and empirical analysis of motivation and academic achievement, intelligence of the subjects should be regarded as a crucial variable in these situations and this has been the principal aim of the present study. In order to investigate the three-way interaction of intelligence, drive level and performance, it was necessary to find a sample with a wide spread of intelligence scores, but which subjected its members to the same academic achievement aims and the same examination. In Britain, selection has automatically divided the less able from the more gifted at the age of eleven, and the education of these two groups is then continued separately. It seemed a good idea, therefore, to investigate a sample of children before the eleven-plus selection had taken place and use performance in this examination as the performance measure of the subjects. A sample of eleven year old children was, therefore, investigated and a wide range of I.Q.s (70 - 139+) was included in the sample. However, most previous work has

been conducted with high school and college students and doubt has been expressed concerning the reliability of achievement motives in children as young as eleven.

To see if similar results could be obtained with older groups, two further samples were included, a sixteen year old (pre-ordinary level G.C.E.), grammar school group, and a first year undergraduate university group. Both of these subsequent samples investigated subjects after further quite severe selection on merit had taken place. The sixteen year old group were taking the most important school examination for most intelligent English children, and the university group had been selected for a university place and were facing their first year sessional examination. The I.Q. range of the second and third samples was 99-160+ and ⁹⁷~~110~~-160+ respectively. It was hoped that investigating these different groups would demonstrate the importance of intelligence level and its interaction with motivation and performance for all three stages.

In summary, the principal aims of this investigation were to discover the working of the three variables of achievement motive, anxiety and intelligence at eleven, sixteen and eighteen years of age, and to investigate the performance of the relatively low, middle and high range of intelligence within each sample (e.g., in the college sample I.Q. 99-120 would be regarded as low, but would be a middle I.Q. in the

other samples). This has not been previously investigated. An analysis of achievement need when intelligence is held constant will also be included in this report, no evidence of such a study has been found by the present writer. These principal aims of the research lead to the first set of hypotheses.

Hypothesis I

The effects of anxiety on academic performance will vary with the intellectual level of the subjects.

Hypothesis II

The effects of need achievement on academic performance will vary with the intellectual level of the subjects.

Hypothesis III

High fear of failure will be associated with high neuroticism in the high intelligence group but not in the low intelligence group.

The Secondary Aims of the Inquiry

1. To investigate the possibility of facilitating anxiety in some subjects

Whether anxiety is facilitating or debilitating has become one of the recurrent problems of this research area. So many factors are involved other than the effects of anxiety, notably the level of task difficulty and the possible interference of task irrelevant responses in stressful situations. Many people

have discussed adaptive anxiety, in other contexts (Freud 1936, Hebb 1955) but the general effects of anxiety on academic performance have always been regarded as maladaptive. Within the context of this study two major considerations of this problem have been attempted. Spielberger has suggested that, for subjects of very superior intelligence, high anxiety may facilitate efficient academic performance. Using drive theory concepts of improved performance with high drive in less response competitive tasks, he explains that academic examinations are simple tasks for the very gifted and, therefore, that high anxiety, providing as it does high drive, will facilitate efficient performance (Spielberger 1962, 1966). The present study has investigated this finding and the effects of high approach or avoidance drives on performance will be discussed in relation to the few subjects of very superior intelligence.

The second issue which will be discussed is that raised by Alpert and Haber (1960), who introduced into their questionnaire of anxiety, positive facilitating anxiety questions. They were attempting to overcome the deficiency of the Sarason T.A.Q. which only provides a "debilitating" or "not debilitating" dichotomy from its items. Alpert and Haber's questions concerning facilitatory anxiety have been included in the questionnaire given to two of the samples in the present work. The second set of hypotheses follow from this section:-

Hypothesis IV

Highly intelligent subjects in all samples will demonstrate that high drive facilitates academic performance. Both high negative and high positive drive will be seen as facilitating by intelligent subjects.

Hypothesis V

Subjects who admit to facilitating anxiety will be highly intelligent subjects.

Hypothesis VI

Subjects who admit to facilitating anxiety will perform even more efficiently than their high intelligence would predict.

2. To investigate the relationship between strength and direction of drive and its interaction with performance

Reviewing the literature, it became apparent that attention was continually returning to the question of a differential relationship between drive and performance depending on the strength of that drive. An optimal level of drive, varying from task to task, was suggested; but attention in this argument is focused on the strength of the drive. Following drive theory, this emphasis on strength is understandable, due to the non-specificity of drive within the Hullian system. Activation theorists and Hullian drive theorists would suggest an interaction where drive, of any kind, would have varying effects on performance according to its strength.

Too much drive would lead to inefficient performance and, similarly, so would too little drive. Thus, a curvilinear relationship between drive level and performance, following the now familiar U-shape of the Yerkes-Dodson Law is suggested. Drive theory predicts a monotonic positive relationship between drive level and performance when the task is a simple one, but once task complexity is increased (response competition), high drive leads to detrimental performance. Thus, once again a U-shaped curve of results is predicted for complex performance tasks.

The inclusion of the Atkinson need achievement work, however, presents a new problem: that of the direction of drive. Atkinson has always regarded the interaction between achievement drives as monotonic and positive, high positive drive providing enhanced performance in accordance with the drive theorists position. However, Atkinson's work introduces the problem of direction of drive. It will be remembered that Atkinson's subjects are selected not only by the intensity of their achievement motive, but by the directional orientation of this high motive, test anxiety is regarded as a negative drive, high need achievement as a positive drive. Both drives are seen as having a monotonic relationship with performance but test anxiety is seen as negatively related while need achievement is seen as positively related. High negative drive, as measured by test anxiety questionnaires, is seen as negatively

affecting performance and this negative relationship is monotonic in that the higher the drive the worse the performance decrement. Similarly, the higher the positive drive the better the performance. So for Atkinson it is the direction as well as the strength of drive which is important.

In summary then, it can be seen that theorists who adopt either a curvilinear relationship between motivation and performance view, or a basically monotonic relationship view which is impeded by the task-irrelevant responses in complex situations, are focusing on the strength of the drive involved. Atkinson, however, is concentrating on the direction of the drive, whether approach or avoidance, as well as the intensity of the drive involved.

From these theoretical positions various hypotheses emerge. Both in terms of direction and in terms of strength of drive the results for highly intelligent students are of crucial importance. Activation theorists suggest that academic work is simple for highly intelligent students and, therefore, the higher the drive level the more efficient the performance. Drive theorists would agree with this prediction though not with the reasoning behind it. Atkinson suggests that high need achievement would be facilitating to all students, while Sarason conceives of test anxiety as detrimental to all students. If test anxiety is shown to be detrimental to students of high ability, a directional interpretation of the effects of drive

will be supported. If, however, high test anxiety is seen as facilitating academic performance for these subjects, drive theory conceptions of non-specificity of drive will receive some support. Following the results of Spielberger, and Spence, it is predicted in this study that both high negative drive, test anxiety, and high positive drive, need achievement will be facilitating for highly intelligent students. This is not in accordance with Atkinson's theory, for he would predict that subjects with both high test anxiety and high fear of failure, would be a "neutral" group, because the two aspects would cancel each other out. In which case actual performance level would be unrelated to achievement motivation and determined by actual ability. If subjects report high fear of failure and high test anxiety, it would seem likely that they would not form a "neutral" group, but a "conflict" group, for they are motivated strongly, both to approach and to avoid achievement situations. Conflict studies in animals, would suggest perhaps that such a situation of conflicting emotions, would be unpleasant for subjects and thus detrimental to efficient performance. Therefore, the results of subjects with both high approach and high avoidance motivation are of particular interest to this study. If Atkinson is right and these motive strengths cancel each other out, then subjects performance should be seen as unrelated to motivational determinants. If, however, some conflict is aroused, then I would predict that

subjects of average ability would be detrimentally affected by this high level of conflicting drives, and produce performance decrements. For subjects of very high ability I would predict that high drive, although of a conflicting nature, will lead to efficient performance, following drive level predictions of increase in any drive leading to increased efficiency on non-complex tasks. This question of conflicting motivational orientation is discussed in the next section.

For students of low ability it has been suggested that neither level nor direction of motivational anxiety will have a great effect on performance; that is students of low ability will be bound by their low ability and that unpleasant as their anxiety may be, their performance will be maintained at a low level. For the middle majority range of ability the position becomes more complex. From Activation theories a moderate level of drive would be required for efficient performance. From drive theory predictions low drive level would be beneficial, because academic work is seen as difficult for this ability range and, therefore, lower drive would facilitate the handling of more complex response competitive materials. Atkinson's direction theory would predict, however, that high positive drive (need achievement) would be beneficial to this group, and low negative drive (test anxiety) would also be beneficial. The crucial result here would seem to be the effects of need achievement in the middle range. If high

need achievement is beneficial then a direction approach to drive must be considered, if it is detrimental then strength of drive alone is important.

Hypothesis VII

The performances of highly intelligent students will be facilitated by high drive whether positive or negative in direction.

Hypothesis VIII

For the low ability range neither direction nor strength of drive will play an important part in determining their academic performance.

Hypothesis IX

For the middle range of ability subjects, high positive drive will increase performance efficiency, high negative drive will decrease efficiency; that is, the direction as well as the intensity of drive will be important

3. To investigate the relationship of test anxiety and need achievement at three different age levels

From the previous section it can be seen that this study is interested in both the direction and the strength of the academic achievement motive. This line of inquiry has been encouraged by Atkinson's (1966) work with the relationship between test anxiety and need for achievement. As has previously been stated, Atkinson conceives of test anxiety scores as measures of a negative motivation to avoid failure, and need achievement

scores as representing a positive approach motive of striving for success. Atkinson's research pays particular attention to the two types of personality structure that demonstrate most satisfactorily the direction of motivation; that is to the achievement-oriented personality, where motive to achieve success is greater than motive to avoid failure and the failure-threatened personality, where motive to avoid failure is greater than motive to achieve success. Particular attention is paid in this study, to extremes in these categories, subjects with high test anxiety and low need achievement, and subjects with high need achievement and low test anxiety. Atkinson accepts, however, that the two motives are not necessarily antipathetic. Some subjects produce high scores on both tests and it is very common for subjects to produce low scores on both tests. It was mentioned in the preceding section that subjects with both high avoidance and approach motives have been regarded by Atkinson as a neutral group, but this study regards them as subjects in a particularly stressful situation. However, the results for these subjects are not usually analysed as they are not within one of the two "interesting" categories of high on one motive and low on the other. From drive theory both high negative and positive drive will be facilitating to intelligent students and debilitating to lower ability students. However, from conflict theory these subjects, placed in a highly conflict-arousing situation, should

perform worse than expected. These subjects were investigated in this work.

The approach-avoidance emphasis using test anxiety and need achievement has been investigated with college students in the United States. This study attempted to extend the range of these studies and to investigate the effects of motive strength and direction in younger children.

Hypothesis X

The achievement-orientated subject will perform better than expected from his intelligence level. The failure-orientated subject will perform worse than expected from his intelligence level.

Hypothesis XI

Subjects with both high approach motive and high avoidance motive scores will be the most disturbed, have high neuroticism scores and produce severe performance decrement, with the possible exception of those subjects who are highly intelligent.

Hypothesis XII

The effect of approach and avoidance motives will be similar for all samples, for eleven year old children and for university undergraduates.

4. To investigate the relationship between various measures for motivation

In order to gather data concerning the principal aims of this inquiry, various measures of motivation and drive level

were collected. It was thought desirable, in view of the existing conflict, to look at the relationship between these measures of motivation by means of a correlation analysis. Two particular relationships were of interest for the present study; the relationship between the various measures of anxiety and neuroticism, and the relationship of the projective measures employed and the questionnaire measures purporting to be measuring the same motive. If Eysenck and Cattell are right, and neuroticism is not synonymous with anxiety, though related to it, and if Sarason is right, that test anxiety is a measure of situationally specific anxiety, there would be a moderate but positive relationship between these two measures of anxiety and neuroticism. Facilitating anxiety scores should be negatively correlated with test anxiety scores because of the nature of the items involved, and possibly with neuroticism.

Various projective methods were used in this study - a McClelland type T.A.T. need achievement measure and an open-ended projection test, devised by the present writer and similar to a Rosensweig P.F. test. These tests were administered to all samples and were scored in a similar manner. Both tests were scores for presence or absence of positive approach motive, need achievement, and negative avoidance motive, fear of failure (separately). This will be further discussed in the section concerned with method. It was hoped to demonstrate that positive approach motive scores in the

projective measures would be highly correlated with questionnaire measures of need achievement, and that negative avoidance motive scores from the projective test would be highly correlated with test anxiety measure.

Hypothesis XIII

Neuroticism scores will be moderately related to measures of debilitating test anxiety, and will be negatively related to measures of facilitating anxiety. Facilitating and debilitating anxiety measures will also be negatively related.

Hypothesis XIV

Projective measures of achievement need and fear of failure will be positively correlated with questionnaire measures of these motive orientations and different projective test scores of these variables will be correlated with each other (i.e., all fear of failure scores will be correlated).

5. To investigate the conditions mentioned above in different subjects:- in females, in children, and in English subjects.

The majority of research in this field has been conducted with American college males, further selected in that they were enrolled in introductory psychology courses. The present study hoped to provide evidence that results obtained with this limited population by American research authors, such as Atkinson, Spielberger and Sarason, could be duplicated in Britain with young children of both sexes, with grammar school

and undergraduate females. The original sample of eleven year old subjects consisted of both male and female children. The two older samples were all female. This was partly determined by the results of the eleven year old study which demonstrated little difference between boy and girl subjects, and partly to the findings of Robinson (1961) and Bruckman (1964) that no sex differences existed in their results. The practical availability of subjects also made it convenient to concentrate upon female subjects in the older age groups.

Hypothesis XV

The relationship of motivational orientation and academic performance will be essentially similar for female subjects, British subjects and child subjects, to that found with American male undergraduates.

Summary of Hypotheses

Hypothesis I

The effects of anxiety on academic performance will vary with the intellectual level of the subjects.

Hypothesis II

The effects of need achievement on academic performance will vary with the intellectual level of the subjects.

Hypothesis III

High fear of failure will be associated with high neuroticism in the high intelligence group, but not in the low intelligence group.

Hypothesis IV

Highly intelligent subjects in all samples will demonstrate that high drive facilitates academic performance. Both high negative and high positive drive will be seen as facilitating by intelligent subjects.

Hypothesis V

Subjects who admit to facilitating anxiety will be highly intelligent subjects.

Hypothesis VI

Subjects who admit to facilitating anxiety will perform even more efficiently than their high intelligence would predict.

Hypothesis VII

The performance of highly intelligent students will be facilitated by high drive whether positive or negative in direction.

Hypothesis VIII

For the lower ability range neither direction nor strength of drive will play an important part in determining their academic performance.

Hypothesis IX

For the middle range of ability subjects, high positive drive will increase performance efficiency, high negative drive will decrease efficiency; that is the direction as well as the intensity of drive will be important.

Hypothesis X

The achievement-orientated subject will perform better than expected from his intelligence level. The failure-orientated subject will perform worse than expected from his intelligence level.

Hypothesis XI

Subjects with both high approach motive and high avoidance motive scores will be the most disturbed, have high neuroticism scores and produce severe performance decrement, with the possible exception of those subjects who are highly intelligent.

Hypothesis XII

The effects of approach and avoidance motives will be similar for all samples, for eleven year old children and for university undergraduates.

Hypothesis XIII

Neuroticism scores will be moderately related to measures of debilitating test anxiety, and will be negatively related to measures of facilitating anxiety. Facilitating and debilitating anxiety measures will also be negatively related.

Hypothesis XIV

Projective measures of achievement need, and fear of failure will be positively correlated with questionnaire measures of these motive orientations and different projective test scores of these variables will be correlated with each other (i.e., all fear of failure scores will be correlated).

Hypothesis XV

The relationship of motivational orientation and academic performance will be essentially similar for female subjects, British subjects and child subjects, to that found with American male undergraduates.

PART IV

THE METHOD OF INQUIRY

PART IV

METHOD

Chapter VI The Subjects.

Chapter VII The Research Instruments.

Chapter VIII Procedure and Statistical Design.

CHAPTER VI

THE SUBJECTS

Chapter VI

The Subjects

Introduction

The method section of this report will be divided into a section on subjects, on research tests and on procedure adopted, including statistical analysis of results. Occasionally the same information will be included under more than one heading if it is necessary to do so for the sake of clarity. Similarly, where necessary, procedure and method have been discussed separately for each sample. Research instruments are described in full and included in the appendix. Statistical techniques used are not described if these techniques are standard statistical procedures.

Subjects

Three independent samples were used in this research, because of the need to consider a wide range of intellectual ability in the sample. The choice of subjects was also influenced by the need to investigate motivation and achievement not only in subjects of varying intellectual ability but also of different ages and sexes. The three samples in this investigation were selected from those age groups which would reasonably be expected to be subject to a greater degree of examination stress, a pre-eleven plus group,

a pre-ordinary level G.C.E. group, and a pre-first year examination, university group.

Sample 1.

The first, and largest, sample tested was a group of ten year old children, both male and female. This group, when first tested, were all at the end of their third year and entering their fourth year in junior mixed primary schools in Middlesex. The sample was taken from three schools in the same area, all competing for places at the same local grammar and public schools, and all served by the same secondary modern schools. The schools differed in size, type and academic record. The largest school was in a modern building, with streaming and an excellent academic record. The second school was also streamed into two classes, but the buildings were older and the academic record of the school considerably lower. The third school was a small (one class per year) Church school. It was hoped that by taking subjects from these three different schools in the same area a reasonable cross-section of subjects would be obtained.

The original testing sessions gathered information from a hundred and sixty eight children, but complete records and test results were available for one hundred and fifty two children, seventy one girls and eighty one boys. The I.Q. range of these children was, for boys 73-139, and for girls 85-139 (The test used had a ceiling of 139).

Sample 2.

This sample was an all female group consisting of the fifth form of a large county high school for girls in Kent. The sample was all female, partly because of the availability of this group of subjects for the experimenter, and partly because of the interest of the experimenter in female samples, which had been ignored by most past research workers. The girls were tested immediately prior to their "mock" ordinary level G.C.E. examinations. One hundred and nine girls were tested but complete records were available for only one hundred and two. One hundred subjects were used in the statistical analysis. The age range of the subjects was 15.5 - 16.4 years and the I.Q. range was 103-161, on the Cattell culture-free test, and 102-135 on the results of their eleven-plus intelligence examination. The subjects were in streamed ability classes, but the school had an excellent academic record and it was expected that most of the fifth-form students would continue into the sixth-form. Competition was high.

Sample 3.

The final sample was also all female and consisted of seventy seven first year undergraduates studying sociology at a London college. The two male members of this sample were excluded thus giving a sample of seventy five, complete records were available for seventy one subjects. All these students

had been selected for a university place as a result of their advanced level G.C.E. performance and one would expect a reasonably homogenous I.Q. range. They were tested prior to their first year examination in introductory psychology, which was used as the performance measure. The age range of this sample was 18 - 20 (one subject of over thirty was omitted from the sample), and the I.Q. range on the Cattell test was 109-153, but with a cluster of I.Q.s in the middle range of 120-130. Female subjects were once again selected because of easily available subjects (a female college) and the experimenter's interest in a female sample.

Summary

Three hundred and twenty three subjects were used in this inquiry in four samples:

Seventy one female subjects aged ten; eighty one male subjects age ten; one hundred female subjects aged sixteen; seventy one female subjects aged eighteen plus. The I.Q. range of the entire sample was 73-160+. The range for the ten year old sample was 73-139. For the sixteen year old sample 103-160+, and for the eighteen year old sample 109-153.

CHAPTER VII

THE RESEARCH INSTRUMENTS

Chapter VII
The Research Instruments

An attempt was made to ensure that, as far as possible, the tests used in this investigation were similar to those used in American studies. Also, that tests used in one sample in the study were similar to those used in the other samples. Copies of all questionnaires used are included in the appendix.

Tests for Sample 1. (10+ children)

1. Q.1. The Sarason Test Anxiety Scale for Children T.A.S.C.

This test consisted of thirty items which were read aloud to the subjects who followed on their own questionnaires. The items all dealt with experiences of tests and examinations common to school children. They required yes-no answers to various symptoms of anxiety, likely to be felt by children under these conditions. For example, the subject was asked to agree or disagree with the item: "Do you worry when your teacher says she is going to ask you questions to find out how much you know?"

The instructions given to the children emphasized that their answers would be confidential and that there were no right or wrong answers to the questions. (For actual instructions see appendix).

The entire thirty items were included, but the wording

was occasionally modified to make the questions read more naturally for English children. The procedure of reading each question aloud was followed through this and every questionnaire for this sample.

2. Q.II. The Junior Maudsley Personality Inventory

This inventory was not published when the present research was beginning, but the author (S. Eysenck 1965) sent a copy of the questionnaire and scoring key, for which the present writer is most grateful. Only the first twenty two items were used because of time restriction, but this small number did give a sample of eight E-scale items, eight N-scale items, and six lie scale items.

The children were instructed to answer yes or no to the questions which were read aloud in the same way as the T.A.S.C.. In addition the children were instructed to work as quickly as they could, and not to think too long about each question.

3. Q.III. A Personal Inventory

This test was devised to measure level of aspiration, with respect to school and school work. It was designed by the present writer to gather information concerning the children's attitudes to school, their parents attitudes, and the child's own ambitions and academic expectations. The test consisted of twelve items, for example: "What type of school would you like to go to when you leave here?". "What would you like to be when you leave school?" (see appendix).

4. P.T.1. A Need for Achievement Test

This test was used in a modified form for all three samples. The McClelland procedure for measuring need achievement, by means of T.A.T. pictures was retained because one of the aims of this inquiry was to see if American results, with college students, could be duplicated for English school children, both male and female, McClelland's original four pictures were used as follows:-

- Picture I - The Inventors. McClelland Picture B.
- Picture II - Boy in Checked Shirt^t, Working. McClelland Picture H.
- Picture III - Boy with Vague Operation Scene in Background. McClelland Picture G. Card 8BM from the T.A.T.
- Picture IV - Father and Son. McClelland Picture A. Card 7BM from the T.A.T.

(see appendix)

The pictures were presented in a booklet form, so that each subject could have the pictures directly in front of him. The instructions emphasized that the children should try to write imaginative stories, as this was a test of "creative imagination." They were urged to write interesting and exciting stories and there were no right or wrong stories. In every story the subjects were asked to say what was happening in the picture, why it was happening, and what would happen next. The subjects were allowed five minutes for each story.

The stories were scored for presence or absence of positive need achievement, hope of success, and negative fear

of failure, by three judges independently. The booklets were separated so that all stories for picture one, were scored blind, then all for picture two, etc. The scorers could give each picture a score of -1 if there was no achievement imagery, 0 if there was implied, but not stated imagery, and +1 if achievement imagery was clearly stated. The pictures were first given a score for hope of success and then re-scored for fear of failure.

5. P.T.II. Picture Completion Test.

A second projective test was devised by the experimenter as a suitable tool for investigating children's attitudes to many aspects of school. The test was originally designed for the eleven-plus sample, as it was thought that the McClelland Need Achievement Pictures would not be suitable for use with such young children. However, it was later decided to use the McClelland test as well as the second projective measure, modified forms were adapted for the older age groups. The test is a picture completion test similar in design to the Rosenzweig P.F. test (1945) where the subject must fill in what one character in the picture is saying to the other character. The booklet for the first sample contained eleven pictures designed to evoke differing responses in the child. Pictures 1, 3, 5 and 8 were intended to evoke responses connected with the child's relationship with his parents and school. Pictures 2, 6, 10 and possibly 11 were intended to investigate

responses concerned with the child's teacher and the school. Pictures 4, 7, 9 and possibly 10 and 1 were intended to elicit responses concerning the child's relationship with other children and the school. Pictures 5 and 11 could be unconnected with school work. The children were instructed to look at the pictures in the booklet and to fill in (in the space provided) what the person was replying. They were asked to write the first thing that came into their minds. The experimenter went through the booklet with the children, to make sure they completed and responded to each picture.

This test was scored in a manner similar to the scoring technique used for the McClelland test. Three independent judges rated each picture for presence or absence of positive need achievement and negative fear of failure. All pictures were assessed separately and blindly, in the same way as P.T.1.

6. House Tree Person Test

Each child was required to draw a house, a tree and a person, between the questionnaires, to provide some alleviation of the monotony. These pictures were briefly examined for possible use in this investigation but it was decided that while the pictures might have given useful information of a clinical nature the present experimenter lacked the clinical experience to evaluate such pictures meaningfully in terms of test anxiety.

7. Background information on the subjects

Intelligence quotients and past examination performance were obtained from each subject's record card. The following data was obtained for each child:

I.Q. Test	The Moray House Picture Interest	age 7+
	The National Foundation of Educational Research. Primary Verbal I.	7+
	N.F.E.R. Primary Verbal II.	10+
	N.F.E.R. Mechanical Test I.C.	8+
English Test	The Schonell Vocabulary Test	8+ and 10+
	N.F.E.R. English Progress B.2.	8+
	N.F.E.R. English Progress C.2.	10+
Arithmetic Test	Moray House Jun. Arithmetic 2.	10+

I.Q.'s were calculated from the 8 year old and ten year old intelligence tests.

Also available for each child was his father's occupation, teacher's rating of position in class and actual position in yearly examinations.

The I.Q. record was obtained by the teachers introducing these tests into the class during normal lessons. No indication was given that the tests were any different from the usual classroom tests. The eleven-plus examination, however, was given in a testing situation. The children sat

the examination in the school hall, were given warning of the date and the atmosphere was one of great stress. From each child the performance on the Arithmetic, English and General Knowledge papers and the total score was obtained. Also, information was gathered on the following points. Whether the child had passed or failed; which school he had been selected for, and his position in the test in relation to other children in the class.

Tests for Samples II and III

1. Q.1. Questionnaire I

This questionnaire consisted of forty items. Thirty two of these items were selected from the I. G. Sarason's Autobiographical survey Questionnaire (I. G. Sarason 1962). This is a questionnaire containing items on six main traits, Test Anxiety, Need for Achievement, General Anxiety, Lack of Protection, Defensiveness and Hostility. Sixteen of the items chosen, related to test anxiety (from S. B. Sarason's original T.A.Q.) and sixteen of the items to Need for Achievement. The final eight items in this questionnaire, were taken from Alpert and Haber's (1960) positive, facilitating anxiety scale. The instructions given to the subjects emphasized that the answers would be treated confidentially. Subjects were asked to answer the questions as carefully and as honestly as they could. They were told that the questions

were concerned with problems that might worry people of their age, but there were no right or wrong answers. They answers by encircling the true, false, or question mark on the questionnaire.

2. Q.II. The Maudsley Personality Inventory

The standard M.P.I. was given to all the subjects except that the items were duplicated on plain paper with modified instructions. It was thought that the standard M.P.I. sheet was slightly intimidating.

3. Q.III A Personal Inventory

This questionnaire about aspirations and academic ambitions was similar in form to the Q. III given to the subjects in sample I, except that this sample was asked to predict their "O" level performance at sixteen and their degree class at eighteen. Also, subjects were again requested to give some idea of their career choice and that of their parent's for them.

4. P.T.I. A Need for Achievement Test

The procedure adopted for this was identical to that adopted for the eleven + children, except that it was found that older subjects took between two and three minutes to write their stories, rather than the five minutes which was required by the younger children.

5. P.T.II. Picture Completion Test

Again this test was similar to the P.T.II described for sample I. However, the pictures used were designed especially for this group. The characters depicted were older than in the pictures given to the younger group, and the situations were thought to be more in keeping with the age of the subjects. The procedure was similar, but subjects were allowed to complete the booklet in their own time.

Once again the subjects were instructed in a similar manner to the younger group. They were asked to fill in the space provided, what the people in the pictures were saying, or thinking. They were also asked to give the first answers they could think of and to work as quickly as they could.

The booklet for sample II contained ten pictures. Pictures 6, 2 and 15 were intended to obtain responses concerning the subjects feelings towards the school situation, specifically G.C.E. and further education. Picture 12, and possibly 2 were designed to test school attitudes more generally, although picture 12 could be interpreted as an examination situation. Pictures 8, 10, 6 and 14 were designed to evoke responses concerning the subjects relationships with others of the same age, both at school and at work. Pictures 5, 11 and 4 were connected with the subject's relationships with parents and school.

The booklet for sample III contained eight pictures, some identical with those used for sample II. Pictures 6, 2, 14 and 1 were omitted as these were especially aimed at the ordinary level G.C.E. subjects. Pictures 16 and 17 were introduced for this sample.

These picture completion and projective need achievement tests were scored in the same manner as those tests given to the first sample (see Appendix).

6. The Cattell I.P.A.T. Culture Free Intelligence Test

Scale two was given to sample II and scale three to sample III. Also for sample II the I.Q. rating given to each subject on entry to grammar school were available. Unfortunately, it was not possible to discover what test or tests these scores were based upon. There was no other I.Q. material available for sample III.

7. Examination Results

For sample II the subjects performance in "mock" G.C.E. examinations in English, French and Maths. was obtained. Also the subject's G.C.E. record was later obtained. It was decided to use the "mock" performance in English, French and Maths. because all subjects took these three subjects, were taught by the same teacher and took the same examination. Also the actual G.C.E. marks did not distinguish between individual marks, subjects were grouped together in grades and differences between highly intelligent subjects, for example, were lost.

A composite score was calculated as the performance measure for these subjects.

The examination performance for sample III was their performance in the first year psychology course. This result was selected firstly because of availability to the experimenter, secondly because all subjects took this particular examination and finally because this is the performance measure used by the majority of American research programmes, whose results are of interest to this particular study.

CHAPTER VIII

PROCEDURE

Chapter VIIIProcedure

The procedure adopted for this research will be clarified if each sample is dealt with independently and in the order they were tested.

A. Sample I

This sample of 10+ children was the first and largest tested. The schools were made available by the Education Department of the London Borough of Hillingdon. Three schools were tested. Bishop Winnington-Ingram C. E. Junior School, Ruislip; Coteford Junior School, Pinner; and Northwood Junior School, Northwood. The children were tested in groups during July and August 1965. The investigator was assisted by her husband, but all instructions were given by the experimenter, and testing sessions were supervised by the experimenter personally. As far as possible, a standard procedure was followed. The original testing sessions lasted for one hour and the children were seen in class groups of between thirty and forty subjects. Drawing tasks were introduced between questionnaires to relieve monotony. The experimental assistant helped children who were in difficulties, collected papers and drew the attention of the experimenter to any children who needed more time, or help in any form. The children were seated in the school hall at individual tables so that it was

not possible for them to compare answers. The first batch of tests were given in the following order:-

1. Personal Inventory Q III
2. Draw a House
3. The Sarason T.A.S.C. Q I
4. Draw a Tree
5. The Shortened Junior M.P.I. Q II
6. Draw a Man
7. The P.T. II The Picture completion test.

Six groups of children were tested in this fashion and the experimenter spent a further day in each school obtaining information from the subject's record cards.

The following year the experimenter returned to the schools in May 1966, and gave the children the McClelland Need-Achievement Test, P.T.I. This was administered in smaller groups, about fifteen in a group, so that help could be given to children in need. This testing took place after the eleven-plus examination and before the results of this examination were made known. It was felt that need achievement should be at a high pitch just prior to the results being made known.

In July, 1966, the experimenter returned to the schools and obtained the examination results of each child.

B. Sample II

In November, 1965, the second sample was tested. The subjects for this sample all attended the same school, Maidstone High School for Girls. The subjects were streamed according to ability, but were all fifth form students taking the Ordinary Level G.C.E. examination the following June. The subjects were tested originally in two large groups of about fifty students. The students came to the school hall and were seated at individual tables. The experimenter read the instructions and the experimenter and experimenter's assistant walked among the subjects and answered queries, etc.. The tests were given to the students in this order:-

1. The Personal Inventory
2. The P.T.I. The Need Achievement Test
3. The Q.I. The Test Anxiety and Need Achievement Questionnaire
4. The P.T.II. The Picture Completion Test
5. Q.II. The M.P.I.

Later the same day the subjects were tested in four smaller groups in their own classrooms. The subjects were given the I P.A.T. Culture-free intelligence test, scale 2, according to the standard procedure and instructions. Information was obtained about the subject's father's occupation, I.Q. when entering school (at the age of eleven), G.C.E. "mock" result, and actual G.C.E. results.

C. Sample III

This sample contained first-year undergraduate female students, reading sociology at a London College. During the Spring of 1966, these subjects were tested in small groups whenever it was possible to obtain a sufficient number of students to test. The number in the groups usually varied between four and ten, but one group of thirty was tested. The tests were administered in the same order as for Sample II with the exception that the Intelligence test was taken before the other tests, and in many cases some time before. Subject's results on the first year examinations were obtained.

Summary

As far as possible a standard procedure was used for all three samples. When I.Q. tests were administered the standard instructions were given and standard timing was adhered to. Questionnaires were given in the same order to each group tested, and each group was tested by the same experimenter and assistant.

Statistical Methods Used

The tables of raw data and statistical analysis are included in the appendix, in full. Individual results are discussed fully in the results section. Therefore, only the

briefest discussion of statistics will be included here. The raw data was collected from the tests, as described in the section on procedure, and presented in tabular form (see appendix). Three major statistical methods were used, a correlation analysis, a regression analysis, and a X^2 analysis of a series of contingency tables. The Formulae used are also included in the appendix.

For each sample a product-moment correlation analysis was computed from the raw data. The resultant correlation-matrix for each sample is included in full in the appendix. Individual correlations of particular interest are discussed in the appropriate chapters in the section on the results.

A regression analysis was computed of the observed performance, the I.Q. data, on the predicted performance, the examination results, so that for each subject a regression score was obtained. Subjects who performed better than would be predicted (from their I.Q.) in the examination would get a positive regression score, and those who performed worse than predicted would receive a negative regression score. The tables of regression scores are included in the appendix.

Subject's regression scores were used to demonstrate differences between varying motivational groups. This data was presented in 2 x 2 contingency tables, and X^2 analysis (with Yate's corrections) were applied to the results. When the groups were too small, the Fisher Exact Probability test (Siegal 1956) was applied.

All other computations used are of a simple arithmetic kind, (means, etc.) and are fully explained in the appropriate section in the text, either in the form of tables, or in the general results section. For a fuller treatment of the statistics used, see the section on the results and the tables in the appendix.

PART V

THE RESULTS AND DISCUSSION OF RESULTS

PART VRESULTS and DISCUSSION of RESULTS

- Chapter IX Test Anxiety Results.
- Chapter X Need Achievement Results.
- Chapter XI The Effects of Anxiety and Need Achievement
 on Those subjects at Three Levels of Ability.
- Chapter XII The Effects of Motivational Orientation
 on Performance.
- Chapter XIII Facilitating Anxiety.
- Chapter XIV Neuroticism.
- Chapter XV Projective and Questionnaire Measures of
 Need Achievement and Fear of Failure.
- Chapter XVI Sample Differences in the Data.

CHAPTER IX

TEST ANXIETY RESULTS

Chapter IXTest Anxiety ResultsResults of Hypothesis I.

Hypothesis I stated that the effects of anxiety on academic performance will vary with the intellectual level of the subject. This hypothesis was derived from Spielberger's work using the M.A.S. as a measure of anxiety. In his work it was typically found that when a sample was taken as a whole, there was no relationship between anxiety and performance, or a very small relationship showing that high anxiety is detrimental to efficient performance. If, however, the results were considered separately for the sample, broken down according to academic ability, a pattern would emerge showing that for the middle sixty per cent of ability range, high anxiety causes decrement in performance. For the lower twenty per cent of ability, there was no relationship between anxiety and performance; for the upper twenty per cent no significant relationship was found but there was evidence that high anxiety may be beneficial to high ability group (Spielberger 1962, 1966).

The results from the three groups studied in this research will be treated separately for each sample.

Sample I (subjects aged 10-11)Sample IA (male)Total Ability Range

When the total sample was considered, it was found that forty eight subjects could be included in the analysis; twenty four high anxious subjects and twenty four low anxious subjects (where low anxious scores were nought to eight, inclusive, and high anxious scores sixteen and above). The I.Q. range for these subjects was 73-135. The result of the χ^2 analysis were as follows: (full tables of raw scores and regression scores are given in the appendix).

TABLE I Sample IATotal Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	12	12	24
Low T.A.	22	2	24
	<u>34</u>	<u>14</u>	<u>48</u>

value = 8.168 degrees of freedom = 1 p < .01^{*}

It can be seen that subjects with low test anxiety perform better than predicted from their earlier intelligence scores.

^{*} One tailed tests have been used throughout for χ^2 and Fisher's exact probability test.

Middle Range Ability

When the results were analysed for the middle-range ability, the significance value of $p < .01$ was maintained. There were twenty eight subjects in this group, nine high anxious and nineteen low anxious subjects, with an I.Q. range of 101-125.

TABLE II Sample IAMedium Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	3	6	9
Low T.A.	17	2	19
	<u>20</u>	<u>8</u>	<u>28 = N</u>

value = 6.88 degrees of freedom 1. $p < .01$.

With the medium range of ability subjects, low test anxious subjects did better than predicted while there was a tendency for high test anxious subjects to do worse than predicted.

Extreme Groups

When the results of the extreme groups: the upper and lower twenty per cent range, were considered the following results were obtained.

The Upper Ability Subjects

The upper twenty per cent of this sample yielded nine subjects with high ability and extreme scores on the T.A.Q.; five high anxious, high ability subjects, and four low anxious, high ability subjects. The I.Q. range for this group was 126-135+.

TABLE III Sample 1AUpper Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	2	3	5
Low T.A.	4	0	4
	<u>6</u>	<u>3</u>	<u>9 = N</u>

not significant

Using the Fisher Exact Probability Test of Significance (Siegal 1956), it was found that there was not a significant difference between the two groups. The numbers involved were very small, but it can be seen that all low anxious, high ability students did better than predicted but high anxiety students gave a mixed result. The expected result that high anxiety would be facilitating for this group, was not found.

The Lower Ability Subjects

The lower twenty percent of this sample contained eleven subjects with extreme test anxiety scores and low ability; ten high anxiety students, one low anxious student. The I.Q. range was 73-100

TABLE IV Sample IA

	<u>Lower Ability Range</u>		
	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	7	3	10
Low T.A.	1	0	1
	<u>8</u>	<u>3</u>	<u>11 = N</u>
			<u>not significant</u>

It was not possible to test this result for significant values because only one subject had both low test anxiety and low ability. It can be seen that of the high anxious subjects seven did better than predicted, which would be difficult to explain either in terms of drive theory, or Sarason's debilitating anxiety concepts.

Sample IB Female Subjects (aged 10-11)Total Ability Range:

When the whole range of intellectual ability was considered, there were forty seven subjects who could be included in the analysis: twenty three high anxious subjects and twenty four low anxious subjects*. The I.Q. range for this group of subjects was 85-139+. The result of the X^2 analysis on the regression scores were as follows:

TABLE V Sample IB
Total Range of Ability

	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>	<u>Total</u>
High T.A.	6	18	24
Low T.A.	15	8	23
	<hr/> 21	<hr/> 26	<hr/> 47 = N

value = 6.14 degrees of freedom 1. $p < .02$

From the entire ability range for girls, aged ten to eleven, it can be seen that low test anxiety was facilitating for academic performance and high test anxiety was debilitating.

*(score above eighteen = high, below eight = low)

Medium Ability Range (Middle sixty per cent)

When the extreme upper and lower samples were excluded from the analysis, there were twenty-four subjects with medium ability and extreme scores on the T.A.Q.: thirteen high anxiety subjects and eleven low anxiety subjects, with an I.Q. range of 107-127. The χ^2 results were as follows:

TABLE VI Sample IBMedium Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	4	9	13
Low T.A.	8	3	11
	<hr/> 12	<hr/> 12	<hr/> 24 = N

value = 2.685 degrees of freedom 1. $p < .05$

The significant value was continued, but not strengthened, by removing the extreme ability groups; in fact, it was weakened. This would not be predicted from Spielberger's work (Ch. III). However, it can be seen that high test anxiety is debilitating for medium ability subjects while low test anxiety is facilitating.

Upper Ability Range

When the results of the upper twenty per cent range were considered separately, there were fourteen subjects in the sample, five high anxious and nine low anxious subjects, with an I.Q. range of 128-139+. Using the Fisher Exact Probability Test, no significant differences were found between the two groups.

TABLE VII Sample IBHigh Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	2	3	5
Low T.A.	6	3	9
	<u>8</u>	<u>6</u>	<u>14 = N</u>

This is not a significant difference, but from the contingency tables it can be seen that low anxiety may still be facilitating for this group which is contrary to the drive theory predictions of high ability groups finding high anxiety facilitating and low anxiety detrimental to efficient performance.

Lower Ability Range

When the results of the lower ability range were considered separately, there were nine subjects with low ability; I.Q. range 85-106, and extreme T.A.Q. scores. The Fisher Exact Probability Test yielded a non-significant result.

TABLE VIII Sample IBLower Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	0	6	6
Low T.A.	1	2	3
	<u>1</u>	<u>8</u>	<u>9 = N</u>

Once again the sample was really too small to establish any trends, only three low anxious, low ability subjects being included in this sample. All high anxious, low ability subjects (N = 6) performed less well than could be predicted by their I.Q. scores.

Summary of Sample 1A and 1B

The results from Sample I: children aged ten plus, both male and female, seemed to give support to Sarason's (1962 etc.) conception of high anxiety as detrimental to efficient performance for all children, regardless of ability. There

was a significant relationship between test anxiety and performance, both for boys and girls, when the entire range of ability was considered. However, when the sample was divided according to academic ability into three groups, the expected differing effects of anxiety were not seen. The medium range of ability group did maintain the significant relationship between anxiety and performance, but contrary to prediction did not strengthen it. There was not a significant difference between high and low anxiety subjects in the high ability group, so here the significant relationship was lost, as Spielberger would predict. However, there was no evidence to support a drive theory expectation that high anxiety would be facilitating for the high ability group. There were only five high ability, high anxious, girls three of whom were doing less well than was predicted. Exactly the same figures were found for the boys. On the

From the ten plus group, therefore, the evidence would appear to support Sarason's view that high test anxiety is detrimental to efficient performance, regardless of the academic ability of the subjects.

Sample II. 16+ female

The same analysis was carried out for sample II, which consisted of one hundred, sixteen year old female subjects. Taking high anxiety as scores above eleven and low anxiety as scores below seven on the T.A.Q. fifty eight of the subjects tested could be included in the analysis: thirty high anxious subjects and twenty eight low anxious subjects. The I.Q. range of this group was 99-161. Taking the regression scores of their composite scores (in French, English and Maths., see Appendix) predicted from their I.Q. the following contingency tables were drawn up and X^2 analysis applied.

TABLE IX Sample IITotal Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	9	21	30
Low T.A.	21	7	28
	<hr/> 30	<hr/> 28	<hr/> 58 = N

value = 10.011 degrees of freedom 1. $p < .01$

Including the total ability range in the analysis it can be seen that for this sample high test anxiety was detrimental to efficient performance and low test anxiety was beneficial to efficient performance.

Medium Range Ability

The results from the middle sixty per cent of ability range were then considered and it was found that thirty subjects could be considered in this group; fifteen high anxious and fifteen low anxious subjects, with an I.Q. range of 116-133. X^2 analysis of the following contingency table was as follows:

TABLE X Sample IIMedium Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	1	14	15
Low T.A.	13	2	15
	<u>14</u>	<u>16</u>	<u>30 = N</u>

value = 16.21 Degrees of freedom 1. $p < .001$

It can be seen that the significant relationship between anxiety and performance found for the entire ability range was strengthened when only the medium ability subjects were included in the analysis. This result supports the Spielberger prediction that anxiety affects the medium ability students most strongly, with high anxiety leading to performance decrement.

Upper Ability Range

The results from those students in the upper twenty per cent of ability range were considered next. Twelve subjects were found to have high ability, I.Q. range 139-161 and extreme scores on the T.A.Q., six high anxiety and six low anxiety subjects. The Fisher Exact Probability test was applied to the resultant 2 x 2 contingency table.

TABLE XI Sample IIUpper Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	4	2	6
Low T.A.	1	5	6
	<u>5</u>	<u>7</u>	<u>12 = N</u>

not significant

The result was not significant but this was probably due to the small number in the sample. If the contingency table is considered it can be seen that four out of six high anxious subjects are doing better than predicted. If the results for high anxious subjects are considered for the entire sample, it would seem that this is an unduly high number of subjects to find with high anxiety facilitating performance (out of fifteen middle ability students with high anxiety only one was found to be performing better than predicted). Also, out of the six low anxious subjects in the high ability range, only one was

performing better than predicted. This result, although not significant, is again against the pattern for medium ability students where thirteen out of fifteen were performing better than predicted. This result would seem to show a trend in the direction of drive theory interpretation that high drive is facilitating for high ability subjects, because academic work is reasonably easy for these students. Low drive is also seen as debilitating for the same reasons.

Lower Ability Range

The results for the lower twenty per cent of ability range were considered separately. There were sixteen low ability subjects with extreme scores on the T.A.Q.: nine high anxious and seven low anxious subjects. The I.Q. range for this group was 99-115. Fisher's Exact Probability Test was applied to the results.

TABLE XII Sample II

Low Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	4	5	9
Low T.A.	7	0	7
	<hr/> 11	<hr/> 5	<hr/> 16 = N

$$p < .05$$

It can be seen that in the low ability range of sample II, low test anxiety subjects were doing better than predicted,

which was a continuation of the pattern of results from the medium ability group. High anxiety and performance for the low ability group did not seem to be related. Spielberger would predict that high anxiety would have no significant effect on low ability groups, but he would also predict that low anxiety would also have no relationship with performance for this group.

Summary of Sample II

The results from this sample would seem to be supporting a drive theory interpretation of the effects of anxiety on performance, and lending tentative support to Spielberger's tri-partite analysis of the data, according to academic ability. There was a significant relationship between test anxiety and performance for the entire ability range, demonstrating that high anxiety was detrimental to efficient academic performance and low anxiety was beneficial to academic performance. This result was strengthened when the results from the middle ability range were considered separately. There was a non-significant relationship between test anxiety and ability in the upper ability range, but ^{some} evidence of a trend demonstrating that high anxiety was beneficial to a high ability group. The results from the lowest twenty per cent group continued the findings of the medium group, that low anxiety was facilitating for academic performance. This last

result was contrary to the expected result but may have been due to the fact that low ability in this sample contained subjects with reasonably high I.Q.; compared with Sample I (99-115 compared with 75-100).

From these results the evidence would seem to support the idea that anxiety affects academic performance differently for subjects of high ability, where it has ^{may be} a facilitating effect, and for other subjects where high anxiety is detrimental to efficient academic performance.

Sample III (female 18+)

The third and final sample consisted of seventy one female subjects aged between eighteen and twenty one, with an I.Q. range of 97-153 (the majority I.Q. scores falling between 120 - 130). From this sample fifty six subjects were found to have extreme scores on the T.A.Q., that is, high anxiety being scores of ten and over and low anxiety being scores of six and less, on the T.A.Q.. There were twenty eight high anxious subjects, and twenty eight low anxious subjects. The results for all fifty six subjects were considered first.

TABLE XIII Sample III

	<u>Total Ability Range</u>		
	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	Total
High T.A.	12	16	28
Low T.A.	18	10	28
	<hr/> 30	<hr/> 26	<hr/> 56 = N

value = 1.794 degrees of freedom 1. not significant

When the entire ability range was considered, there was no significant difference between the performance of high anxiety and low anxiety subjects. The result would be contrary to Sarason's expectation of a negative relationship between anxiety and performance. This sample was also the sample which was most equivalent in age to the subjects used by American researchers. Probably the non-significant result would be explained by Sarason as due to the fact that the subjects were female but opposite trends at different ability levels have cancelled each other out, to give a non-significant relationship between performance and anxiety in the sample considered as a whole.

The Medium Ability Range

When the results from the middle sixty per cent of ability subjects were considered, the following pattern emerged. There were thirty three subjects having a medium I.Q. (117-130) and giving extreme results on the TA.Q., fourteen high anxiety subjects and nineteen low anxiety subjects.

TABLE XIV Sample IIIMedium Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	3	11	14
Low T.A.	13	6	19
	<u>16</u>	<u>17</u>	<u>33 = N</u>

value = 5.37 degrees of freedom 1. $p < .02$

Therefore, it can be seen that when the two extreme ability groups were excluded a significant relationship between test anxiety and performance emerged. High anxiety was seen as detrimental, low anxiety as beneficial to academic performance. This relationship was lost when the results of the entire ability range are considered together.

Upper Ability Range

The results from the upper twenty per cent were considered next. Eleven subjects were found to have high ability, I.Q. range 131-153, and extreme scores on the T.A.Q.. These subjects were eight high test anxiety scorers and three low test anxiety scorers.

TABLE XV Sample IIIHigh Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	7	1	8
Low T.A.	1	2	3
	<u>8</u>	<u>3</u>	<u>11</u>

$p < .05$ (Fishers)

Using the Fisher test $p < .05$. That is high anxious students were performing better than predicted. That is a significant finding to support a drive theory prediction that high anxiety is facilitating for highly intelligent subjects (I.Q. 130+). There were only three students with low anxiety and high ability so no conclusions could be drawn concerning them.

Lower Ability Range

Finally, the results for the lowest twenty per cent of ability subjects were considered. There were twelve subjects with I.Q.'s between 97-116 with extreme T.A.Q. scores, six high and six low anxiety subjects. The Fishers' Exact Probability Test was applied and a non-significant result was obtained.

TABLE XVI Sample IIILow Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High T.A.	2	4	6
Low T.A.	4	2	6
	<u>6</u>	<u>6</u>	<u>12</u>

not significant

There was no significant difference in this sample of low ability subjects between the performance of high anxious and low anxious subjects.

Summary of Sample III

The relationship between test anxiety and performance for sample III directly confirmed the pattern of results predicted by Spielberger and explained in terms of drive theory. When the whole ability range was considered, there was no significant difference between the performances of high and low anxious subjects. When the middle sixty per cent of ability subjects were considered, however, there was a significant difference between the performance of high and low anxiety subjects, high anxiety subjects performed less well than would be predicted from their I.Q. level. However, the extreme groups displayed a different pattern of results. Low ability subjects demonstrated no difference between the two extreme

anxiety groups, whereas high ability groups displayed a significant difference between high and low anxiety subjects. In the high ability group, high anxiety was seen as facilitating academic performance. High drive increased the efficiency of these subjects, who presumably find academic work comparatively "easy".

Discussion of the Results of Hypothesis I.

Hypothesis I constituted the principal aim of this inquiry, to investigate the interaction of intelligence, test anxiety and academic performance. It was suggested that the intellectual capacity of subjects may affect the way in which anxiety influences their performance. This idea was derived both from practical and theoretical premises. Theoretically, it was argued, that the Spence drive theory, the activation theories and Atkinson's risk-taking model, all include the notion of level of difficulty or complexity of the performance task to be discussed. Inherent in these approaches, is the conception of drive level having a differential effect on performance, depending on the complexity of the task. Therefore, academic ability should be considered when discussing the effects of anxiety on performance.

This present study incorporated three samples, differing in age level and range of ability and the results of these investigations were quoted above and in more detail in the Appendix.

It can be seen that the results for each sample were not quite the same, although certain similarities could be traced throughout. The sample which was most consistent with the predicted pattern of results was sample III. This was the University group and it is most interesting to note that it was this group which gave results most similar to American studies, which, of course, were conducted also on college students. The main difference between sample III and American college groups was that the I.Q. range of the group was more homogeneous and the subjects were female. The importance of the sex difference will be discussed later.

When all the subjects in sample III were included, it could be seen that there was no significant difference between high anxious and low anxious subjects. This finding was contrary to what one would expect from Sarason's results using the T.A.Q. (Sarason 1962), but it was consistent with the Spielberger (1966) results using the M.A.S., and it confirmed the difficulty expressed by I. G. Sarason (1962) of consistency in the expected relationship between test anxiety and performance. It also confirmed the English results of Griffith (1964) and Sarnoff et al. (1962), who found no significant differences between a high anxious and a low anxious group of eleven year old English children.

When the sample was divided into ability groups in the Spielberger pattern, the top twenty per cent, the middle sixty

per cent and the bottom twenty per cent, a relationship between T.A.Q. scores and performance, masked in the total sample, emerged. There was a significant difference ($p < .02$) between the high anxious and low anxious subjects in the middle range, with the high anxious subjects doing worse than predicted and the low anxious subjects doing better than predicted. The lower ability range yielded no significant differences between high and low anxious subjects, as predicted. The upper ability range, however, gave an interesting result. It was found that there was a significant difference ($p < .05$) between high and low anxious groups, but in the opposite direction than that predicted by Sarason. High anxiety subjects were doing better than predicted in this sample. This finding would appear to lend support to a drive theory notion of high drive being facilitating for high ability subjects. That is that high ability subjects, finding academic work comparatively easy to master, need a high level of drive to effect efficient performance. This finding also supports the Spielberger results which demonstrated a non-significant trend in this direction. It would be interesting to follow this up with a larger sample, but the difficulty has always been to obtain sufficient subjects of high ability.

The results from the other two samples, while not giving such a clear cut picture as sample III, gave some interesting results. The results from sample II, sixteen year old female

subjects, tended to support the already discussed pattern of results seen in sample III. The main difference between the two sets of results was that for sample II there was an overall significant difference between the high anxious and low anxious groups. This would lend support to the Sarason results and somewhat nullify the need to use the tri-partite ability analysis which was so fruitful for sample III. However, the ability grouping was undertaken and did support the need for such an analysis. The significant difference between the high and low anxious subjects was strengthened in the middle ability group; as would be predicted. The upper ability range results would tend to lend support to the results of sample III, for although the trend did not reach statistical significance, there would seem to be ^{some} evidence to suggest that high anxiety was facilitating for high ability subjects. (The significant difference for the lower ability group will be discussed later).

The results from sample I were somewhat different from the older samples and would fit in more readily with a Sarason explanation rather than a Spielberger drive theory interpretation. Little support could be found for differentiation according to ability, except that the two extreme samples showed no significant differences due to anxiety level, a result which was contrary to the results of the entire ability range results. It would seem, however, that for both boys and girls high anxiety at eleven years of age has a detrimental effect on

performance regardless of academic ability.

From these results, for older aged groups at least, there was quite strong evidence to support the view that anxiety, as measured by T.A.Q., affects academic performance differentially according to academic ability. Also, the results tended to support a drive theory interpretation of how anxiety affects performance. This finding did not hold for the eleven plus group.

CHAPTER X

NEED ACHIEVEMENT RESULTS

Chapter XNeed Achievement ResultsResults of Hypothesis II

Hypothesis II stated that the effects of need achievement on academic performance would vary with the ability level of the subjects. It was hoped to demonstrate that need achievement as a measure of drive level, would have a similar relationship with performance and ability to that which was demonstrated for test anxiety. Therefore, it was predicted that for the entire ability range there would be no significant differences between high and low need achievement groups. When the data for high, medium and low ability groups was considered separately, a differing pattern would emerge. For the middle sixty per cent of ability groups, it was predicted that high need achievement, measuring as it should high approach motive, would be facilitating. For the lowest ability subjects, level of need achievement would have no effect on performance; for the high ability group high approach motive and high drive would both predict a facilitatory function of need achievement on academic performance.

As previously explained, all three groups were given a projective T.A.T. n.Ach. test and the two older groups were also given a questionnaire on need achievement. On preliminary investigation, it was found that the questionnaire measure did

not correlate significantly with the projective measure, and so for the purpose of this part of the analysis, only the results from the T.A.T. projective measure of n.Ach. were used. (Another projective measure of n.Ach. was used, P.T.II, which was found to correlate highly with the T.A.T. projective test - this is discussed later in this section).

As with the Test Anxiety results, the data from each sample will be considered separately:

Sample I

Sample IA Boys age 10-11

Total Ability Range:

Firstly, the data for the entire range of ability for male subjects (I.Q. = 73-135) was considered. It was found that there were fifty four subjects whose data could be included in the analysis: twenty two high need achievement scorers and thirty two low need achievement scorers. (Where high n.Ach. = scores of four or more , and low n.Ach. = scores of nought and one).

TABLE XVII Sample IA

Total Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	Total
High n.Ach.	15	7	22
Low n.Ach.	19	13	32
	<u>34</u>	<u>20</u>	<u>54 = N</u>
value = 0.1542 degrees of freedom 1.			<u>not significant</u>

There was no significant difference between the high need achievement group and the low need achievement group on academic performance for this sample.

Medium Ability Range

There were thirty-one boys of medium ability (I.Q. = 102-125), with extreme need achievement scores, twelve high need achievement scorers and nineteen low scorers.

TABLE XVIII Sample IA

Medium Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	9	3	12
Low n.Ach.	12	7	19
	<u>21</u>	<u>10</u>	<u>31 = N</u>

value = 0.0856 degrees of freedom 1. not significant

There was no significant difference between the two groups in this sample. Thus, the prediction that high need achievement would facilitate academic performance for subjects of medium ability, was not confirmed for this sample.

Upper Ability Range

In this sample there were eleven subjects with high ability (I.Q. = 126-135) and extreme need achievement scores, six high and five low scorers.

TABLE XIX Sample IAUpper Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	4	2	6
Low n.Ach.	2	3	5
	<u>6</u>	<u>5</u>	<u>11 = N</u>

not significant

The Fisher Exact Probability Test was applied but there was no significant difference between the two groups. Four out of six high achieving subjects can be seen to be doing better than predicted but this trend does not reach statistical significance. Therefore, the prediction that high approach motive, need achievement, would be particularly facilitating for high ability subjects is not confirmed in this small sample.

Low Ability Range

Nine subjects were found to have extreme need achievement scores and low ability (I.Q. = 73-100). Two of these were high scorers and seven low scorers on the n.Ach. test. (It is difficult to find subjects with low ability but high need achievement).

TABLE XX Sample IALow Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	1	1	2
Low n.Ach.	4	3	7
	<u>5</u>	<u>4</u>	<u>9 = N</u>

not significant

The Fisher test revealed no significant difference between the two groups. This confirms the prediction explained earlier.

Sample IB (female subjects 10-11)Total Ability Range

The same analysis was carried out for female subjects of this sample. There were found to be forty seven female subjects with extreme achievement scores, twenty six high achieving subjects and twenty one low achieving subjects, (where high n.Ach. = scores of four + and low n.Ach. = scores of naught and one). * See 216a

TABLE XXII Sample IBMedium
Total Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	14	5	19
Low n.Ach.	5	4	9
	<u>19</u>	<u>9</u>	<u>28 = N</u>

value = .2767 degrees of freedom 1. not significant

TABLE XXI Sample IB

	<u>Total Ability Range</u>		
	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	17	9	26
Low n.Ach.	9	12	21
	26	21	47 = N

value = 1.56 degrees of freedom 1. not significant

The χ^2 analysis revealed no significant difference between the two groups. That is, there was no evidence that high achievement scorers did better than low achievement scorers when the whole range of ability was considered.

Medium Ability Subjects

When the data for the medium sixty percent of ability subjects was analysed separately, the following results were found. There were twenty-eight female subjects in this sample with medium ability (I.Q. = 107 - 127) and high or low scores on the n.Ach. test. Nineteen of these were high scorers and nine were low scorers for need achievement.

The X^2 analysis revealed no significant difference between the two groups. However, if the separate entries are considered it can be seen that fourteen of the nineteen high achievers were performing better than predicted. There would seem to be a trend in the expected direction: that high need achievement is facilitating for medium ability subjects, but this did not reach statistical significance.

Upper Ability Subjects

The results for the two extreme ability groups were next examined. Firstly, the high ability group drawn from the upper twenty per cent of the distribution, with an I.Q. range of 128-139+ was examined. There were nine subjects with high ability and extreme need achievement scores; five high and four low scorers.

TABLE XXIII Sample IB

Upper Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	5	0	5
Low n.Ach.	3	1	4
	<u>8</u>	<u>1</u>	<u>9 = N</u>

not significant

The Fisher test revealed no significant difference between the two groups.

Lower Ability Range

There were only eight subjects in this group who were both extreme scorers on the n.Ach. test and lower ability subjects (I.Q. range 85-106). Of these eight subjects only one had a high need achievement score. It has already been mentioned that most low ability subjects also have low achievement scores. It was not possible to test these two groups for significant differences because of the lack of high need achievement subjects, but the scores were distributed as follows:

TABLE XXIV Sample IB

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	0	1	1
Low n.Ach.	2	5	7
	<u>2</u>	<u>6</u>	<u>8 = N</u>

not significant

No particular trend can be determined unless one might accept that low need achievement subjects do worse than predicted, because five out of seven such subjects were under-achieving.

Summary of Results of Hypothesis II. Samples IA and IB

The results from sample I, both male and female groups, do not lend support to the hypothesis that the effects of achievement need vary with the academic ability of the subjects involved. The expected relationship between high need achievement and good academic performance was not found for either of the two total range of ability groups, as would be expected by Atkinson (1966), or for the Medium Ability groups as would be expected by the present writer. When the extreme upper and lower ability students were considered separately there was again no statistically significant evidence to support the assumption that high need achievement is particularly facilitating for high ability groups. There was evidence of a trend in this direction with all five high ability, high need achievement girls doing better than predicted and four out of six high ability, high need achievement boys doing better than predicted, but there were insufficient numbers for this trend to reach statistical significance. The position for the lower ability groups was difficult to assess because of the lack of low ability high need achievement subjects. It is questionable whether a more extensive sample of these subjects would reveal many high need achievement, low ability subjects, because it has been demonstrated by several previous studies (Atkinson 1966) that low ability subjects tend to have low need achievement scores.

The hypothesis that achievement differences will have differential effects on subjects of differing ability was not confirmed by the statistical analysis of this sample.

Hypothesis II

Sample II

The data from sample II (females aged 16+) was considered next. When no differentiation according to academic ability was made, it was found that sixty four subjects had scores of high need achievement (scores 6-8) or low need achievement (scores 0-2). The I.Q. range for the entire sample was 99-161.

TABLE XXV Sample II

Entire Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	27	5	32
Low n.Ach.	6	26	32
	<u>32</u>	<u>31</u>	<u>64 = N</u>

value = 25.024 degrees of freedom 1. p < .001

The X² analysis revealed a highly significant difference between the two groups: high achieving subjects were doing better than predicted, low achieving subjects were doing worse than predicted. This finding provided strong support for Atkinson's (1966) prediction but was a much stronger relationship than had been expected for the total range of ability by the present writer.

Medium Ability subjects

The results from the medium sixty per cent of subjects were analysed. There were thirty-six subjects with extreme n.Ach. scores and medium ability (I.Q. range 116-133). There were seventeen high and nineteen low scorers on the need achievement measure. The X^2 test was applied to the data.

TABLE XXVI Sample IIMedium Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	16	1	17
Low n.Ach.	2	17	19
	<u>18</u>	<u>18</u>	<u>36 = N</u>

value 21.845 degrees of freedom 1. $p < .001$

This table demonstrates most clearly the effects of high and low need achievement. High need achievement subjects are performing better than predicted, low need achievement subjects worse than predicted. The significance value of $p < .001$ is maintained from the entire sample and the trend is, of course, seen clearly in the contingency tables.

Upper Ability Subjects

There were eleven subjects who fell within the top twenty per cent ability range of 139-161 and also gave extreme n.Ach. scores. Seven of these subjects were high scorers, four were low scorers. The Fisher test was applied to the results.

TABLE XXVII Sample II

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	4	3	7
Low n.Ach.	2	2	4
	<hr style="width: 50%; margin: 0 auto;"/> 6	<hr style="width: 50%; margin: 0 auto;"/> 5	<hr style="width: 50%; margin: 0 auto;"/> 11 = N
		<u>not significant</u>	

No significant difference was found between the two groups. The expected strong relationship between high ability and high need achievement was not found, and this is especially notable in view of the strong relationship between these two factors found for the entire range and medium ability groups.

Lower Ability Group

There were sixteen subjects with low ability (I.Q. 99-115) and extreme achievement scores, eight high and eight low scorers. It is notable that eight high need achievement, low ability subjects have been found in this sample; but it must be remembered that low ability in this sample was relatively high for the general population. Also, all the subjects were attending a grammar school where high achievement aims were encouraged in the subjects.

TABLE XXVIII Sample IILow Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	7	1	8
Low n.Ach.	<u>2</u>	<u>6</u>	<u>8</u>
	9	7	16 = N

$p < .025$ (Fisher Test)

The Fisher Exact Probability Test revealed a significant difference between the two groups. Subjects with high need achievement scores were doing better than predicted, subjects with low scores were performing worse than predicted. Thus, the lower ability groups were seen to continue the overall result found in the entire sample and the medium ability subjects. This was not expected but is probably explicable in terms of the fact that low ability is relatively high in this sample, and there is not a real division in ability and expectations of the lower group and the medium group (this will be discussed later).

Summary of Results Sample II

The relationship between need achievement and academic performance was entirely different for the second sample than for the first. As the two parts of sample I gave similar patterns of results, it is probable that this is an age difference, rather than a sex difference (to be discussed later).

It can clearly be seen that, taking the sample as a whole, high need achievement is facilitating for academic performance and low need achievement debilitating. This result is present most strongly in the medium ability group, and is also seen in the lower ability group. The significant relationship seen in the low ability group was not expected. The group which gave results contrary to the general trend was the high ability group where no real pattern emerged and no significant difference between the two groups was revealed. The expected high relationship between high ability and high achievement need was not found.

Achievement motivation was demonstrated to have differing effects on subjects of different ability, but not in the predicted manner.

Sample III

The results from the third sample, female subjects aged 18-21, were considered next. Forty eight subjects were found with high or low need achievement scores; twenty six high scorers (scores above four) and twenty two low scores (scores of one and nought). The I.Q. range for this sample was 97-153 but the majority of scorers fell between 120-130.

TABLE XXIX Sample IIITotal Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	19	7	26
Low n.Ach.	9	13	22
	<u>28</u>	<u>20</u>	<u>48 = N</u>

value = 3.84 degrees of freedom 1. $p < .05$

The X^2 analysis revealed a significant difference between the two groups in the expected direction with high achievement motivation facilitating academic performance and low achievement motivation having a detrimental effect on performance.

Medium Ability Subjects

The data for medium ability subjects, those who fell in the middle sixty per cent of the I.Q. distribution (I.Q. 117-130), was considered separately. Twenty six subjects were found, fourteen high scorers and twelve low scorers.

TABLE XXX Sample IIIMedium Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	10	4	14
Low n.Ach.	6	6	12
	<u>16</u>	<u>10</u>	<u>26</u>

value = 0.2892 degrees of freedom 1. not significant

The X^2 analysis did not demonstrate any significant difference between the two groups. The significant result obtained from the entire ability range, far from being stronger as predicted, was lost. This result can be seen to be greatly influenced by the behaviour of the low scorers on the need achievement test, who produced as many over-achievers as under-achievers. This was against the predicted relationship. However, it can be seen that for those subjects scoring high on need achievement, ten out of fifteen are doing better than predicted.

High Ability Subjects

There were eleven high ability subjects who fell within the top twenty per cent of ability range (I.Q. 131-153), and produced extreme scores on the need achievement test. However, only one of these subjects produced a low need achievement score. For students of such high ability a low need achievement score would be somewhat unusual. It was not possible to apply statistical tests to the result because of this lack of low achievement need, high ability subjects.

TABLE XXXI Sample IIIHigh Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	8	2	10
Low n.Ach.	0	1	1
	<u>8</u>	<u>3</u>	<u>11 = N</u>

Although no statistical test could be applied, the trend of the few results obtained can be seen to be in the expected direction. Eight out of the ten high n.Ach. subjects did better than predicted. The only low n.Ach. subject did worse than predicted.

Low Ability Subjects

Nine subjects were found to have low ability ratings (I.Q. 97-116) and extreme need achievement scores, only two subjects, however, had high need achievement scores. The Fisher Exact Probability Test was applied to the results but no significant differences were found between the two groups.

TABLE XXXII Sample IIILow Ability Range

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
High n.Ach.	1	1	2
Low n.Ach.	3	6	9
	<u>4</u>	<u>7</u>	<u>11 = N</u>

not significant

Summary of Results Sample III

The results from sample III would seem to lend some support to the hypothesis. The relationship between n.achievement measures and performance for the entire sample was statistically significant in the expected direction, but this relationship was due, almost entirely, to the results for the part of the sample of above average ability. For the extreme groups the interpretation is difficult because of the smallness of the sample and the difficulty of finding high n.Ach. scorers of low ability and low n.Ach. scorers of high ability. Some support was lent to the trend that high n.Ach. scores are facilitating in the upper ability groups.

Discussion of the Results of Hypothesis II

Hypothesis II was concerned with the interaction of intelligence with need achievement and academic performance. As has previously been discussed, it was argued that the effects of test anxiety might vary with the intellectual ability of the subjects. This prediction was derived from theoretical expectations and from the results of Spielberger (1966) and

Erikson (1964). However, if one considered the drive theory conception of non-specificity of drive, it would follow that need achievement should be differentially affected by academic ability, as well as test anxiety. So it was decided to see if this was so. There were no empirical studies to justify this hypothesis, only theoretical predictions. The empirical studies with need achievement, such as Atkinson's (1966), have not used the device of differential analysis for differing intellectual ability; but have demonstrated that high need achievement is facilitating for academic performance. The results from hypothesis II quoted above, and in the Appendix, will be discussed here.

The results from sample I will be discussed first because it was these results which were different from the other samples. It can be seen that no support was given to the hypothesis and that no relationship between need achievement and performance was found at this age. The expected relationship between high need achievement and high performance was not found either for the male or female group. In fact, in the whole analysis there were no significant differences between high need achievement subjects and low need achievement subjects. This finding was contrary to the finding of Bruckman (1964, 1965) and Robinson (1961) with English children, where it was typically found that high need achievement scorers, both male and female, performed better than low need

achievement subjects. However, it would lend support to the contention of McClelland and Atkinson, that it is not really possible to measure need achievement in children as young as these subjects. But it is difficult to understand why scores are not related to academic performance in these subjects when it is considered that the children in this sample were the most interested in the task and took to imaginative story writing very well. Their stories were the easiest to mark for need achievement and both tests of need achievement (P.T.I and P.T.II) correlated highly with each other (.54). It may be that fantasy motivation in young children is not sufficiently mature to be reality bound; that is, that young children's fantasy is not related to real life motivation and bears little relevance to motivation in their everyday life. This, however, is speculation, the reason that there was no relationship between need achievement and academic performance for this sample is not known. No questionnaire measure of need achievement was given to these children, so it was not possible to examine their responses in more detail.

The results from samples II and III were more explicable in terms of Atkinson's theoretical model. It can be seen that for both samples need achievement results were significantly related to academic performance when the entire range of ability was included in the analysis (16+ $p < .001$, 18+ $p < .05$). The relationship was much stronger for the sixteen plus age

group. For both groups it can be seen that subjects with high need achievement scores performed better than predicted, and subjects with low need achievement scores performed worse than predicted. There seems little evidence to support a tri-partite analysis of results similar to the analysis which proved so fruitful with the anxiety results. When the data was analysed separately for differing ability groups, no real difference was found that could be said to depend on ability grouping. When the middle range of ability was analysed, the same pattern of results was found as for the entire range for the sixteen plus group. This also followed for the low ability group. There was no evidence to support the idea that high need achievement would be particularly facilitating for high ability subjects. The middle range of eighteen plus subjects showed no significant difference between the two groups. This is somewhat difficult to explain but partly it must be caused by the extreme results which showed that high achievement was facilitating for high ability subjects. However, most high ability subjects had high need achievement scores, and most low ability subjects had low need achievement.

There is little evidence to support the use of the n.Ach. scores of the traditional McClelland type to predict academic performance with eleven year old subjects. When older age groups were considered n.Ach. would seem to be related to academic performance with high scorers performing better on

academic performance tasks. However, the relationship between need achievement and performance would not seem to be particularly influenced by the academic ability of the subjects, unless it can be said that for the eighteen plus group high ability subjects seem to find high need achievement particularly facilitating. This trend is not sufficient to confirm the hypothesis.

CHAPTER XI

THE EFFECTS OF ANXIETY AND NEED ACHIEVEMENT
ON THOSE SUBJECTS AT THREE LEVELS OF ABILITY

Chapter XIThe Effects of Anxiety and Need Achievement on
Those Subjects at Three Levels of Ability1. Results of Hypotheses IV and VII

Hypotheses IV and VII are essentially the same and state that the performance of highly intelligent subjects in all samples will demonstrate that high drive facilitates academic performance. That is, it was predicted that both high negative drive, test anxiety, and high positive drive, need achievement, would be ~~seen as~~ facilitating ^{for} ~~by~~ intelligent subjects. If these hypotheses are confirmed it will provide support for the concept of non-specificity of drive, inherent in Spencian Drive theory, that is the strength and not the direction of the drive that is important.

It can be seen from the previous sections, the results of hypotheses I and II, that the results of the samples of ten and eleven year olds do not confirm either of the above hypotheses. When test anxiety is considered there is no evidence, either for boys or for girls to support the idea that high test anxiety is facilitating for highly intelligent children (see tables III and VII). When need achievement is taken as the measure of drive there is some support for the view that high positive drive is facilitating for the highly intelligent, but this does not reach statistical significance (see tables XIX and XXIII). It will be noted, however, that all high need

achievement, high ability girls are performing better than predicted. The results from the eleven-plus sample would tend to support a directional view of motivation. That it is the direction of the drive which is important, high need achievement may be facilitating for highly intelligent subjects, but high test anxiety, which is a negative drive is ~~seen as~~ debilitating.

The results from the two older samples, however, give some support to a drive theory interpretation of the effects of motivational factors on the academic performance of the highly intelligent. When test anxiety is considered it can be seen that for both samples II and III there is evidence that high test anxiety (supposedly a negative drive (Sarason)) is ~~seen as~~ facilitating for gifted subjects (see tables XI and XV)). The result for sample III reaches statistical significance $p < .05$ even though the sample is small, thus, demonstrating that for the upper ability range subject, high test anxiety is facilitating while low test anxiety is debilitating.

The results for need achievement are not entirely in keeping with the expected result. It was assumed that high need achievement would be particularly facilitating for the upper ability groups. In sample II (table XXVII) it can be seen that there is no evidence to support the idea that high need achievement is facilitating for the upper ability subject.

(the sample is very small). The results from sample III (table XXXI) are more in keeping with the hypothesis, because although no significant result is obtained, due to the lack of high ability, low need achievement subjects; there is evidence to suggest that high need achievement is facilitating for highly intelligent subjects (eight out of ten doing better than predicted).

Hypotheses IV and VII, therefore, would seem to be generally supported by the results from the two older samples, but not in the eleven-plus group. Test anxiety scores of highly intelligent older subjects are in keeping with the predicted direction of results. For need achievement, only the results from sample III can be said to confirm the hypothesis.

2. Results of Hypothesis VIII

Hypothesis VIII states that for the low ability group neither direction nor strength of drive will play an important part in determining the academic performance: and that for low ability subjects their low ability itself will determine academic performance and that motivational factors will have little or no effect. There is some evidence to support this hypothesis because in all three samples both for need achievement, and test anxiety there are only two cases where a significant difference due to motivational factors can be found for the low ability group. These two cases are both

in the sixteen plus group, none of whom had very low ability (the lowest I.Q.'s being 95-100). For them it was found that low test anxiety, low ability subjects, do better than predicted and high need achievement subjects do better than predicted. Thus, it would seem that in the sixteen year old sample the so called low ability group merely show a continuation of the pattern of results, demonstrated by the medium ability group. More evidence is needed on this hypothesis, perhaps from a larger group with a greater spread of I.Q. at a more mature age, probably eighteen.

3. Results for Hypothesis IX

Hypothesis IX states that for the middle range of ability subjects high positive drive will increase performance efficiency, high negative drive will decrease efficiency: that is the direction as well as the intensity of the drive will be important. In almost all cases these predictions were confirmed. When test anxiety was considered, it could be seen that all groups demonstrated the validity of the hypothesis for test anxiety. Samples IA and IB showed significant values of $p < .01$ and $p < .05$ respectively, that high test anxiety was detrimental to performance and low test anxiety was facilitating for performance (Tables II and VI). The sample II, sixteen plus subjects, showed a significant value of $p < .001$ in the expected direction (see Table X) and the final sample III showed a significant value of $p < .02$ in the expected direction

(see Table XIV). Thus, for test anxiety it can be seen that for the middle range of ability, negative avoidance motivation, test anxiety has a negative relationship with academic performance. The effect of Test Anxiety on performance was in the predicted negative direction.

The results for need achievement lend some support for the other prediction that high positive motivation, need achievement will be positively related to performance. This support only reached statistical significance, however, in one case, sample II, where $p < .001$ that high n.Ach. was facilitating for academic performance (Table XXVI). The other results were all non-significant but this would appear to be due to the low n.Ach. subjects who performed better or worse than predicted equally often. When the results from high n.Ach. subjects were considered there would seem to be some support for the hypothesis. The eleven year old samples showed that nine out of twelve boys and fourteen out of nineteen girls, with medium ability and high n.Ach. did better than predicted (see Tables XVIII and XXII). Similarly, for sample III it can be seen that ten out of fourteen high n.Ach. scores were performing better than predicted (see Table XXX).

Therefore, although the results are much clearer for the test anxiety scores, it would seem to be the case that when the medium ability subjects were considered, direction as well as intensity of drive was important in determining academic performance.

Discussion of Hypotheses IV, VII, VIII and IX

All the above hypotheses deal with some aspect of the tri-partite analysis of results according to academic ability, which was one of the main aspects of this research. Each individual result has already been discussed quite fully, so it really only remains to be said, that there is ample evidence to suggest that the tri-partite analysis is a fruitful method of analysing the effects of motivational factors on performance. The fruitfulness of the tri-partite analysis is particularly noticeable when the test anxiety results of sample III are considered. Without this breaking down of the data into three ability groups, the relationship existing between test anxiety and performance would not have emerged. Only when the data for each group was considered separately could the relationship be seen at all. Also, it appears to have been established that the effects of motivational factors, particularly test anxiety vary with the intellectual ability of the subjects. The eleven year old results do not really fit into the pattern of the other two samples, for a monotonic relationship between test anxiety and performance seemed to hold true, i.e., high test anxiety lead to performance decrement. The relationship between need achievement and performance for this group was non-significant.

The results from the second set of hypotheses, dealing with academic sub-groups would seem to support the practice

of dealing with the data of ability groups separately. The tri-partite system of analysing this kind of data was supported.

CHAPTER XII

THE EFFECTS OF MOTIVATIONAL ORIENTATION ON
PERFORMANCE

Chapter XIIThe Effects of Motivational Orientation
on Performance1. Result of Hypothesis X

Hypothesis X states that the achievement-orientated subject will perform better than predicted and the failure-orientated subject will perform worse than predicted.

This hypothesis deals with the classic Atkinson motivational types, the two groups of subjects used in the majority of experiments conducted by Atkinson and his co-workers since 1958 (Atkinson 1966). These two "types" are the achievement-orientated, with high need achievement and low test anxiety scores; and the failure-orientated type, who have high test anxiety, and low need achievement scores. The achievement-orientated subject has high approach motivation and low avoidance motivation. The failure-orientated subject has high avoidance motivation and low approach motivation.

These two distinct 'types' of scorers were separated in each sample and their scores considered.

Sample IA and IB

The results from these two samples were considered together, as there had been no evidence to suggest that motivational factors and performance had been affected by sex differences in the previous analyses. It was found that there

were sixteen subjects with low scores on the T.A.Q. (below eight) and high n.Ach. test scores (above four), leading to a typing of achievement-orientated subjects. The results from these subjects are expressed in the following table.

Table XXXIII

Sample I. The Achievement-Orientated Subjects
(high n.Ach., low T.A.)

<u>Subject's</u> <u>No.</u>	<u>Regression Scores</u>	
	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>
	+	-
5	.87	
13	6.93	
31	2.94	
99	4.75	
103	6.87	
108	2.70	
109		1.54
114	5.29	
117	1.17	
122	4.06	
127	4.17	
129	3.94	
133	2.00	
136	3.52	
144		1.78
<hr/>		
N = 16	= 14 over- achievers	2 under- achievers

Thus, it can be seen that fourteen out of sixteen achievement-orientated subjects are doing better than predicted, while only two are performing worse than predicted.

When the results for sample I, failure-orientated subjects, were considered, the following pattern emerged. There were seventeen failure-orientated subjects in this sample, with high test anxiety scores and low need achievement scores. The data from these subjects will be expressed in the following table.

Table XXXIV

Sample I. The Failure Orientated Subjects
(high T.A., low n.Ach.)

Regression Scores

<u>Subject's</u> <u>No.</u>	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>
	+	-
2	2.99	
26		4.17
30		5.83
43		1.67
55	7.25	
60	.20	
62		4.09
72	1.26	
81	.16	
90	.28	
97		5.78
100		2.77
148		6.14
149		.03
156		1.62
158	2.90	
166	12.84	
<hr/>		
N = 17	= 8 over- achievers	9 under- achievers

From the above table it can be seen that there was no support for the hypothesis that failure-orientated subjects do worse than predicted.

Sample II

The same investigation was carried out for the sixteen-plus sample. It was found that sample II contained fifteen achievement-orientated subjects and sixteen failure-orientated subjects, when only extreme high or low scorers were considered. The results from these two sub-groups will be expressed in the following tables.

Table XXXVSample II. The Achievement-Orientated Subjects

<u>Subject's</u> <u>No.</u>	<u>Regression Scores</u>	
	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>
	+	-
7	4.05	
29	0.44	
45	7.28	
49	4.51	
52		2.66
53	12.28	
62		0.34
66	7.20	
67	1.28	
68	6.20	
69	4.28	
75	8.75	
79	9.20	
88	9.20	
89	5.44	
<hr/> N = 15	<hr/> 13 over- achievers	<hr/> 2 under- achievers

Table XXXVISample II. The Failure Orientated Subjects

<u>Subject's</u> <u>No.</u>	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>
	+	-
4		9.72
6		9.18
15		3.72
18		1.34
19		12.95
20		11.49
32		2.95
42		2.72
47		5.72
55		5.92
57	0.66	
83		14.80
84		6.95
101		7.72
104		4.72
106		2.64
<hr/>		
N = 16	1 over- achiever	15 under- achievers

It can be seen that the regression scores for the sixteen-plus group support the hypothesis most strongly. The achievement-orientated subjects are doing better than predicted; the failure-orientated worse than predicted.

Sample III

Similarly, the data for sample III was investigated and it was found that there were eleven achievement-orientated subjects with high n.Ach. scores and low test anxiety scores. There were eight failure-orientated subjects with high test

anxiety scores and low n.Ach. scores. These results are expressed in the following tables.

Table XXXVII

Sample III. The Achievement-Orientated Subjects

<u>Subject's No.</u>	<u>Regression Scores</u>	
	<u>Better than Predicted</u> +	<u>Worse than Predicted</u> -
7	7.41	
8	5.96	
12		10.11
22	7.83	
26		8.15
29	0.96	
33	2.54	
51	6.86	
55		1.91
56	15.41	
60	13.28	
<hr/> N = 11	<hr/> 8 over- achievers	<hr/> 3 under- achievers

Table XXXVIII

Sample III. The Failure-Orientated Subjects

<u>Subject's No.</u>	<u>Regression Scores</u>	
	<u>Better than Predicted</u> +	<u>Worse than Predicted</u> -
31		19.59
37		1.91
38		3.46
39		9.78
44		4.49
58		22.04
62		23.11
63		2.49
<hr/> N = 8	<hr/> 0 over- achievers	<hr/> 8 under- achievers

From the above tables it can be seen that the data from sample III confirms the hypothesis.

X² Analysis of the Results of Hypothesis X

When Fisher Exact Probability Test was applied to the results of each sample, the following significant differences were found.

Table IXL

X² Analysis of Achievement-Orientations

Sample I:

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
Achievement- Orientated	14	2	16
Failure- Orientated	8	9	17

not significant

Sample II:

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
Achievement- Orientated	13	2	15
Failure- Orientated	1	15	16

p < .005

Sample III:

	<u>Better than Predicted</u>	<u>Worse than Predicted</u>	<u>Total</u>
Achievement- Orientated	8	3	11
Failure- Orientated	0	8	8

p < .025

Discussion of the Results of Hypothesis X

It would seem that all three samples present evidence to support the hypothesis that the achievement-orientated subjects do better than predicted in academic performance situations. The evidence from samples II and III would support the hypothesis that the failure-orientated subjects do worse than predicted. The data from sample I's failure-orientated subjects is the only set of results which does not strongly support the hypothesis. In samples II and III the differences between the two sub-groups reach statistical significance of $p < .005$ and $p < .025$ respectively.

Therefore, the evidence would support the hypothesis, derived from Atkinson's risk-taking model of achievement behaviour, that the achievement-orientated subject ($M_s > M_{af}$), with high approach motivation and low avoidance motivation does better than predicted in academic achievement situations. Similarly, the failure-orientated subject ($M_{af} > M_s$), with high avoidance motivation and low approach motivation, does less

well than predicted in academic performance tasks.

The results of Hypothesis X demonstrates most clearly the importance of the use of both need achievement and test anxiety as measures of motivational determinants of academic performance. For it is when the overall orientation of the subject is considered that we can see clearly the interaction effects of these factors on performance. These results would support Atkinson's use of the two measures to determine motivational orientation. The hypothesis was accepted.

2. Results of Hypothesis XI

This hypothesis deals with another extreme group of subjects, the high approach and high avoidance motive subject. These are the few subjects who score extremely high scores on both need achievement measures and test anxiety measures. The hypothesis suggests contrary to Atkinson's expectations of 'neutral' motivation for this group, that these subjects will be a disturbed group, or a "conflict group" because they are motivated both to approach success and to avoid failure equally strongly. It is suggested that these subjects will produce severe performance decrements, and have high neuroticism scores except in the case of highly intelligent subjects. The highly intelligent subjects would be expected to be facilitated by both high drives, as seen from the previous results.

From each sample a third group of subjects was found,

having high need achievement and high test anxiety. This was called the conflict group.

Sample I

Once again, the male and female subjects were considered together in this part of the analysis, for reasons already given. It was found that there were sixteen 'conflict' subjects in Sample I. These subjects were divided into ability groupings A = upper ability (twenty percent), B = medium ability (sixty per cent) and C = lower ability (twenty per cent). There were three 'A conflict' subjects, three 'C' conflict' subjects and ten 'B conflict' subjects. The results for these groups are expressed in the following tables.

Table XL

Sample I. Conflict Group A (High Ability,
high T.A., high n.Ach.)

Regression Scores

<u>Subject</u>	<u>Better than Predicted</u>	<u>Worse than Predicted</u>
	+	-
16	1.48	
18	1.83	
29	3.71	
N = 3	3 over- achievers	No under- achievers

There were only three high ability 'conflict' subjects, but as expected from drive theory these three subjects, regardless of possible conflict, were performing better than predicted.

Table XLI

Sample I. Conflict Group B (Medium Ability,
High T.A., High n.Ach.)

Regression Scores

<u>Subject</u>	<u>Better than Predicted</u>	<u>Worse than Predicted</u>
	+	-
3		3.77
35		1.06
36	1.52	
69	0.57	
87	0.10	
91		0.43
107		7.65
119		7.48
153		11.78
161		3.61
N = 10	3 over- achievers	7 under- achievers

Conflict group B would seem to support the hypothesis that high approach and high avoidance motives, with average ability, will lead to performance decrement.

Table XLII

Sample I. Conflict Group C (Low Ability,
High T.A. and n.Ach.)

Regression Scores

<u>Subject</u>	<u>Better than Predicted</u>	<u>Worse than Predicted</u>
	+	-
65	1.09	5.
101		16.10
141		3.14
N = 3	1 over- achiever	2 under- achievers

Once again, the numbers in the group are very small,
 : ^{No} evidence would be lent to the hypothesis by this group.

Sample II

The subjects in sample II were treated in a similar fashion to sample I. The conflict subjects with high test anxiety and high need achievement, were considered in three groups: the upper ability group A (twenty per cent), the medium ability group B (sixty per cent) and the lower ability group C (twenty per cent). In this sample, there were five 'conflict group' A subjects, five 'conflict group' B subjects and two 'conflict group' C subjects. A total of twelve conflict subjects was found in sample II.

Table XLIII

Sample II Conflict Group A

<u>Subject</u> <u>No.</u>	<u>Regression Scores</u>	
	<u>Better than</u> <u>Predicted</u> +	<u>Worse than</u> <u>Predicted</u> -
23	1.12	
31	4.51	
54	1.58	
60	4.66	
61	4.66	
<hr/> N = 5	<hr/> 5 over- achievers	<hr/> no under- achievers

All high ability, high test anxiety, high need achievement subjects were performing better than predicted. Thus, high drive, regardless of directional conflict was facilitating for high ability subjects.

Table XLIV

Sample II Conflict Group B and CRegression Scores

<u>Subject</u> <u>Group B</u>	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>
	+	-
10	3.28	
28	10.44	
91		7.56
102	2.05	
103	6.44	
<hr/>		
N = 5		
<u>Subject</u> <u>Group C</u>	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>
74	1.36	
82		2.53
<hr/>		
N = 2	5 over achievers	2 under- achievers

The hypothesis was not confirmed for this sample. There was no evidence to support the view that conflict subjects of average and low ability do worse than expected.

Sample III

In sample III there were eight high conflict subjects, five rated A and three rated B. There were no low ability high conflict subjects in this sample. The results were as follows:

Table XLVSample III Conflict Group ARegression Scores

<u>Subject</u> <u>No.</u>	<u>Better than</u> <u>Predicted</u> +	<u>Worse than</u> <u>Predicted</u> -
1	7.86	
28	1.25	
40	1.25	
57	1.14	
65	4.22	
<hr/> N = 5	5 over- achievers	0 under- achievers

The hypothesis was confirmed, high drive, regardless of directional conflict facilitated performance for the high ability group.

Table XLVISample III Conflict Group BRegression Scores

<u>Subject</u> <u>No.</u>	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>
34	4.57	
61		0.4
66		20.04
<hr/> N = 3	1 over- achievers	2 under- achievers

There were only three subjects in this group, so it is difficult to assess the trend of results. A larger sample is needed.

Discussion of Results of Hypothesis XI

The first part of hypothesis XI deals with the group of subjects termed the 'conflict' group. These subjects have both high approach motive, and high avoidance motive. It was predicted that all subjects of this kind with average or low ability would perform worse than predicted. For highly intelligent subjects, however, the direction of drive, and in this case the subsequent ^{drive} ~~drive~~ conflict would not influence performance. The strength of drive would be the determining factor, and high drive would equal better than predicted performance.

For all three groups it was demonstrated that in the high ability groups, high approach and avoidance drive lead to improved performance. There were thirteen high ability conflict subjects in these three samples, all of whom were performing better than predicted. Atkinson's expectation of neutrality of motivation was rejected for high ability subjects and the hypothesis was confirmed.

For medium and low ability subjects the pattern was not so clear. In sample I nine out of thirteen such subjects were doing worse than predicted, as expected. This was not found for sample II where only two out of seven were doing less well than predicted. There were only three subjects in sample III, two of whom were doing worse than predicted. There is not enough evidence from the small sample to support,

with any confidence, the hypothesis concerning medium and low ability subjects. However, Atkinson's theory that subjects with both high test anxiety and high need achievement would be a neutral group, with each motive strength cancelling the other, is somewhat undermined by the results of sample I. In sample I, it would appear that high conflicting motivation does lead to performance decrement, as predicted by this study. Larger samples are needed before any definite conclusions can be drawn.

Therefore, it can be said, that the hypothesis concerning high ability subjects is confirmed. When medium and low ability subjects are considered the hypothesis is confirmed for sample I only.

(the second part of the hypothesis concerning the neuroticism scores of conflict subjects will be discussed later in the section given to neuroticism results in general).

CHAPTER XIII
FACILITATING ANXIETY

Chapter XIIIFacilitating Anxiety1. The Results of Hypothesis V

Hypothesis V states that subjects who admit to facilitating anxiety will be highly intelligent subjects. This hypothesis was derived from the drive theory prediction that high anxiety facilitates the performance of highly intelligent subjects. If this is so, it is reasonable to suppose that these subjects will give high scores on the test of facilitating anxiety, (Alpert and Haber 1960), which includes items such as "feeling anxious during examinations helps me perform well". The results of sample II and III were considered for this point. No test of facilitating anxiety was given to sample I.

Sample II

There were twenty three subjects in sample II (total N = 100), with high facilitating anxiety scores (scores of four or more). These were six highly intelligent subjects out of twenty two; fourteen medium range subjects out of fifty three; and three low ability subjects out of twenty five low ability subjects.

TABLE XLVIISample II. Facilitating Anxiety Scorers

	<u>High Ability</u>	<u>Medium and Low Ability</u>	<u>Total</u>
<u>High Scorers</u>	6	17	23
<u>Low Scorers</u>	16	62	77
	<u>22</u>	<u>79</u>	<u>100 = N</u>

value = 0.153 degrees of freedom = 1. not significant

From sample II there was no evidence that more subjects of high ability had high facilitating anxiety scores, than subjects of lesser intellectual ability.

Sample III

In sample III, there were also twenty three subjects (out of a total of seventy one subjects) with high facilitating anxiety scores (scores of four plus). There were nine out of fourteen high ability subjects; ten out of forty two medium ability subjects; and four out of fifteen low ability subjects.

TABLE XLVIIISample III. Facilitating Anxiety Scorers

	<u>High Ability</u>	<u>Medium and Low Ability</u>	<u>Total</u>
<u>High Scorers</u>	9	14	23
<u>Low Scorers</u>	5	43	48
	<u>14</u>	<u>57</u>	<u>71 = N</u>

value = 6.386 degrees of freedom = 1. p < .02

From sample III there was support from the X^2 analysis, that a large proportion of high ability subjects compared with other ability subjects, were obtaining a high facilitating anxiety score, as was predicted.

Discussion of Hypothesis V

It can be seen from the evidence from the two samples tested present a contradictory result for hypothesis V. Whereas there is no support for the hypothesis in sample II, sample III does give statistically significant support to the hypothesis. In summary, it can be said that there are some subjects from all ability groupings who give high facilitating anxiety scores. In sample II there is no evidence to suggest that an unduly high number of high ability subjects admit to high facilitating anxiety, but in sample III the evidence suggests just this. Support is lent to the hypothesis by the results of sample III.

2. Results of Hypothesis VI

Hypothesis VI goes on to say that subjects who admit to facilitating anxiety will perform even more efficiently than their high intelligence would predict. As before only samples II and III could be considered and their data is presented in the following tables.

Sample II. High Facilitating Anxiety ScorersTable II High Ability Students

<u>Subject</u> <u>No.</u>	<u>Regression Scores</u>	
	<u>Better than</u> <u>Predicted</u> +	<u>Worse than</u> <u>Predicted</u> -
12	2.51	
18		1.34
34	4.12	
61	4.66	
62		0.34
80	2.64	
	<hr/> 4	<hr/> 2

Four out of six high ability students with high facilitating anxiety scores performed better than predicted.

Table L Medium Ability Subjects

<u>Subject</u> <u>No.</u>	<u>Regression Scores</u>	
	<u>Better than</u> <u>Predicted</u> +	<u>Worse than</u> <u>Predicted</u> -
1		5.49
2	2.05	
3		3.95
7	4.05	
30	1.44	
44	2.05	
46	7.28	
48	2.28	
53	12.28	
72	2.05	
73		3.56
76	.44	
77	7.20	
109	11.28	
<hr/> N = 14	<hr/> 11	<hr/> 3

Eleven out of fourteen of the medium range subjects with high facilitating anxiety performed better than predicted. Of the three low ability subjects, two performed much better than predicted +11.52 and +8.75 (subject 49, 75) while one was underachieving.

Therefore, irrespective of academic ability in sample II, there are twenty three subjects with high facilitating anxiety scores; of these seventeen are doing better than predicted (the X^2 value = 5.2 degrees of freedom = 1, $p < .05$). There would seem to be evidence, therefore, to accept the hypothesis for sample II.

Sample III High Facilitating Anxiety Scorers

Table LI High Ability Subjects

<u>Subject</u> <u>No.</u>	<u>Regression Scores</u>	
	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>
	+	-
1	7.86	
2	4.86	
9	6.89	
26		8.15
28	1.25	
40	1.25	
41	5.89	
54	1.78	
65	4.22	
N = 9	8	1

Eight out of nine high ability subjects, with high facilitating anxiety scores performed better than predicted.

Table LII Medium and Low Ability Subjects

	<u>Regression Scores</u>	
<u>Subject</u> <u>No.</u>	<u>Better than</u> <u>Predicted</u>	<u>Worse than</u> <u>Predicted</u>
<u>Medium Ability</u>		
	+	-
6	9.96	
8	5.96	
14	10.96	
16	2.96	
25		9.75
38		3.46
56	15.41	
60	13.28	
67		4.59
69	8.28	
<u>Low Ability</u>		
13		1.94
23		4.49
32	10.51	
45	7.89	
N = 14	9	5

Nine out of fourteen medium and low ability subjects were performing better than predicted. Therefore, for all sample III high facilitating anxiety scorers seventeen out of twenty three were doing better than predicted (X^2 value = 5.2, $p < .05$). In the entire group of subjects tested, thirty four out of forty six were overachieving. There would seem to be evidence to support the hypothesis.

Discussion of Hypotheses V and VI

Both of these hypotheses are concerned with the effects of facilitating anxiety, which was measured by certain questions in the general motivational questionnaire (see Appendix). The evidence would seem to support the idea that, subjects with high scores on this test, that is who admit that anxiety facilitates their academic performance, really do better than predicted on academic tests. Also, there would seem to be an unduly large number of high ability subjects admitting to high-facilitating anxiety in sample III, but not in sample II. Therefore, both hypotheses receive tentative support, though the need for larger samples and more intensive study is indicated.

CHAPTER XIV

NEUROTICISM

Chapter XIVNeuroticism

Several hypotheses emerged from the aims of this inquiry, which dealt, in whole or in part, with the neuroticism scores and the relationship of such scores to other measures.

The neuroticism score, it will be remembered was taken from the Eysenck scales, the M.P.I. for samples II and III and the children's scale (Sybil Eysenck 1965) for Sample I. Neuroticism scores for each sample were included in the general correlation matrix for each group which are given in the Appendix.

1. The Results of Hypothesis XIII

Hypothesis XIII states that neuroticism scores will be moderately related to measures of debilitating test anxiety, and will be negatively related to measures of facilitating anxiety. Facilitating and debilitating anxiety measures will also be negatively related.

The reasoning behind this hypothesis has been fully explained in the section on the aims of the inquiry, so only a brief explanation will be given here. Neuroticism scores were expected to relate only moderately with test anxiety because it was assumed that test anxiety is a measure of a situationally specific anxiety and not a measure of generalised anxiety. It was predicted that subjects with a high test

anxiety score need not necessarily have a high neuroticism score. Neuroticism was expected to be negatively related to measures of facilitating anxiety. This was not a firm prediction from any theory, but it seemed plausible that if facilitating anxiety actually aids performance, those who admit that they are anxious but that this is helpful, would have low neuroticism scores. Facilitating anxiety and debilitating anxiety should be negatively correlated. This was expected, but not found, by Alpert and Haber (1960). It should, however, follow from the tests because items in the debilitating test anxiety scale are similar to: "Anxiety when I am doing a test makes me perform badly", while in the facilitating anxiety test the items are antipathetic, i.e., "Anxiety when I am doing a test makes me perform better".

These predictions were tested for all samples, with the exception of the predictions concerning facilitating anxiety with sample I, for they did not have such items in their questionnaire.

Sample I

In sample I there was no measure of facilitating anxiety, but it can be seen that neuroticism is correlated with debilitating test anxiety; the product moment correlation = .32 ($p < .001$). This is a highly significant correlation but not a large figure when it is compared with the correlation of 0.6+ with projective measures of fear of failure, etc. (see

correlation matrix in Appendix). Neuroticism scores are also correlated -0.29 ($p < .02$) with eleven plus performance.

TABLE LIII

Sample I. Neuroticism Scores

Correlation with	<u>T.A.Q.</u>	<u>Fear of Failure I</u>	<u>Fear of Failure II</u>
Neuroticism Score	$+0.32^1$	$+0.19^4$	$+0.17$
Correlation with	<u>I.Q.</u>	<u>11+ Exam</u>	
Neuroticism Score	-0.14	-0.20^4	

1 = $p < .001$

4 = $p < .05$

Sample II

Both neuroticism scores and facilitating and debilitating anxiety scores were available for sample II.

It was found that neuroticism scores were only moderately related to test anxiety scores in this sample as predicted.

It was also found that neuroticism scores were ^{not} ~~negatively~~ related to academic performance.

TABLE LIV

Sample II. Neuroticism Scores

Correlation with	<u>T.A.Q.</u>	<u>Fear of Failure I</u>	<u>Fear of Failure II</u>			
Neuroticism scores	$+0.29^2$	$+0.23^3$	$+0.01$			
Correlation with	<u>11+</u>	<u>I.Q.</u>	<u>English</u>	<u>French</u>	<u>Maths</u>	<u>Composition Score</u>
Neuroticism Scores	-0.03	$+0.11$	$+0.02$	-0.01	-0.06	-0.01

2 = $p < .01$

3 = $p < .02$

It was also predicted that neuroticism scores would be negatively related to scores of facilitating anxiety. This was not confirmed in this sample.

Finally, it was predicted that facilitating and debilitating anxiety would be negatively correlated. This was confirmed for this sample. It was found that facilitating anxiety scores were negatively correlated with all measures of debilitating anxiety, and significantly so in the case of the T.A.Q.

Correlation with	<u>T.A.Q.</u>	<u>Fear of Failure I</u>	<u>Fear of Failure II</u>
Facilitating Anxiety (T.A.+)	-0.24 ³	-0.07	-0.05

3 = $p < .02$

Sample III

A similar analysis was conducted on the data for sample III. All three scores: neuroticism, facilitating anxiety (T.A.+) and debilitating anxiety (T.A.), were available for this sample.

It was found that test anxiety and fear of failure scores were only moderately related to neuroticism scores as predicted. It was also found that neuroticism scores were negatively related to I.Q. and academic performance measures. None of the correlations reached the .05 level of significance.

TABLE LVSample III. Neuroticism Scores

Correlation with	<u>T.A.Q.</u>	<u>Fear of Failure I</u>	<u>Fear of Failure II</u>
Neuroticism scores	+0.15	+0.13	+0.20
Correlation with	<u>I.Q.</u>	<u>Examination</u>	
Neuroticism scores	-0.11	-0.20	

It was also found that facilitating anxiety and neuroticism were negatively related as was predicted. The correlation between the two measures was found to be -0.36 ($p < .01$).

Finally, facilitating anxiety was found to be negatively correlated with all measures of debilitating anxiety, i.e., test anxiety, and fear of failure, as predicted, but this negative relationship did not reach statistical significance, and was effectively a zero correlation.

Correlation with	<u>T.A.Q.</u>	<u>Fear of Failure I</u>	<u>Fear of Failure II</u>
Facilitating Anxiety	-0.05	-0.03	-0.07

Discussion of Hypothesis XIII

No results counter to this hypothesis were found but only weak support seemed to exist for some parts of it. It was found that neuroticism scores were no more than moderately related to debilitating anxiety scores in all samples, except sample I. This supports the contention that test anxiety scores are measures of situationally specific anxiety

and not general anxiety measures. It was also found that facilitating anxiety and neuroticism were negatively related in sample III ($p < .01$) as suspected, but not in sample II. Some support is, therefore, lent to this part of the hypothesis. Finally, it was found that facilitating and debilitating anxiety were negatively correlated in both samples II and III but the relationship was only a weak one, reaching the .05 level of significance for only one measure in one sample.

2. The Results of Hypothesis III

Hypothesis III states that high fear of failure will be associated with high neuroticism in the highly intelligent group, but not in the other groups. This is derived from the idea that high ability subjects would have had a background history of academic success and, in fact, should not have any need to feel 'frightened' of academic test situations. Therefore, high fear of failure may be associated with high neuroticism for these subjects, but not for less able subjects. The mean neuroticism scores of these groups were investigated.

Sample I

The mean neuroticism score for the entire sample was 3.5 (total possible score = 8). All high anxious subjects had a mean score of 4.3: 4.1 for boys and 4.5 for girls. High anxious, high ability subjects had a mean neuroticism score of 4.6 for boys and 4.8 for girls. That is the neuroticism score

for these subjects was higher than the neuroticism score for all subjects and a little higher than the mean neuroticism score for high anxious subjects. As a contrast high anxious, low ability subjects had a mean neuroticism score of 2.4 for boys and 1.1 for girls. Thus, for sample I there is some support for the hypothesis that high anxious, high ability subjects have high neuroticism scores.

Sample II

Similarly, the means of each group were considered for sample II. It was found that the mean neuroticism score for all subjects in sample II was 30.75. The mean score for all high anxious subjects was 34.4. All high ability, high anxious subjects had a mean score of 36, while high anxious, low ability subjects had a mean score of 31.8. Thus, again very tentative support is lent to the hypothesis.

Sample III

The same analysis for sample III revealed that the mean neuroticism score for all subjects was 22.5 for all high anxious subjects 25.3, for all high anxiety high ability subjects 31.6 and all high anxiety low ability subjects, mean neuroticism scores was 22.7. Thus, again, in the third sample, there is support for the view that high ability, high anxious subjects will have comparatively high neuroticism scores. Thus, the hypothesis is confirmed.

TABLE LVI

	<u>Mean Neuroticism Scores All Samples</u>		
	<u>Sample I</u>	<u>Sample II</u>	<u>Sample III</u>
All subjects	3.5	30.75	22.5
High anxious subjects	4.3	34.3	25.3
High anxious subjects High ability subjects	4.7	36	31.6
High anxious subjects Low ability subjects	1.7	31.8	22.7

Discussion of Hypothesis III

The hypothesis that high fear of failure will be associated with high neuroticism in highly intelligent subjects but not in subjects of low ability would seem to receive some support from the data. This would support the idea that high fear of failure is a realistic reaction for low ability groups, as their low ability would lead them to expect failure. Perhaps for them, fear of failure measures are, in part, expectation of failure measures. For high ability subjects high fear of failure would not be a very realistic appraisal of the situation, for their high ability must have given them a history of academic success. Therefore, for such subjects high fear of failure could be a neurotic manifestation which their high neuroticism scores would confirm. The hypothesis was accepted.

3. The Results of Hypothesis XIB

The later part of hypothesis, already mentioned, states

that subjects with both high approach motive and high avoidance motive will have high neuroticism scores. This follows from the assumption that such subjects will experience some degree of conflict in their achievement-orientation, for at the same time they are motivated both to avoid failure and to achieve success. It was thought that such subjects may have high neuroticism scores.

Sample I

The mean score on the neuroticism scale for all 'conflict subjects' in this group was 3.3, for all subjects in this group it was 3.5, therefore, there is no evidence to support the assumption that high 'conflict' subjects would have high neuroticism scores.

Sample II

The mean score for neuroticism for all subjects in sample II was 30.75 and for all high 'conflict' subjects it was 29. So there is no evidence in sample II that high 'conflict' subjects have high neuroticism scores.

Sample III

The mean neuroticism score for sample III was 22.5 for all subjects. For high 'conflict' subjects the mean score was 25.1. There is some support to the hypothesis for this group, but it is certainly not strong support.

Discussion of Hypothesis XIB

There is no support from sample I and II to support the hypothesis that subjects with both high test anxiety and high need achievement will have high neuroticism scores. There is slight evidence to support the hypothesis in sample III. However, from the available evidence the hypothesis must be rejected. High 'conflict' subjects are no more 'disturbed', according to their neuroticism scores, than all other subjects.

Brief Discussion of the Hypotheses concerning Neuroticism Scores

Hypotheses III, XIB and XIII are all dealing with some aspect of neuroticism scores. Each result has been discussed individually, but it would seem that the use of a neuroticism score, as an overall measure of generalised anxiety, is useful in these kinds of analysis for the purposes of comparison. In general, assumptions concerning the relationship of neuroticism to other motivational measures have been confirmed.

CHAPTER XV

PROJECTIVE and QUESTIONNAIRE MEASURES OF
NEED ACHIEVEMENT and FEAR OF FAILURE

Chapter XVProjective and Questionnaire Measures of Need
Achievement and Fear of FailureThe Results of Hypothesis XIV

Hypothesis XIV states that projective measures of achievement need and fear of failure will be positively correlated with questionnaire measures of these motive orientations and different projective test scores of these variables will be correlated with each other.

There were two projective measures; the P.T.I, which was a McClelland type T.A.T. test, where subjects were asked to write imaginative stories, in response to four pictures (see appendix). The second projective measure was taken from P.T.II, which was a new projective test, a picture completion test, similar in design to a Rosensweig P.F. test, where subjects were required to fill in the balloon coming from one of the people in a 'comic strip' picture (see appendix). All three samples were given these two tests, modified for age. Measures of fear of failure and need for achievement were taken from the results (see section on method). Samples II and III were also given a questionnaire measure of test anxiety and need achievement. Sample I was given a questionnaire measure of test anxiety. The correlations between these measures were investigated. (For full correlation matrix see appendix). A Product Moment Correlation was applied in all cases.

Sample I

The Sarason's T.A.S.C. (Test Anxiety Scale for Children) was the questionnaire measure of test anxiety for this group and the two projective measures of test anxiety (fear of failure) were taken from P.T.I. and P.T.II. The correlation between them was as follows:

	<u>P.T.I.</u>	<u>P.T.II.</u>	
	Fear of Failure	Fear of Failure	
T.A.Q.	.64	.59	p < .001

It can be seen that questionnaire measures of test anxiety correlate highly with projective measures of fear of failure.

The two projective measures of fear of failure correlate with each other .63 p < .001.

There was no questionnaire measure of need achievement for this group, but there were two projective measures of need achievement which correlated with each other .54 (p < .001).

It can also be seen from the correlation matrix that questionnaire measures of test anxiety and projective measures correlate negatively with performance as would be predicted and projective measures of need achievement correlate positively with achievement.

TABLE LVIIExamination Performance and Motivation Correlations

	<u>T.A.Q.</u>	<u>Fear of Failure I</u>	<u>Fear of Failure II</u>
11+ results	-.34 ¹	-21 ⁴	-.09
	<u>Need Achievement I</u>	<u>Need Achievement II</u>	
11+ results	+.22 ⁴	+.30 ²	
	1 = p < .001	2 = p < .01	4 = p < .05

Sample II

All subjects in this sample answered a questionnaire of both need achievement and test anxiety. They also gave the two projective measures of fear of failure and need for achievement. A full correlation matrix for this group can be found in the Appendix.

Questionnaire measures of test anxiety were found to correlate with projective measures of fear of failure .63 (p < .001) for P.T.I and .48 (p < .001) for P.T. II. Projective measures of fear of failure correlated .38 (p < .001) with each other.

It can also be seen that measures of test anxiety or fear of failure correlate negatively with measures of academic achievement.

TABLE LVIIIExamination Performance and Fear of Failure
Correlations

	<u>16+I.Q.</u>	<u>English</u>	<u>French</u>	<u>Maths</u>
T.A.Q.	-.05	-.30 ²	-.45 ¹	-.34 ¹
Fear of Failure I	+.07	-.18	-.25 ³	+.14
Fear of Failure II	-.11	-.09	-.18	-.18

Composite Achievement Scores

T.A.Q.	-.42 ¹
Fear of Failure I	1.25 ³

1 = p < .001 2 = p < .01 3 = p < .02

Also it could be seen that measures of need achievement correlate positively with measures of academic achievement.

TABLE LIXExamination Performance and Need Achievement
Correlations

	<u>11+I.Q.</u>	<u>16+I.Q.</u>	<u>English</u>	<u>French</u>	<u>Maths</u>	<u>Composite Score</u>
Need Achievement	.09	.06	.11	.08	.01	-
n.Ach. I	.07	.06	.37 ¹	.50 ¹	.39 ¹	.50 ¹
n.Ach. II	.09	.05	.25 ³	.37 ¹	.16	-

1 = p < .001 3 = p < .02

It is interesting to note that need achievement measures are highly correlated with performance in examinations, in the expected direction, but only moderately and non-significantly correlated to I.Q. measures.

Sample III

All subjects in sample III also answered questionnaires of need achievement and test anxiety and gave projective material on two projective tests. The product moment correlation between these measures was calculated.

Test Anxiety measures were found to be correlated with each other in the expected direction. The questionnaire measure was correlated with the two projective measures of fear of failure .60 ($p < .001$) and .58 ($p < .001$) respectively. The two projective measures were correlated .55 ($p < .001$) with each other.

Need achievement projective measures were correlated .61 ($p < .001$) with each other but only .28 and .06 with the questionnaire measure.

As in the other samples it was found that test anxiety and fear of failure measures correlated negatively with academic performance and need achievement measures correlated positively with academic achievement measures.

TABLE LXExamination Performance and Motivation Correlations

	<u>T.A.Q.</u>	<u>Fear of Failure I</u>	<u>Fear of Failure II</u>
I.Q.	+0.22	+0.13	+0.11
Exam.	-0.20	-0.23 ⁴	-0.28 ⁴

4 = p < .05

	<u>Need Achievement</u>	<u>n.Ach.I</u>	<u>n.Ach.II</u>
I.Q.	+0.20	+0.36 ²	+0.33 ²
Exam.	+0.21	+0.47 ¹	+0.44 ¹

1 = p < .001

2 = p < .01

It is interesting to note here that whereas test anxiety measures correlate negatively with academic performance in examinations, there is a slight positive correlation between measures of test anxiety and I.Q. ratings. N.Ach. scores for this sample are positively and strongly correlated with I.Q. measures.

Discussion of Hypothesis XIV

Hypothesis XIV has been concerned with the correlation of the various measures of motivational determinants of academic performance. It was predicted that all measures of test anxiety should be correlated quite highly with one another and the same should hold for need achievement. This would establish the validity of the measures involved. For example, if fear of failure in P.T. II (a new measure devised by the

present writer), could be seen to correlate highly with T.A.Q. scores, this would help to establish the validity of this measure. Also, if it could be seen to correlate with P.T.I. measures of fear of failure, its validity as a projective tool would be suggested. Similarly with need achievement measures.

It can be seen that the hypothesis was confirmed when test anxiety correlation were considered. In all samples questionnaire measures of test anxiety were seen to be significantly correlated with projective measures of fear of failure, which in turn could be seen to correlate highly with each other. Also, as expected from previous results, test anxiety measures were seen as negatively correlated with measures of academic achievement (except from sample III where test anxiety was positively related to I.Q. measures).

When need achievement results were considered, it could be seen that for all samples, projective measures of need achievement were highly correlated with each other. However, the correlation between such projective measures and the questionnaire of need achievement, though positive, were very low. Need achievement scores both questionnaire and projective were seen, in all samples, to correlate positively with achievement measures.

From these results, therefore, it would seem that projective measures of fear of failure were measuring the same motivational orientation as the T.A.Q. and that, therefore, this method of analysing the projective material (new to this research) is a valid method. The hypothesis for test anxiety measures is confirmed.

Also, it would seem that projective measures of need achievement were both measuring the same motivational determinant, but the questionnaire was measuring some other aspect of motivation. This was made clear by the fact that although only a low correlation was found between the questionnaire measure and the n.Ach. measures, there was still a positive relationship between questionnaire measures of need achievement and academic performance, although this did not reach statistical significance. This finding was in keeping with other research results, where it was found that questionnaire measures of need achievement did not relate to projective measures of need achievement, but did relate to measures that the projective measures correlated with very strongly (Strodbeck 1958).

The hypothesis was partially confirmed for need achievement results.

CHAPTER XVI

Sample Differences in the Data

Chapter XVI

Sample Differences in the Data

It has already been stated that the majority of research projects, which have utilized measures of motivation and the effects of such measures on performance, have used as subjects American, male, college students. One of the interests of this research was to see if the relationships between motivational determinants and academic performance would be similar for differing groups; groups that differ in respect of age, sex and spread of academic ability. It was for this reason that three independent samples were tested, an eleven year old group, pre-selection, a sixteen year old grammar school group, and an eighteen year old university group.

1. The results of Hypotheses XII and XV

Hypothesis XII states that the effects of approach and avoidance motives will be similar for all samples. Hypothesis XV states that the relationship of motivational orientation and academic performance will be essentially similar for female subjects, British subjects, and child subjects to that found with American male undergraduates. The two hypotheses are essentially similar, one being more extensive than the other.

(a) Age Differences

From the previous results it can be seen that there was evidence to suggest that the eleven-plus group, sample I,

produced results that were different from the results of the older samples. When test anxiety results were considered, it could be seen that, although the relationship between test anxiety and academic performance was in the expected direction for all subjects, there was no evidence to support the practice of tri-partite ability grouping to reveal differential effects of test anxiety and performance. For this younger group, test anxiety would appear to have a monotonic, negative relationship with performance, whereas in the older groups there was evidence that test anxiety has differential effects on subjects with different ability.

When need achievement was considered, again there would appear to be a noticeable difference between the younger sample I and the other two samples. In sample I, the relationship between need achievement and academic performance was not significant either for the entire sample, or for each separate ability group. This result is at variance from the results of the older samples. It would appear that projective measures of need achievement in such young children are not related in any meaningful way to academic performance. However, when the overall achievement-orientations are considered, it can be seen that the eleven plus group produced over-achieving achievement-orientated subjects and under-achieving failure-orientated subjects, in the same way as the two other samples. Also, sample I's 'conflict' subjects would appear

to behave in the expected manner, eight out of twelve medium or low ability subjects of this kind were underachieving. The main difference between groups, therefore, is that the eleven-plus sample does not give any significant need achievement results, and the effects of test anxiety on performance does not appear to vary according to the academic ability of the subject. This is at variance with the results of samples II and III, which are essentially the same as each other.

(b) Sex Difference

Only in sample I were subjects of both sexes included, but if the results of samples II and III varied greatly from known American results, this could probably be attributable as much to a sex difference as to a cultural difference. In sample I there was no evidence to support the idea that male and female subjects were not essentially similar in their responses to the measures taken and the effects of such measures on performance. There were slight differences in scores, for example, high test anxiety for boys was above 16, and for girls it was above 18. Similarly, the mean neuroticism score for boys was 4.1 and for girls 4.5, but these and other scoring differences were marginal. The analysis was carried out separately for girls and boys, but no large differences between the two sub-groups, sample IA and IB were discovered. From sample I there was no evidence that boys and girls

differed markedly on motivational scores or the effects of such scores on their academic performance.

(c) Cultural Differences

It was thought that if the results from sample III were noticeably different from established American results, this could be due to a cultural difference. However, as has been previously explained, it could also be due to a sex difference; as the American group were all male, and the group in this research all female. Once again, no marked difference was found between the American results and these results, as far as they overlapped. Thus, the validity of these measures and analysis for British subjects received support from this finding, and the validity of using female subjects also received support.

Discussion of Hypotheses XII and XV

In summarising it can be said that the only really significant difference between samples to emerge from this research is an age difference. It would appear that the relationships of motivational measures and academic performance are not so clear for the eleven plus group as they are for the older samples. It is not known whether this age difference is attributable to age differences, ^{to differences of academic self-selection,} or to test differences, for it may be remembered that different tests were used for sample I, while sample II and III had the same tests. There is no evidence from this research to support the practice of using

only male subjects in this kind of research. Also, it would appear that there are no outstanding differences between American and British subjects on measures of motivational orientation, or the effects of such measures on academic performance.

The hypothesis was supported for the results of sex and national differences, but not for age differences.

PART VI
CONCLUSIONS and SUGGESTIONS FOR
FURTHER RESEARCH

Conclusions and Suggestions for Further Research

The aim of this research was to investigate several theoretical conceptions concerning the nature of anxiety and its relationship to academic achievement. Concepts of motivational determinants of such achievement have been popular in the literature. Several main theories have been brought together for this study, which attempted to reduplicate and extend the principal research findings, and at the same time obtain a clearer picture of the interaction of such motives and academic achievement. An attempt was also made to explain the results of this, and other research, in the light of accepted bodies of psychological knowledge.

This study extended and clarified previous research findings in several ways. Firstly, Spielberger's tri-partite analysis of results for this type of inquiry was extended to include female subjects and children at various age levels. The T.A.Q. was used in place of the M.A.S. (utilized by Spielberger), so that the results of the research into situationally specific anxiety and drive-level conceptions could be brought together. This also seemed preferable, for investigation of the test items of these questionnaires would suggest that one could logically expect more relationship between test anxiety items and achievement situations, than with generalized anxiety items. Need-achievement results were investigated in this manner and suggestions of

differential effects of need achievement according to academic ability were demonstrated.

For all investigations the intelligence level of the subjects was taken into consideration, a control which appears to be lacking in many previous studies on the effects of motivation on academic achievement. Attention was directed towards groups of subjects, hitherto largely ignored; the groups with high facilitating anxiety, and the subjects with conflicting achievement orientations. An attempt was made to provide clarification of measurement of projective material and a new measure was introduced with encouraging results.

Several findings from this study seem to be of interest, but the Main findings fall into four categories. Firstly, the advantages of a tri-partite analysis of results according to academic ability was supported. Secondly, the importance of the general motivational orientation, whether to approach or to avoid was demonstrated. Thirdly, the influence of facilitating anxiety for specific subjects was discussed and finally a simple, somewhat clearer scoring of projective material received some support from the results.

On the first point it can be concluded that anxiety effects academic performance differentially according to academic ability. This finding was strongly supported for the older subjects but not for the eleven year old group. The use of Spielberger's technique of analysing results separately

for subject of differential ability was supported and extended. When need achievement results were considered, the benefit of the tri-partite division was not so clearly defined, but there was some evidence that this could be a fruitful method of analysing the data.

One of the clearest findings from this research would seem to be the support given to the importance of the overall motivational orientation of subjects. In all three samples it was found that achievement-orientated subjects, with high motivation to approach success and low motivation to avoid failure, were obtaining better academic results than would be expected from their ability ratings. Similarly, failure-orientated subjects, with high motivation to avoid failure and low motivation to achieve success, were doing less well than expected to them. This finding even received some support from the eleven-plus sample, where the influence of need achievement on academic performance was not apparent when considered separately.

The results concerning the subjects, called the conflict groups in this study, was of some interest. Conflict subjects were those with high motivation both to achieve success and avoid failure. Atkinson has said that in such cases the two motive tendencies would cancel each other to give a group of subjects of "neutral" motivation. This study predicted that such subjects would not have a resultant motivational

orientation of neutrality, but one of conflict. No previous results on this question appear to be available, due to the current practice of using only those subjects with traditional achievement or failure orientated resultant motivation. The results provided evidence to suggest that Atkinson's neutrality concept should be further investigated. From conflict subjects of medium and low ability there was tentative evidence to support the view that both high approach and avoidance motivation leads to performance decrement, suggesting some element of conflict in these subjects. However, this evidence was only present for sample I, and was disputed in sample II and there were too few subjects in sample III to enable one to arrive at any conclusion. Further research with larger numbers is needed with subjects of conflicting motive orientations before any hypotheses concerning conflict or neutrality is accepted, with average ability subjects. However, when the results of high ability subjects were considered more conclusive evidence against the 'neutrality' concept was provided. All high ability subjects with high approach and avoidance motivation were performing better than even their high intelligence would lead one to predict. No evidence was found to support Atkinson's prediction that such 'neutral' subjects should not be influenced by motivational determinants. The result is in keeping with the conception of high drive, regardless of possible conflict, leading to more efficient performance of highly intelligent subjects.

This point leads to consideration of the findings concerning the existence and effects of facilitating anxiety. It was demonstrated that for subjects with extremely high ability, high anxiety (a negative drive) as well as high need achievement (a positive drive) leads to more efficient performance. This was also true when both motive tendencies were high and some degree of conflict might be expected. Explanations of this finding were put forward accepting drive theory interpretation, that for highly intelligent subjects academic test, aimed at a wide range of talents, would appear comparatively non-complex. Thus, for these subjects, high drive of any nature would lead to improved performance efficiency. More research with large numbers of gifted students is needed in this field. Apart from high ability subjects, there was a limited number of subjects who scored highly on a questionnaire measure of facilitating anxiety. Although the numbers were small, it was demonstrated that subjects who received such high scores were over-achieving in academic testing situations. This would lend some support to the contention that there is such a motive as anxiety which aids efficient performance; that this is a motive recognised by the subject and reported in a questionnaire and also that this anxiety is related to better performance in such subjects. This would seem to be an important finding, and further research on such anxiety and the subjects who experience it would be interesting.

The last major finding of this research concerns the encouraging correlation of measures of projective motivation, and questionnaire measures of fear of failure and need achievement. The use of a simpler technique for scoring these directional components separately in the two projective measures was supported, both by their correlation with each other and with the questionnaire, at least in the case of debilitating^{ing} anxiety. A questionnaire measure of need achievement, which correlates highly with projective n.Ach., is still needed. However, it was found that both the questionnaire and projective measures of need achievement significantly correlated with academic performance. The use of the new projective measure (a situationally specific projective test), especially with younger children, was regarded as valuable in view of the high correlation of this measure with the traditional projective test.

Other findings to emerge from this research would suggest that the use of a general anxiety scale as a control, simplifies the problem of what motivational anxiety scales actually measure. Thus, the view that the T.A.Q. is a measure of situationally specific anxiety was accepted in view of its moderate correlation with the neuroticism scale. The use of the measures of motivation, need achievement and test anxiety was supported with female subjects, but more work would seem to be needed with primary school children.

In conclusion, it can be said that the principal hypotheses of this inquiry were accepted for subjects above sixteen years of age, but the research findings for the eleven-plus group were not accepted in every case.

PART VII

APPENDIX

APPENDIX A

SCORING PROCEDURES

Appendix A
Scoring Procedures

1. N.Ach. Scoring Techniques

The original method of scoring n.Ach. protocols is explained fully in Atkinson's study (1958), where details of the scoring technique and various practice materials are presented.

The scoring of n.Ach. stories is based on a method of content analysis which requires a 'simple classification of responses in terms of predetermined scoring categories'. McClelland (1953). The categories are either positive or negative, approximating to 'anticipations of goal attainment', or 'anticipation of failure' respectively. The content analysis requires the classification of achievement related words, phrases or ideas contained in a story in terms of these scoring elements or categories.

The two most commonly used 'traditional' scoring procedures will be described here. Firstly, there is Scoring System C, containing the original categories evolved by McClelland and associates (1953), and secondly, Scoring System D-2 a refinement of System C evolved by Sadacca Ricciuti et al. (1957). System D-2 makes few fundamental changes in the scoring procedure of System C, and consists largely of finer sub-divisions of the categories of the system, and more explicit definitions

of these categories. The authors of System D-2 report a very high correlation (0.84) between the two scoring procedures when applied to the same set of pictures (Sadacca Ricciuti 1957). Also, they found that most of the new categories introduced in D-2 had low validities and that the most valid categories in the new system were also included in System C. (Achievement Imagery and Achievement Thema and Instrumental Activity). It can be concluded from these studies that scoring System C still remains the most commonly used and valid scoring procedure.

The original scoring System C consists of eleven sub-categories which are as follows:

Positive Scoring System

1. Achievement Imagery (AI)

This is the most crucial scoring category. If it is decided that this element is present then, and only then, can the other categories be scored. Hence AI is of considerable importance in the original scoring systems. In order to score for AI, a story must contain references to "standards of excellence" against which a person's behaviour and thinking are evaluated. References to explicit evaluations of performance, "he did well" are regarded as the best and safest criteria for scoring AI. Implicit, or inferred evaluations of performance are also permissible criteria for scoring AI. Scoring System D-2 has provided a more precise and detailed description of implicit and inferred evaluation of performance under AI.

From System D-2

(i) Personal Involvement in some activity such as when there is some reference to the desire to succeed, anticipation of success, or affective concern about the outcome of the activity.

(ii) References to "Unique Accomplishment", e.g., "he creates a masterpiece.

Other Positive Scoring Categories

2. Positive Anticipation of Success (G.A+).
3. Positive Affect associated with achievement (G+).
4. External Assistance for Characters in Achievement related activity (Nup).
5. Successful Instrumental Activity leading to achievement (I+).
6. Absence of a competing theme not related to achievement (Ach. theme).

Negative Scoring Categories

1. Unsuccessful Instrumental Activity (I-).
2. Anticipation of Failure (GA-).
3. Negative Affect in relation to achievement (G-).
4. Personal Obstacles (personal inadequacies interfering with achievement) (BP).
5. Environmental obstacles (external obstacles interfering with achievement) (BW).

The D-2 system groups the scoring categories, other than AI, as follows:

- (a) Involvement (Categories N+ G+ G- FAT Ga+ Ga- I + I and I-).
- (b) Aids Blocks, etc. (Categories Nup Bp Bw).
- (c) Achievement Thema.

(a) Involvement. This refers to instances showing that a character in the story is concerned about the quality or outcome of some activity.

(b) Aids Blocks, etc. These categories indicate whether achievement related activity is encouraged or blocked, e.g., the category Nurturant Press (Nup) is scored whenever someone in a story helps or encourages another character in some activity. The Blocks (B) category refers to interruptions or frustrations in the pursuit of an achievement goal, which may be either within the person himself (Bp) or outside the person in the external world (Bw).

(c) Achievement Thema (Ach. theme). This is scored whenever AI is elaborated throughout the story and occupies a position of central importance in the story.

Simplified Scoring Method Used in this Study

The interest of this study was in the directional component of achievement drives and a difficulty in the traditional scoring systems was mentioned in the text. It was explained that AI, presence of achievement imagery, a positive category, must be scored, before proceeding to score further positive and negative sub-categories. The resultant overall n.Ach. score is composed of both a negative and a positive element. Bruchman (1964) found that many of her protocols, rejected for absence

of AI, contained many negative components, which would not have been scored under the traditional system. Furthermore, Atkinson's use of n.Ach. scores as measures of positive striving for success, while test anxiety measures are regarded as negative scores, is open to some attack, when it is remembered that n.Ach. scores contain many negative components. Atkinson's justification of this practice is mentioned in the text (Chapter 4).

In this study it was decided to score both the traditional n.Ach. protocols (P.T.I) and the other projective material (P.T.II) separately for positive and negative elements. Three hundred and fifty subjects were used, giving one thousand four hundred stories to be scored from (P.T.I) alone. Thus, a simpler method of scoring was desired and devised. This is described below: A recent study, not available when this research was initiated, also scored the T.A.T. protocols separately for hope of success and fear of failure (de Charmes 1965) but a different technique was used.

Scoring Technique

The completed booklets were numbered and split into individual picture responses. All stories to picture I were then analysed, by three independent judges for three categories: presence of positive achievement imagery, directly stated (score +1); implicit positive achievement imagery (score = 0); no positive achievement imagery (score = -1). All four pictures

were scored in this way. Positive achievement imagery was described as any positive striving or hoping for success or unique performance. Next the same pictures were scored for negative achievement imagery, defined as any negative expression of fear of failure or anticipation of failure. The three categories were again; presence of negative achievement imagery, directly stated (score +1); implicit negative achievement imagery (score 0); no negative achievement imagery (score -1). When the scores were completed, scores of plus one were marked as two, scores of nought were marked as one, and scores of minus one were marked as nought, thus eliminating the negative scores. With four pictures the range of scores for each subject was from nought (no imagery at all) to eight (directly stated imagery in each picture). For each subject two scores were thus obtained, one for positive striving for success and one for negative fear of failure.

The same method of scoring was applied to the picture completion responses (P.T.II).

Three judges scored the protocols, one psychologist with experience with this scoring, and two non-psychologist, one with scoring experience and one without. All scorers familiarized themselves with scoring systems C and D-2 before attempting to read the stories. Also, the present writer scored the stories, and the results were compared. Complete agreement was reached independently for the majority of stories,

where discrepancies occurred the majority opinion was accepted. (There were very few disputed scores, owing to the simplicity of the scoring technique. Where discrepancies occurred it was usually a positive sub-category response which was involved. Discrepancies occurred over four fear of failure scores and fifteen hope of success scores.) The correlations between these measures and questionnaire scores and performance was discussed in the result section.

The high degree of agreement reached by the judges was almost definitely due to the simplicity of this scoring technique. The following are a few examples of stories which illustrate the directional component of achievement motivation. Examples of both positive need achievement and negative fear of failure themes are given.

P.T.I. N.Ach. Stories

Stories with Directly stated presence of positive Need Achievement.

A. The man in this picture is working in a factory. A great experiment has lead up to this situation. The men are trying to make a great experiment and become famous, so that they (can) become the best men at this experiment. The men are thinking what will happen next, they hope it will be famous and make lots of money.

(Picture One. Sample IB)

B. The boy's name is Jim. He is in his class. He is working for an exam. Today his class do English. Jim is thinking about the exam. He wants to go to a higher class and he must do well in the exam. He work very hard and I think he will do well.

(Picture Two. Sample 1A)

C. A boy is in an art gallery he sees a picture of an operation. He is thinking of the picture and his father is a doctor. He would like to be a doctor but he must do well at school. He must pass his 11+. He is clever. He will pass.

(Picture Three. Sample 1B)

D. "Dearest Son" said Doctor Markel "I have come to the conclusion that you wish to follow in my trade as a doctor".

More even Dad now that I have my degree in college I want to be like you and help others be well again"

A few weeks later (the) son left and with a last goodbye he strolled down the path to the gate being a very successful doctor.

(Picture Four. Sample 1A)
(subject's I.Q. = 81 spelling corrected)

E. This is a small workshop in the early twentieth century. The men are manufacturing differential gears for a tractor. They would like to make fine gears in the best British tradition, they have great pride in their work and the result is a perfect peice of workmanship.

(Picture One. Sample II)

F. Here the Prime Minister is explaining the latest crisis to befall the country to a new junior minister. He is asking the minister to do his best, for his country in its hour of need. The junior minister is to go directly to a friendly country and secure economic aid. Aware of the enormity of his task, the junior man is confident of his ability to make a success of this chance of a lifetime.

(Picture Four. Sample III)

Positively Stated Negative Fear of Failure

G. The man is working at a factory. He is working very hard but he is afraid that he will not finish in time. He makes many mistakes and is afraid that he will loose his job. The more he works the more mistakes he makes. What will happen next? - he will loose his job.

(Picture One. Sample 1A)

H. The boy is at his English lesson, but he cannot concentrate. He is thinking about school and as he has been away from school he could not learn how to do these things. The boy will probably fail the exam. and have to do another year in this form.

(Picture Two. Sample IB)

I. The younger man has come to the older and wiser man for advice. He feels that his life is a failure and cannot face the future as things are. The younger man has come to (a) situation in life, where he cannot cope anymore; failure follows failure. The older man advises him to forget the past and start again, but he is afraid that the past will repeat itself.

(Picture Four. Sample II)

J. This boy is picturing to himself a scene in an operating room decades ago, when equipment and knowledge was in its infancy. He has just been turned down for a place at university to read medicine. He would like to be a doctor but is afraid that he is not clever enough and must do something else. Like many failures, he wastes his time dreaming of what can never happen.

(Picture Three. Sample III)

2. Questionnaire Measurement

Cut-off Points

Standard questionnaires were used in each sample, and are included in the appendix and described in the section on the method of this inquiry. In all cases quoted cut-off points for division into low, medium and high on any one motivational component were decided on the basis that roughly one third of each sample should be designated high, one third medium and one third low on that trait. Cut-off points were thus decided for each sample separately and the exact figures are given in the text. An example can be seen in the following table which gives the cut-off points for the two most important measures, the test anxiety questionnaire measure and the n.Ach. projective score from the T.A.T. pictures (P.T.I).

Test Scores Cut-off Points

Test Anxiety Questionnaires

	<u>Total Score Possible</u>	<u>High Scores</u>	<u>Low Scores</u>
Sample 1A	30	16+	8-
Sample 1B	30	18+	8-
Sample II	16	11+	6-
Sample III	16	10+	6-

N.Ach. Scores

P.T.I

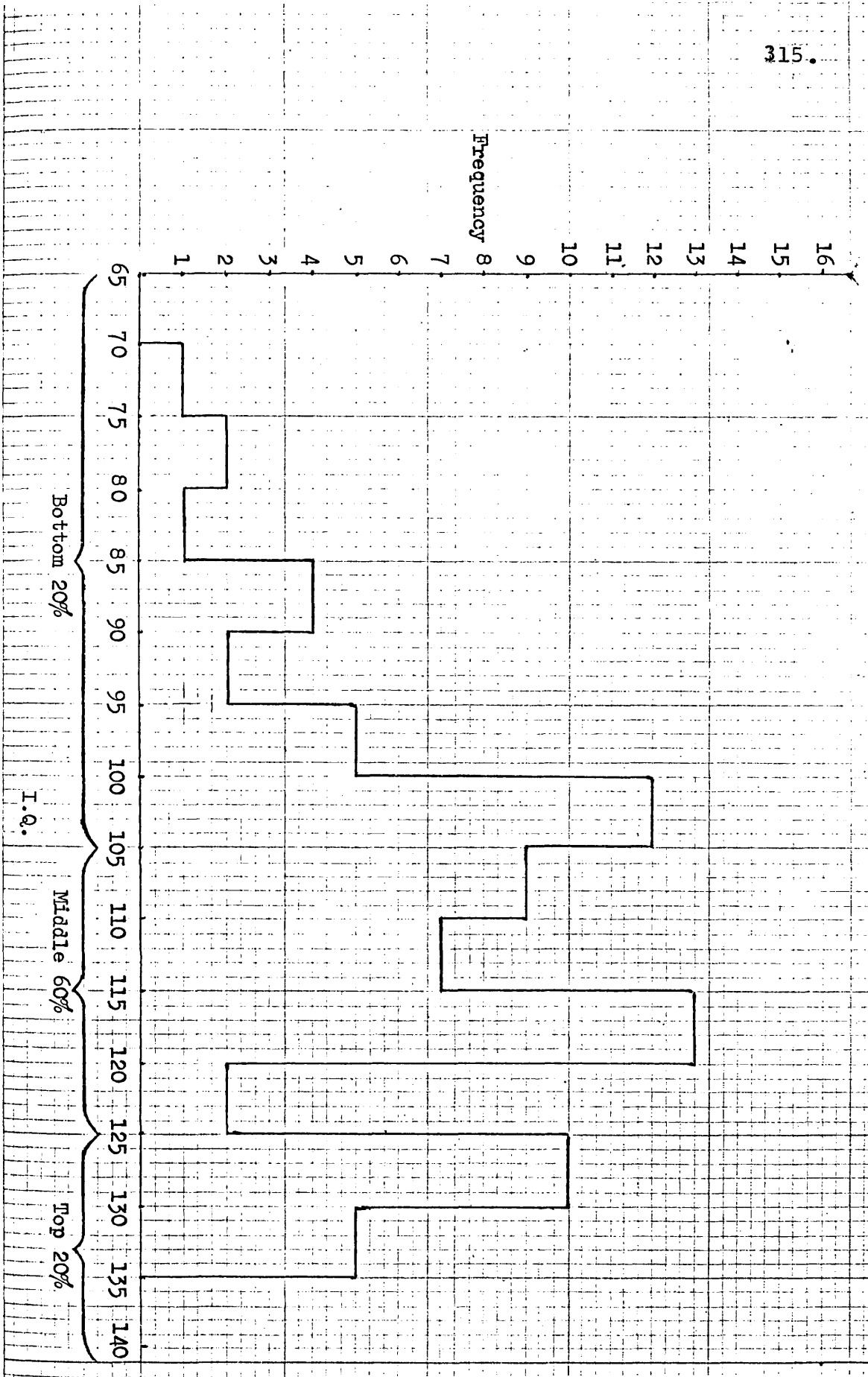
	<u>Total Possible Score</u>	<u>High Scores</u>	<u>Low Scores</u>
Sample 1A	8	4+	1-
Sample 1B	8	4+	1-
Sample II	8	6+	2-
Sample III	8	4+	1-

3. I.Q. Distributions

In all cases the I.Q. distribution was divided into three groups: high ability, medium ability and low ability for that sample. The cut-off points were decided so that, as nearly as was possible, the low and high ability groups should contain twenty per cent each of the distribution and the medium ability group should be comprised of sixty per cent of the distribution. This is expressed in the following Charts. The I.Q. measures used are named in the text.

SAMPLE I - BOYS

Distribution of I.Q. Scores, showing High, Middle and Low Cut-off Points



Bottom 20%

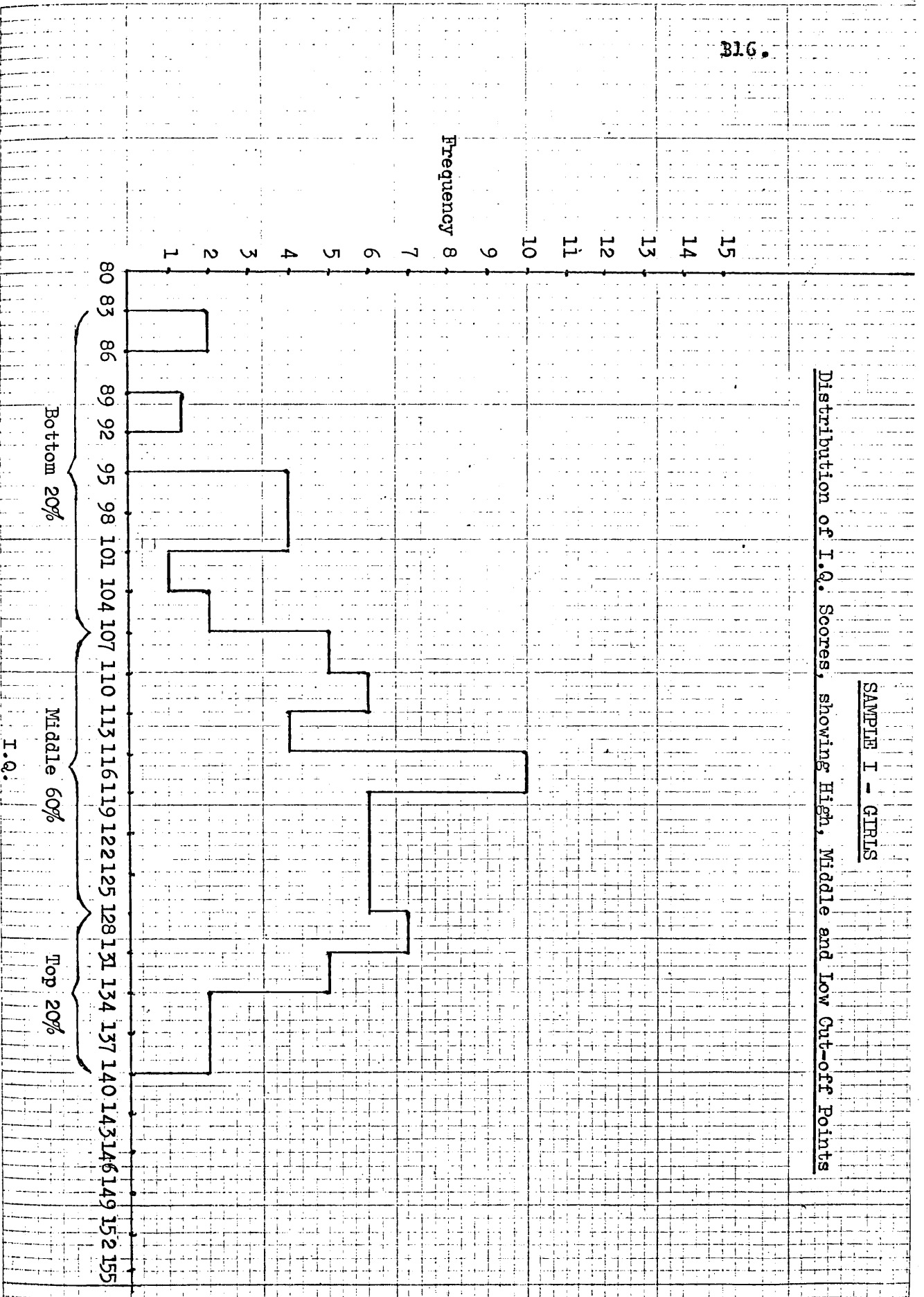
I.Q.

Middle 60%

Top 20%

SAMPLE I - GIRLS

Distribution of I.Q. Scores, showing High, Middle and Low Out-off Points



316.

Frequency

Bottom 20%

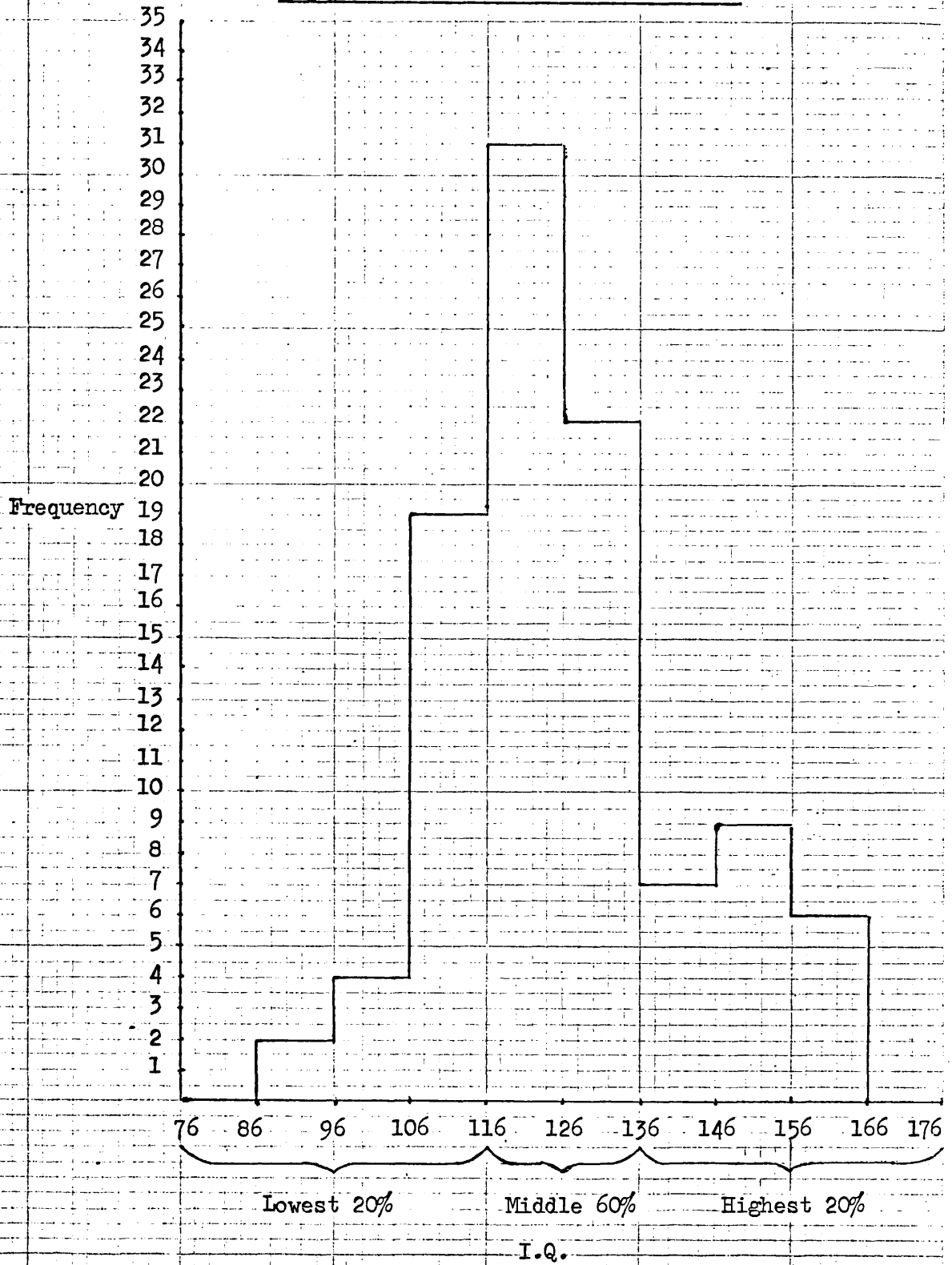
Middle 60%

Top 20%

I.Q.

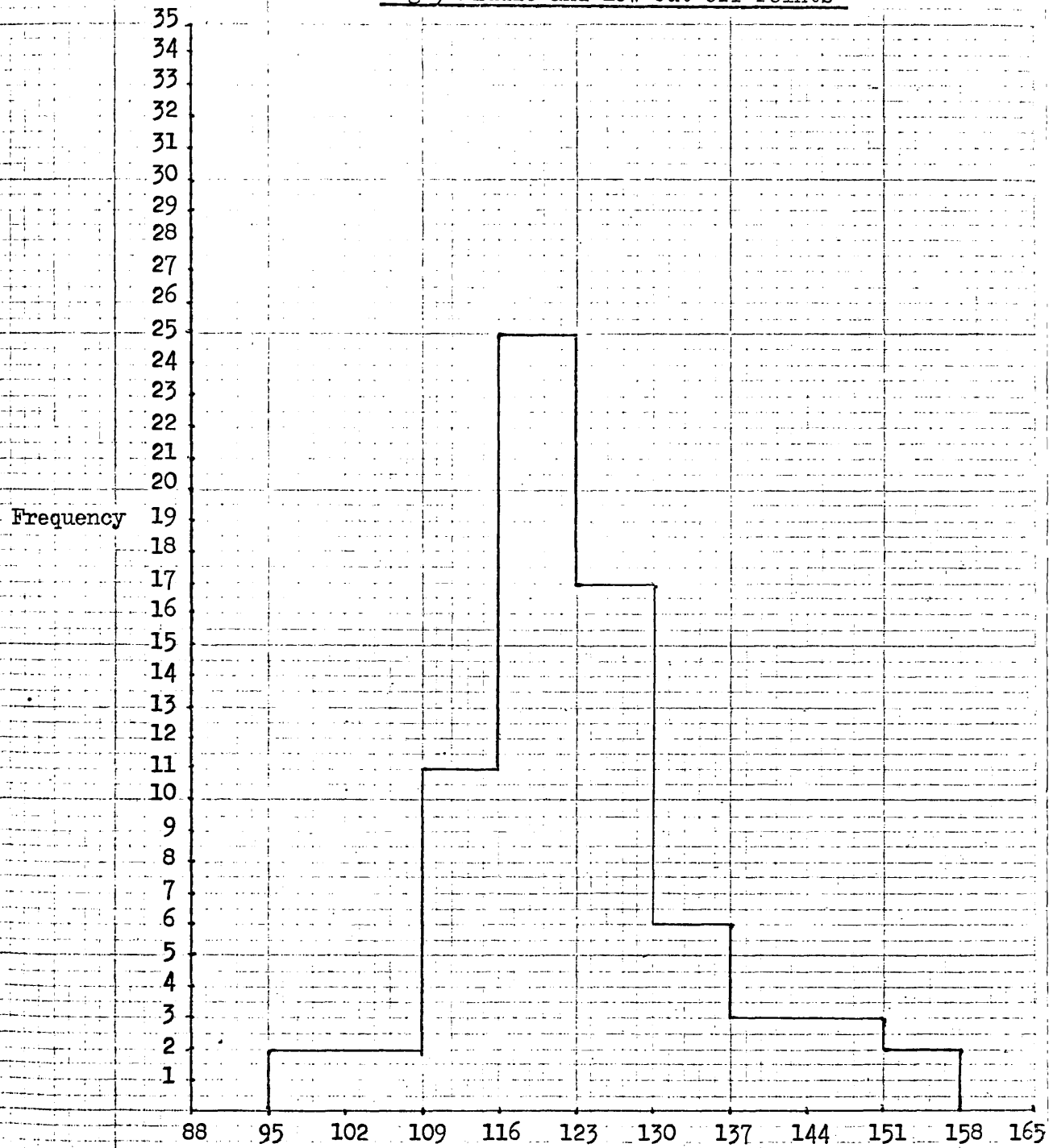
SAMPLE II

Distribution of I.Q. Scores, showing High, Middle and Low Cut-off Points



SAMPLE III

Distribution of I.Q. Scores, showing High, Middle and Low Cut-off Points



Lowest 20% Middle 60% Highest 20%

I.Q.

APPENDIX B

RAW SCORES, STATISTICAL TABLES

AND FORMULAE

SAMPLE IRAW SCORES AND REGRESSION SCORES

<u>Subject</u>	<u>P.Q. I</u>	<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>			<u>I.Q.</u>		<u>Regression Scores</u>
	<u>T.A.Q.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>E.</u>	<u>N.</u>	<u>L.</u>	<u>10+</u>	<u>11+</u>	
1	10	2	2	1	3	8	1	1	110	113	+4.10
2	27	5	1	3	3	8	2	2	112	114	+2.99
3	23	4	4	4	5	8	2	1	125	121	-3.77
4	12	2	4	4	0	6	6	0	130	126	-4.06
5	6	1	5	1	8	7	2	4	114	114	+0.87
6	1	4	3	1	4	6	7	0	124	130	+6.29
7	19	7	3	4	4	7	4	1	116	111	-4.25
8	15	2	5	3	3	6	3	4	112	113	+1.99
9	19	6	3	7	3	6	6	0	113	126	-7.23
10	13	1	1	6	2	7	6	2	118	118	+0.64
11	15	3	3	3	3	6	7	0	117	116	-0.30
12	24	5	2	4	0	6	7	1	120	110	-9.48
13	7	1	5	1	7	4	6	0	113	119	+6.93
14	10	4	4	2	2	7	3	0	126	121	-4.83
15	22	2	2	0	3	4	7	2	137	136	-1.46
16	21	6	4	5	1	5	1	1	138	140	+1.48
17	10	1	4	2	3	7	6	0	134	135	+0.71
18	20	6	5	4	2	6	5	1	132	134	+1.83
19	6	3	3	2	2	7	3	3	130	123	-7.06
20	21	5	2	4	3	8	3	3	124	126	+2.29
21	18	3	3	4	1	6	5	0	128	125	-2.94
22	8	4	5	2	3	6	3	2	126	125	-0.83
23	10	1	1	1	1	7	4	2	135	137	+1.65
24	7	1	1	2	2	5	8	0	117	119	+2.70
26	18	4	1	2	1	7	4	0	128	123	-4.17
27	13	3	1	2	2	7	3	1	130	129	-4.94

Sample I contd.

321.

<u>Subject</u>	<u>P.Q. I</u>	<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>			<u>I.Q.</u>		<u>Regression Scores</u>
	<u>T.A.Q.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>E.</u>	<u>N.</u>	<u>L.</u>	<u>10+</u>	<u>11+</u>	
28	15	3	3	3	1	5	2	0	134	138	-1.06
29	19	2	8	2	1	5	2	1	126	120	+3.71
30	20	3	1	4	2	7	1	3	130	133	-5.83
31	7	1	4	1	5	5	2	0	128	120	+2.94
32	16	6	3	5	2	8	7	1	124	122	-7.94
33	9	0	0	0	1	5	5	1	118	116	-1.71
34	12	1	4	1	3	8	5	0	130	129	-1.36
35	21	4	5	7	7	6	4	0	120	121	-1.06
36	17	3	4	4	4	8	5	0	128	127	+1.52
37	14	3	1	3	2	4	2	4	133	132	-0.94
38	10	2	4	2	4	8	4	1	133	132	-1.23
43	17	1	0	2	1	4	5	4	106	103	-1.67
44	4	1	1	0	2	7	3	1	103	100	-1.49
47	15	2	2	4	2	7	5	3	100	95	-3.32
48	13	0	2	2	4	5	2	5	97	95	-0.14
50	13	3	0	2	1	5	4	0	99	96	-1.26
51	8	2	2	3	1	5	1	0	86	84	+0.49
55	21	3	1	4	0	6	3	3	73	77	+7.25
56	19	5	2	4	1	5	5	2	90	88	+0.26
59	8	2	1	0	0	7	2	1	102	101	+0.57
60	17	0	0	0	0	7	6	0	91	89	+0.20
61	7	0	0	1	0	5	2	0	101	100	+0.62
62	16	0	0	0	0	4	7	3	96	90	-4.09
63	15	2	0	3	0	5	2	0	105	102	-1.61
64	9	2	2	2	2	6	3	0	101	96	-3.38
65	20	4	4	4	2	8	6	2	93	92	+1.09
66	4	2	1	2	1	1	1	1	105	107	+3.39

Subject	<u>P.Q. I</u>	<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>			<u>I.Q.</u>		<u>Regression Scores</u>
	<u>T.A.Q.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>E.</u>	<u>N.</u>	<u>L.</u>	<u>10+</u>	<u>11+</u>	
67	14	0	3	0	1	6	3	0	100	99	+0.68
68	12	2	6	3	4	8	2	2	103	102	+0.51
69	23	3	7	5	2	5	3	1	102	101	+0.57
70	12	3	2	2	1	7	2	4	111	108	-1.96
71	4	4	2	4	2	5	4	1	99	107	+9.74
72	17	2	0	1	0	8	4	0	90	89	+1.26
73	1	3	1	2	1	7	0	5	133	127	-6.23
74	13	1	0	1	0	8	2	1	108	111	+4.22
75	11	1	3	1	3	6	4	0	119	117	-1.42
76	8	0	0	0	0	7	2	1	120	124	+4.52
77	0	0	0	1	4	2	2	1	135	137	+1.65
78	15	6	3	6	3	3	4	1	122	120	-1.59
80	6	1	3	0	4	6	0	2	131	140	+8.88
81	16	0	0	4	0	5	4	1	109	108	+0.16
82	15	2	0	1	0	5	3	0	109	106	-1.84
83	11	2	2	2	3	6	4	2	112	114	+2.99
84	9	1	0	2	1	5	0	2	130	129	-1.06
85	14	5	3	4	2	6	5	2	115	117	+2.81
86	0	1	0	0	2	8	0	5	132	135	+2.83
87	19	6	4	4	2	7	6	2	110	109	+0.10
90	19	3	0	2	0	6	6	3	107	106	+0.28
91	20	7	6	5	5	7	1	0	102	100	-0.43
92	6	1	2	1	2	1	2	3	120	122	+2.52
93	10	1	0	4	0	8	3	1	115	116	+1.81
94	7	0	1	1	1	8	6	2	103	101	-0.49
95	10	2	1	2	0	6	6	1	117	120	+3.70
96	6	0	0	2	3	8	1	1	114	117	+3.87
97	20	6	0	4	1	6	1	1	108	101	-5.78

<u>Subject</u>	<u>P.Q. I</u>	<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>			<u>I.Q.</u>		<u>Regression Scores</u>
	<u>T.A.Q.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>E.</u>	<u>N.</u>	<u>L.</u>	<u>10+</u>	<u>11+</u>	
98	10	1	3	3	4	3	1	2	117	112	-4.30
99	7	0	5	0	3	7	3	2	116	120	+4.75
100	18	4	1	3	1	4	3	0	133	136	+2.77
101	19	6	4	4	0	6	2	2	79	60	-16.10
102	4	1	0	2	1	8	4	3	111	122	+12.04
103	3	0	4	0	3	7	0	2	114	120	+6.87
104	3	1	3	0	3	7	0	2	115	116	+1.81
106	12	3	4	3	5	6	4	1	115	118	+3.81
107	19	6	4	6	4	7	1	1	123	115	-7.65
108	9	2	6	2	4	5	2	3	117	119	+2.70
109	8	0	6	2	4	6	1	4	121	119	-1.54
110	10	2	4	3	6	8	4	1	116	118	+2.75
112	10	1	4	2	3	7	6	1	110	114	+5.10
114	3	2	8	1	10	5	5	1	124	129	+5.29
115	19	5	3	5	3	6	3	2	118	108	-9.36
116	12	4	2	4	1	8	1	1	117	116	-0.30
117	4	0	7	1	5	8	4	1	126	127	+1.17
118	18	5	3	6	4	7	6	2	125	119	-5.77
119	20	4	4	4	1	7	1	2	120	112	-7.48
120	5	1	3	3	3	7	1	3	130	136	+5.94
121	5	0	3	4	1	7	2	2	128	130	+2.06
122	4	2	4	2	4	8	2	3	128	132	+4.06
123	14	7	4	5	2	5	5	1	119	119	+0.52
124	18	6	3	6	3	4	6	0	123	114	-8.65
125	12	2	6	2	2	7	2	2	116	116	+0.75
126	11	3	4	5	3	6	7	2	127	127	+0.12
127	5	2	6	2	5	8	4	1	126	130	+4.17
128	10	7	2	2	2	8	0	2	120	123	+3.52

<u>Subject</u>	<u>P.Q. I</u>	<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>			<u>I.Q.</u>		<u>Regression Scores</u>
	<u>T.A.Q.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>E.</u>	<u>N.</u>	<u>L.</u>	<u>10+</u>	<u>11+</u>	
129	3	1	4	2	2	8	2	1	130	134	+3.94
130	6	2	4	0	2	5	2	1	110	113	+4.10
131	3	0	2	0	2	8	1	0	129	132	+3.00
132	6	0	2	0	3	5	2	1	119	124	+5.58
133	5	0	4	1	4	7	5	2	129	131	+2.00
134	14	6	4	4	2	8	3	0	108	110	+3.22
135	10	6	6	2	3	5	3	0	109	110	+2.16
136	7	0	4	1	3	6	0	0	120	123	+3.52
137	6	0	0	4	2	8	2	0	121	127	+0.46
138	5	0	0	0	2	6	7	1	116	121	+0.75
139	16	6	3	2	3	7	7	4	99	97	-0.26
141	19	5	5	2	1	6	7	0	97	92	-3.14
142	8	0	0	1	5	6	2	1	116	108	-7.25
143	13	4	0	2	1	7	3	1	90	89	+2.26
144	4	0	4	0	0	3	1	0	108	105	-1.78
145	5	3	1	2	1	5	2	4	86	88	+4.49
146	14	4	0	2	3	5	7	2	100	95	-3.32
147	22	6	2	4	3	6	2	1	100	93	-5.32
148	23	6	0	5	2	8	7	2	97	89	-6.14
149	28	7	1	6	0	5	7	1	95	93	-0.03
150	11	2	2	2	1	5	4	2	85	83	+2.55
151	13	1	0	1	0	5	7	4	116	111	-4.25
152	12	4	0	3	1	7	5	1	113	108	-4.07
153	20	3	2	1	2	5	5	1	108	95	-11.78
154	6	3	4	2	5	7	5	2	106	102	-2.67
155	8	0	0	3	3	7	4	2	109	106	-1.84
156	16	3	0	2	0	8	7	4	88	84	-1.62

<u>Subject</u>	<u>P.Q. I</u>	<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>			<u>I.Q.</u>		<u>Regression Scores</u>
	<u>T.A.Q.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>E.</u>	<u>N.</u>	<u>L.</u>	<u>10+</u>	<u>11+</u>	
157	6	0	0	2	2	6	5	2	106	108	+1.33
158	20	4	0	6	5	8	4	3	79	82	+2.90
159	4	2	2	2	2	6	3	4	102	104	+1.57
160	16	4	2	4	1	7	4	2	81	82	+2.78
161	17	5	5	5	4	6	1	1	105	100	-3.61
162	3	0	0	0	3	7	0	4	117	132	+0.70
163	13	2	2	3	2	4	7	1	100	98	-0.32
164	21	7	2	5	2	7	7	2	102	94	-6.43
165	6	3	0	2	0	8	3	3	109	106	-1.84
166	21	2	0	2	0	7	6	3	109	95	-12.84

Sample I

Product-Moment Correlation Matrix

	<u>QI</u>	<u>PT I</u>		<u>PT II</u>		<u>MPI</u>			<u>IQ</u>	<u>Exam.</u>
	<u>TAQ</u>	<u>FF</u>	<u>NA</u>	<u>FF</u>	<u>NA</u>	<u>E</u>	<u>N</u>	<u>L</u>		
	1	2	3	4	5	6	7	8	9	10
1	1.00									
2	0.64	1.00								
3	-0.00	0.18	1.00							
4	0.59	0.64	0.14	1.00						
5	-0.20	-0.02	0.54	0.07	1.00					
6	0.01	0.05	0.03	0.05	0.07	1.00				
7	0.32	0.20	-0.08	0.18	-0.08	-0.02	1.00			
8	-0.07	-0.06	-0.15	-0.09	-0.01	0.08	-0.10	1.00		
9	-0.22	-0.12	0.24	-0.02	0.27	-0.01	-0.15	-0.12	1.00	
10	-0.35	-0.22	0.22	-0.10	0.30	0.02	-0.20	-0.10	0.86	1.00

N = 152 (as for N = 100)

r = 0.195 p < .05
 r = 0.230 p < .02
 r = 0.254 p < .01
 r = 0.321 p < .001

SAMPLE II

RAW SCORES AND REGRESSION SCORES

Subject	P.Q.I.			P.T. I		P.T. II		M.P.I.		I.Q.		Examination Results				Regression Scores			
	T.A.	T.A.+	N.A.	F.F.	N.A.	F.F.	N.A.	E.	N.	11+	16+	E.	F.	M.	Comp. Scores	E.	F.	M.	C.
1	6	3	8	3	2	4	0	40	22	114	119	30	39	48	9	-12.40	-3.51	-2.59	-5.49
2	8	4	6	4	4	2	4	35	44	115	127	45	46	59	19	-0.12	+1.12	+3.81	+2.05
3	9	3	2	4	2	3	3	30	40	114	127	32	51	47	13	-13.12	+6.12	-8.19	-3.95
4	11	1	6	6	2	2	2	26	26	111	123	32	38	44	6	-11.76	-5.70	-8.89	-9.72
5	12	1	5	5	4	2	2	34	42	112	123	39	33	57	11	-4.76	-10.70	+4.11	-4.72
6	13	1	11	6	1	6	0	30	30	106	118	29	33	41	5	-13.06	-9.22	-9.02	-9.18
7	4	3	6	1	6	1	6	44	8	114	127	42	54	58	21	-3.12	+9.12	+2.81	+4.05
8	9	0	6	3	0	4	0	46	35	115	116	46	32	48	13	+4.62	-9.62	-0.87	-0.56
9	6	2	8	3	3	0	0	46	30	135	161	42	42	79	20	-14.69	-12.96	+4.27	-7.42
10	10	2	5	6	5	5	0	44	29	126	151	50	51	74	25	-3.29	-0.99	+5.01	+0.66
11	8	1	8	2	4	2	0	22	34	126	116	48	39	45	14	+6.62	-2.62	-3.87	+0.44
12	8	3	6	0	4	3	2	39	31	121	145	63	49	62	25	+11.75	-1.22	-3.54	+2.51
13	9	2	8	5	1	2	2	34	38	120	113	37	34	40	6	-3.36	-6.73	-7.14	-6.64
14	8	1	4	3	1	2	2	34	24	115	110	35	40	48	9	-4.34	+0.16	+2.58	-2.72
15	10	1	9	5	2	4	2	44	20	112	123	41	45	33	12	-2.76	+1.30	+19.89	-3.72
16	5	0	3	2	4	1	1	35	18	113	123	48	41	59	19	+4.24	-2.70	+6.11	+3.28
17	5	2	9	2	2	1	2	28	32	116	145	52	53	38	19	+0.75	+2.78	-27.54	-3.49
18	11	3	12	5	2	4	4	21	44	117	151	51	51	60	23	-2.29	-0.99	-8.99	-1.34
19	14	5	7	7	0	5	0	12	30	105	127	36	27	36	4	-9.12	-17.88	-19.19	-12.95
20	13	0	4	7	1	6	1	38	37	107	119	31	27	32	3	-11.40	-15.51	-18.59	-11.49
21	6	2	5	2	1	2	1	26	15	105	99	40	32	46	9	+4.40	-4.59	+6.91	+0.67
22	12	0	4	4	4	3	1	23	44	113	123	37	30	40	5	-6.76	-13.70	-8.89	-10.72
23	12	0	1	6	5	4	4	17	14	123	156	54	52	76	27	-0.99	-1.48	+4.14	+1.12
24	9	1	12	4	7	2	6	42	32	114	89	38	28	37	5	+5.80	-5.62	+3.65	-0.25
25	15	1	11	7	4	4	4	22	40	112	139	42	38	45	11	-7.21	-10.44	-17.09	-9.64
26	10	2	8	6	3	4	1	42	30	114	113	36	31	42	6	-4.36	-9.73	-5.14	-6.64
27	12	4	7	4	4	6	4	44	42	114	113	39	44	49	13	-1.36	+3.27	+1.86	+0.36
28	10	1	7	3	7	5	4	14	28	116	116	51	54	59	24	+9.62	+12.38	+10.13	+10.44

Subject	P.Q.I.			P.T. I		P.T. II		M.P.I.		I.Q.		Examination Results				Regression Scores			
	T.A.	T.A.+	N.A.	F.F.	N.A.	F.F.	N.A.	E.	N.	11+	16+	E.	F.	M.	Comp. Scores	E.	F.	M.	C.
29	5	1	2	4	6	0	0	41	28	123	116	39	46	51	14	-2.38	+4.38	+2.13	+0.44
30	5	3	7	1	4	0	1	31	20	110	116	39	50	52	15	-2.38	+8.38	+3.13	+1.44
31	11	2	8	7	6	4	4	38	30	122	145	59	70	71	27	-0.25	+19.88	+5.46	+4.51
32	10	0	11	0	1	6	4	35	25	111	127	44	43	46	14	-1.12	-1.88	-9.19	-2.95
33	6	2	8	0	0	2	2	31	19	116	103	30	43	60	13	-6.96	+5.23	+18.61	+3.44
34	9	5	11	5	5	4	5	20	40	119	156	66	59	96	30	+11.01	+5.52	+24.14	+4.12
35	11	2	15	4	3	5	1	32	42	113	110	35	45	45	10	-4.34	+5.16	-0.42	-1.72
36	9	2	5	1	6	0	5	36	30	102	119	47	51	55	21	+4.60	+8.48	+4.41	+6.51
37	9	2	5	3	0	2	0	21	40	117	116	44	44	47	15	+2.62	+2.38	-1.87	+1.44
38	10	2	2	6	4	4	0	34	22	107	113	36	35	35	6	-4.36	-5.73	-12.14	-6.64
39	8	1	6	5	4	2	4	44	29	127	151	60	50	77	27	+6.71	-1.99	+8.01	+2.66
40	9	2	8	5	3	5	1	22	36	117	156	57	51	67	27	+2.01	-2.48	-4.86	+1.12
41	15	0	3	7	4	7	2	10	16	117	103	32	48	56	14	-4.96	+10.23	+14.61	+4.44
42	13	1	5	6	2	7	2	13	31	111	110	37	35	48	9	-2.34	-4.85	+2.58	-2.72
43	9	2	10	2	3	1	4	43	36	107	113	42	41	45	13	+1.64	+0.27	-2.14	+0.36
44	8	3	5	2	3	1	1	30	34	123	127	47	45	56	19	+1.88	+0.12	+0.81	+2.05
45	6	2	2	4	7	1	6	39	30	110	110	44	49	54	19	+4.66	+9.15	+8.58	+7.28
46	9	4	4	4	6	3	2	14	30	115	123	45	54	65	23	+1.24	+10.30	+12.01	+7.28
47	10	1	5	5	2	6	2	22	36	116	123	37	37	52	10	-6.76	-6.70	-0.89	-5.72
48	9	3	12	3	7	5	3	21	28	116	123	42	51	52	18	-1.76	+7.30	-0.89	+2.28
49	7	4	8	3	8	1	5	36	29	121	106	50	54	51	22	+12.02	+15.34	+7.88	+11.52
50	10	0	4	1	4	3	4	22	20	119	119	41	45	65	19	-1.40	+2.48	+14.41	+4.51
51	6	1	10	2	4	2	3	28	36	116	127	53	56	62	26	+7.88	+11.12	+6.81	+9.05
52	5	2	5	3	6	1	5	43	23	127	151	51	66	72	27	-2.29	+14.01	+3.01	-2.66
53	5	5	8	7	6	5	3	26	34	114	123	60	56	69	28	+16.24	+12.30	+16.11	+12.28
54	11	1	9	7	7	2	2	31	46	119	161	56	61	85	29	-0.69	+6.04	+10.27	+1.58
55	11	0	2	2	0	6	2	27	32	119	127	43	31	47	11	-2.12	-11.88	-8.19	-5.95
56	8	1	0	3	2	6	0	15	14	114	127	35	25	48	6	-10.12	-19.88	-7.19	-10.95
57	10	1	8	4	1	2	1	37	44	114	151	57	48	63	25	+3.71	-3.99	-5.99	+0.66

Subject	P.Q.I.			P.T. I		P.T. II		M.P.I.		I.Q.		Examination Results				Regression Scores			
	T.A.	T.A.+	N.A.	F.F.	N.A.	F.F.	N.A.	E.	N.	11+	16+	E.	F.	M.	Comp. Scores	E.	F.	M.	C.
58	8	2	5	2	7	3	5	29	38	119	133	53	59	62	27	+5.84	+12.34	+3.36	+8.20
59	7	1	5	0	2	1	1	30	24	119	127	45	40	45	13	-0.12	-4.88	-10.19	-3.95
60	10	2	8	6	6	4	0	36	32	115	151	58	56	79	29	+4.71	+4.01	+10.01	+4.66
61	10	4	8	4	6	5	4	36	24	115	151	55	62	89	29	+1.71	+10.01	+20.01	+4.66
62	5	3	10	3	8	5	0	42	40	112	151	48	50	80	24	-5.29	-1.99	+11.01	-0.34
63	7	2	2	4	4	2	0	13	38	112	139	47	53	76	25	-2.21	+4.56	+13.91	+4.36
64	10	1	4	4	3	2	0	17	32	111	113	39	35	55	12	-1.36	-5.73	+7.86	-0.64
65	8	1	2	5	5	3	1	30	32	117	133	40	56	73	22	-7.16	+9.34	+14.36	+3.20
66	6	2	6	4	6	1	4	17	12	117	133	55	51	70	26	+7.84	+4.34	+11.36	+7.20
67	6	2	9	5	6	1	2	25	28	106	110	36	45	52	13	-3.34	+5.15	+6.58	-1.28
68	6	1	10	4	7	2	4	35	26	120	133	59	46	73	25	+11.84	-0.66	+14.36	+6.20
69	4	1	11	3	6	1	1	34	37	115	110	45	38	60	16	+5.66	-1.85	+14.58	+4.28
70	3	1	2	2	1	0	0	15	23	111	117	40	41	55	15	-1.72	-0.92	+5.56	+1.13
71	8	1	8	5	6	1	1	25	42	111	123	40	45	39	12	-3.76	+1.30	-13.89	-3.72
72	9	3	9	4	4	3	2	30	30	117	127	45	45	60	19	-0.12	+0.12	+4.81	+2.05
73	13	3	11	7	4	5	4	34	23	141	116	37	39	48	10	-4.38	-2.62	-0.87	-3.56
74	11	2	6	7	6	9	3	16	25	121	113	44	41	45	14	+3.64	+0.27	-2.14	+1.36
75	5	4	8	2	7	5	6	5	36	109	89	35	60	45	14	+2.80	+26.38	+11.65	+8.75
76	7	3	6	5	4	4	2	26	18	116	116	47	41	42	14	+5.62	-0.62	-6.87	+0.44
77	8	3	5	3	7	4	2	13	32	126	133	52	56	61	26	+4.84	+9.34	+2.36	+7.20
78	5	2	6	1	1	1	2	34	26	134	156	60	49	62	25	+5.01	-4.48	-9.86	-0.88
79	3	1	5	1	6	7	5	44	8	128	133	71	58	66	28	+23.84	+11.34	+7.36	+9.20
80	12	3	6	7	4	1	1	31	42	118	139	41	48	57	18	-8.21	-0.44	-5.09	+2.64
81	9	1	4	5	3	3	1	41	35	107	133	45	46	36	13	-2.16	-0.66	-22.64	-5.80
82	12	1	10	6	5	4	2	19	39	109	103	40	32	28	7	+3.04	-5.77	-13.39	-2.56
83	13	1	1	6	1	4	1	12	34	113	133	37	19	36	4	-10.16	-27.66	-22.64	-14.80
84	13	0	12	5	2	5	2	28	44	116	127	49	22	32	10	+3.88	-22.88	-23.19	-6.95
85	11	1	10	7	2	5	0	44	31	127	123	43	27	39	8	-0.76	-16.70	-13.89	-7.72
86	9	1	3	6	1	7	2	29	31	104	113	40	40	46	11	-0.36	-0.73	-1.14	-1.64

Subject	<u>P.Q.I.</u>			<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>		<u>I.Q.</u>		<u>Examination Results</u>				<u>Regression Scores</u>			
	T.A.	T.A.+	N.A.	F.F.	N.A.	F.F.	N.A.	E.	N.	11+	16+	E.	F.	M.	Comp. Scores	E.	F.	M.	C.
87	14	0	3	6	4	6	2	19	28	107	113	46	43	52	17	+5.64	+2.27	+4.86	+4.36
88	4	2	11	1	6	2	5	48	44	133	133	52	71	69	28	+4.84	+24.34	+10.36	+9.20
89	7	1	4	1	5	3	3	28	36	121	116	50	49	48	19	+8.62	+7.38	-0.87	+5.44
91	13	1	9	8	5	5	4	38	38	107	116	39	23	38	6	-2.38	-18.63	-10.87	-7.56
101	12	1	7	3	1	4	3	36	35	114	123	40	34	38	8	-3.76	-9.70	-14.89	-7.72
102	10	0	8	7	6	4	0	11	36	108	127	53	47	45	19	+7.88	+2.12	-10.19	+2.05
103	11	2	5	3	7	0	2	30	28	115	116	50	42	58	20	+8.62	+0.38	+9.13	+6.44
104	11	0	13	7	2	6	3	25	40	129	110	35	39	44	7	-4.34	-0.85	-1.42	-4.72
105	9	1	11	7	6	1	3	32	26	112	151	42	45	65	19	-11.29	-6.99	-3.97	-5.34
106	11	1	3	5	1	2	0	28	40	127	113	37	37	52	10	-3.36	-3.73	+4.86	-2.64
107	14	1	10	6	3	4	3	31	36	116	123	38	24	20	5	-5.76	-19.70	-32.89	-10.72
108	8	2	11	3	1	1	1	25	36	117	145	58	70	84	30	+6.75	+19.78	+18.46	+7.51
109	8	4	8	3	7	6	5	19	45	116	123	53	61	63	27	+9.24	+17.30	+10.11	+11.28
110	8	1	4	2	7	4	5	26	21	109	110	40	39	58	15	+0.66	-0.85	+12.58	+3.28

SAMPLE IIComposite Score

Percentile Points	Range Exam. Result %	<u>English</u> No. of Subjects	Range Exam. Result %	<u>French</u> No. of Subjects	Range Exam. Result %	<u>Maths</u> No. of Subjects
10	57-100	11	59-100	10	76-100	10
9	52-56	11	54-58	10	66-75	10
8	49-51	9	51-53	10	61-65	10
7	46-48	9	47-50	11	58-60	10
6	44-45	10	45-46	12	53-57	8
5	41-43	11	41-44	12	49-52	9
4	40	8	39-40	8	47-48	10
3	38-39	8	35-38	8	45-46	11
2	36-37	11	31-34	9	38-44	12
1	1-35	12	1-30	10	1-37	10
		<u>100</u>		<u>100</u>		<u>100</u>

NOTE

The composite score for any subject is the sum of the three percentile points. This means that the range of composite scores is from 3 (bottom percentiles, in English, French and Maths) to 30 (top percentiles, in English, French and Maths)

Sample II
Product-Moment Correlation Matrix with
Examination Scores

	<u>Q1</u>			<u>PTI</u>		<u>PTII</u>		<u>MPI</u>		<u>IQ</u>		<u>Examinations</u>		
	<u>TA</u>	<u>TA+</u>	<u>NA</u>	<u>FF</u>	<u>NA</u>	<u>FF</u>	<u>NA</u>	<u>E</u>	<u>N</u>	<u>11+</u>	<u>16+</u>	<u>E</u>	<u>F</u>	<u>M</u>
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.00													
2	-0.25	1.00												
3	0.07	0.17	1.00											
4	0.64	-0.07	0.11	1.00										
5	-0.26	0.26	0.10	0.01	1.00									
6	0.49	-0.06	0.06	0.39	-0.10	1.00								
7	-0.10	0.22	0.19	-0.17	0.48	0.05	1.00							
8	-0.23	-0.01	0.20	-0.15	0.01	-0.24	1.10	1.00						
9	0.29	0.08	0.33	0.24	-0.04	0.01	-0.09	-0.01	1.00					
10	-0.17	0.05	0.09	-0.10	0.07	-0.06	0.09	0.23	-0.04	1.00				
11	-0.05	0.11	0.06	0.07	0.06	-0.12	-0.05	0.16	0.11	0.35	1.00			
12	-0.31	0.18	0.12	-0.18	0.37	-0.10	0.26	0.10	0.02	0.36	0.62	1.00		
13	-0.45	0.40	0.08	-0.25	0.50	-0.19	0.37	0.04	-0.01	0.28	0.44	0.61	1.00	
14	-0.35	0.28	-0.02	-0.15	0.39	-0.19	0.16	0.06	-0.07	0.34	0.63	0.63	0.72	1.00

N = 100
r = 0.195 p < 0.05
r = 0.230 p < 0.02
r = 0.254 p < 0.01
r = 0.321 p < 0.001

SAMPLE IIProduct-Moment Correlation Matrix with Composite Score

	<u>P.Q. I</u>		<u>P.T. I</u>		<u>M.P.I.</u>	<u>I.Q.</u>		<u>Comp. Score</u>
	<u>T.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>N</u>	<u>11+</u>	<u>16+</u>		
	1	2	3	4	5	6	7	
1	1.00							
2	0.64	1.00						
3	-0.26	0.01	1.00					
4	0.36	0.25	-0.07	1.00				
5	-0.24	-0.18	0.08	0.08	1.00			
6	-0.05	0.07	0.06	0.22	0.41	1.00		
7	-0.43	-0.25	0.51	0.01	0.41	0.63	1.00	

N = 100

$r = 0.195$ $p < .05$
 $r = 0.230$ $p < .02$
 $r = 0.254$ $p < .01$
 $r = 0.321$ $p < .001$

SAMPLE III

Raw Scores and Regression Scores

<u>Subject</u> <u>No.</u>	<u>P.Q. I</u>			<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>		<u>I.Q.</u>	<u>Exam.</u>	<u>Regression</u> <u>Score</u>
	<u>T.A.</u>	<u>T.A.+</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>E.</u>	<u>N.</u>			
1	11	5	10	6	7	4	8	30	19	131	64	+7.86
2	7	5	6	2	6	1	5	24	10	131	61	+4.86
3	8	2	5	3	1	3	0	30	20	116	54	+8.51
4	8	2	3	0	3	0	4	13	11	117	45	-1.20
5	9	2	4	1	2	0	3	36	36	111	47	+5.06
6	4	7	3	2	2	1	2	22	14	121	59	+9.96
7	4	1	11	2	6	2	2	34	20	126	60	+7.41
8	3	5	1	2	6	0	8	15	5	121	55	+5.96
9	7	4	9	1	5	3	7	33	18	138	68	+6.89
10	8	2	7	3	6	0	7	17	30	121	60	+10.96
11	6	1	5	2	3	0	5	24	20	126	51	-1.59
12	4	3	10	7	5	3	1	24	10	138	51	-10.11
13	8	8	2	5	0	2	5	27	8	111	40	-1.94
14	6	4	5	2	1	2	3	32	32	121	60	+10.96
15	9	1	7	3	2	4	0	15	32	101	44	+9.15
16	6	6	3	2	2	3	0	33	23	121	52	+2.96
17	6	2	3	2	3	3	4	20	22	111	53	+11.06
18	7	2	6	3	7	5	2	38	28	121	40	-9.04
19	5	2	7	1	2	0	2	19	14	121	48	-1.04
20	3	2	2	4	0	0	0	22	36	126	59	+6.41
21	7	1	5	2	2	5	3	42	24	126	43	-9.59
22	1	0	8	0	6	1	7	14	20	124	59	+7.83
23	3	4	11	1	1	0	3	32	13	116	41	-4.49
24	8	2	6	3	7	5	7	16	30	116	61	+15.51
25	9	5	3	5	2	7	1	23	24	122	40	-9.75
26	3	7	13	1	5	1	3	17	12	132	65	-8.15
27	9	1	1	1	1	0	4	27	22	126	48	-4.59
28	12	6	5	5	7	7	6	26	35	153	73	+1.25

Sample III contd.

335.

<u>Subject No.</u>	<u>P.Q. I</u>			<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>		<u>I.Q.</u>	<u>Exam.</u>	<u>Regression Score</u>
	<u>T.A.</u>	<u>T.A.+</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>E.</u>	<u>N.</u>			
29	4	3	5	0	6	3	1	26	24	121	50	+0.96
30	12	2	7	4	3	5	1	38	32	121	32	-17.04
31	15	2	2	5	2	7	4	22	28	126	33	-19.59
32	5	7	8	5	0	2	1	38	8	116	56	+10.51
33	5	1	7	0	7	2	2	22	10	123	53	+2.54
34	10	1	7	4	7	2	5	40	21	130	60	+4.57
35	8	2	6	3	3	2	7	35	18	121	53	+3.96
36	0	2	5	1	2	2	0	44	32	97	36	+3.99
37	14	0	3	6	0	5	0	44	10	118	45	-1.91
38	13	8	12	6	0	7	0	22	10	123	47	-3.46
39	10	2	8	4	2	5	5	39	28	146	57	-9.78
40	14	6	5	3	5	4	7	23	22	153	73	+1.25
41	13	6	6	1	3	2	5	17	17	138	67	+5.89
42	9	2	3	3	1	3	3	31	32	127	57	+3.70
43	15	0	6	6	3	2	1	20	36	122	44	-5.75
44	13	3	13	0	1	7	3	32	23	116	41	-4.49
45	5	6	6	1	0	1	2	36	27	107	47	+7.89
46	9	1	4	4	2	5	4	21	21	121	35	-14.04
47	5	0	6	1	0	3	0	24	35	127	53	-0.30
48	5	2	8	2	1	3	1	13	18	130	59	+3.57
49	3	2	3	1	1	3	1	17	29	116	43	-2.49
50	7	1	10	4	3	3	5	21	32	127	41	-12.30
51	5	2	7	4	4	5	0	42	27	131	63	+6.86
52	6	0	4	1	1	3	0	39	14	124	48	-3.17
53	9	2	3	6	7	6	5	34	18	123	55	+4.54
54	14	6	6	7	3	3	2	22	21	146	65	+1.78
55	5	1	4	1	4	2	6	24	33	118	45	-1.91
56	5	6	5	0	7	0	9	24	36	126	68	+15.41
57	10	1	3	4	5	5	6	15	18	131	55	+1.14

<u>Subject</u> <u>No.</u>	<u>P.Q. I</u>			<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>		<u>I.Q.</u>	<u>Exam.</u>	<u>Regression</u> <u>Score</u>
	<u>T.A.</u>	<u>T.A.+</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>F.F.</u>	<u>N.A.</u>	<u>E.</u>	<u>N.</u>			
58	15	0	6	5	0	7	0	32	24	121	27	-22.04
59	6	0	7	1	2	2	0	12	28	122	41	-8.75
60	4	7	12	0	7	1	7	28	15	129	68	+13.28
61	16	1	12	5	7	7	5	26	21	121	49	-0.04
62	15	0	4	7	0	7	0	13	32	107	16	-23.11
63	11	1	6	6	0	3	0	12	34	116	43	-2.49
64	8	1	3	2	1	0	5	44	9	118	49	+2.09
65	15	7	12	4	7	5	6	34	22	146	71	+4.22
66	13	1	3	7	4	6	6	11	37	121	29	-20.04
67	8	5	10	1	3	2	4	40	7	126	48	-4.59
68	9	2	5	5	4	6	2	36	33	111	39	-2.94
69	3	5	2	2	2	6	3	10	17	129	63	+8.28
70	7	1	3	4	0	3	0	25	27	131	48	-8.14
71	7	1	4	3	0	1	4	13	31	123	51	+0.54

SAMPLE III

Product-Moment Correlation Matrix

	<u>Q.I.</u>			<u>P.T. I</u>		<u>P.T. II</u>		<u>M.P.I.</u>		<u>I.Q.</u>	<u>Exam.</u>
	<u>T.A.</u>	<u>T.A.+</u>	<u>N.A.</u>	<u>F.F.</u>	<u>n.Ach.</u>	<u>F.F.</u>	<u>n.Ach.</u>	<u>E</u>	<u>N</u>		
	1	2	3	4	5	6	7	8	9	10	11
1	1.00										
2	-0.05	1.00									
3	0.04	0.21	1.00								
4	0.60	-0.05	-0.07	1.00							
5	-0.02	0.14	0.29	-0.07	1.00						
6	0.58	-0.07	0.06	0.56	0.02	1.00					
7	0.06	0.23	0.06	-0.14	0.61	-0.17	1.00				
8	0.02	0.03	0.13	-0.02	-0.03	0.06	-0.11	1.00			
9	0.16	-0.37	-0.19	0.13	-0.08	0.20	-0.11	-0.11	1.00		
10	0.22	0.29	0.21	0.14	0.37	0.12	0.34	-0.03	-0.11	1.00	
11	-0.20	0.48	0.21	-0.23	0.48	-0.28	0.44	-0.00	-0.20	0.64	1.00

N = 71

$r = 0.232$ $p < .05$
 $r = 0.274$ $p < .02$
 $r = 0.302$ $p < .01$
 $r = 0.380$ $p < .001$

FORMULAE1. Pearson Product-Moment Correlation Coefficient

$$r = \frac{N\epsilon d_x d_y - \epsilon d_x \epsilon d_y}{\sqrt{N\epsilon d_x^2 - (\epsilon d_x)^2} \sqrt{N\epsilon d_y^2 - (\epsilon d_y)^2}}$$

2. Regression of Y on X (Discrepancy scores of observed minus predicted performance, predicting from present I.Q.)

$$y^2 = \frac{\epsilon X^2 \epsilon Y - \epsilon X \epsilon XY}{N\epsilon X^2 - (\epsilon X)^2} + \frac{N\epsilon XY - \epsilon X \epsilon Y}{N\epsilon X^2 - (\epsilon X)^2} (X)$$

X = Present I.Q. (non exam. conditions)

y = Observed performance (exam.)

y^1 = Predicted performance

N = No. of subjects

3.

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

χ^2 Test, with Yates correction

$$\chi^2 = \frac{N(|AD - BC| - \frac{N}{2})^2}{(A + B)(C + D)(A + C)(B + D)}$$

from such a diagram:-

A	B	A + B
C	D	C + D
A + C B + D		N

One-tailed tests of significance have been applied to χ^2 and Fisher's exact probability results

APPENDIX C

TESTS & TEST INSTRUCTION

SAMPLE I

SAMPLE II

SAMPLE III

APPENDIX C.CONTENTS

Sample I	Q.I.	T.A.S.C.
Sample II & III	Q.I.	Test Anxiety Need Achievement and Facilitating Anxiety Questions.
Sample II & III	Q.II.	Item Contents.
Sample I	Q.II.	Eysenck Junior Personality Inventory (First 22 items).
Sample II & III	Q.II.	M.P.I.
Sample I,II & III	P.T.1	Pictures Used.
Sample I.	P.T.II.	Picture Completion Test.
Sample II	P.T.II	Picture Completion Test.
Sample III	P.T.III.	Picture Completion Test.

Sample I Q.I. T.A.S.C.Instruction

Here are some questions which I would like you to answer. They are different from normal school questions because they are about how you think and feel and, therefore, there are no right or wrong answers. People think and feel differently. Your answer depends on how you think and feel. Listen carefully to each question and answer by putting a circle around either "yes" or "no". If you don't understand a question ask me about it. No-one but myself will see your answers. Do you understand?

- | | | | |
|----|--|-----|----|
| 1. | Do you worry when your teacher says she is going to ask you questions to find out how much you know? | YES | NO |
| 2. | Do you worry about going up to a new class each year? | YES | NO |
| 3. | When your 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? | YES | NO |
| 4. | When your teacher says she is going to ask some boy and girl in class to do arithmetic problems, do you hope that she will ask someone else and not you? | YES | NO |
| 5. | Do you sometimes dream at night that you are in school and cannot answer your teachers questions? | YES | NO |
| 6. | When your teacher says that she is going to find out how much you have learned, does your heart begin to beat faster? | YES | NO |
| 7. | When your teacher is teaching you about arithmetic do you feel that other children in the class understand her better than you? | YES | NO |

- | | | | |
|-----|--|-----|----|
| 8. | When you are in bed at night, do you sometimes worry about how you are going to do in class the next day? | YES | NO |
| 9. | When your teacher asks you to write on the blackboard in front of the class, does the hand you write with sometimes shake a little? | YES | NO |
| 10. | When your teacher is teaching you about reading, do you feel that other children in the class understand her better than you? | YES | NO |
| 11. | Do you think you worry more about school than other children? | YES | NO |
| 12. | When you are at home and are thinking about the arithmetic lesson for the next day, do you become afraid that you will get the answer wrong? | YES | NO |
| 13. | If you are sick and miss school, do you worry that you will do worse in your school work than other children when you go back to school? | YES | NO |
| 14. | Do you sometimes dream at night that other boys and girls in your class can do things that you cannot do? | YES | NO |
| 15. | When you are home and you are thinking about your reading for the next day, do you worry that you cannot do? | YES | NO |
| 16. | When your teacher says that she is going to find out how much you have learned do you get a funny feeling in your stomach? | YES | NO |
| 17. | If you did very badly when the teacher asked you to do something, would you probably feel like crying even though you would try not to cry? | YES | NO |
| 18. | Do you sometimes dream at night that the teacher is angry because you do not know your lessons? | YES | NO |

In the following questions the word "test" is used. What I mean by the test is anytime your teacher asks you to do something to find out how much you know or how much you 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 anytime that your teacher asks you to do something to find out how much you know.

- | | | |
|--|-----|----|
| 19. Are you afraid of school tests? | YES | NO |
| 20. Do you worry a lot before you do a test? | YES | NO |
| 21. Do you worry a lot while you are doing a test? | YES | NO |
| 22. After you have done a test do you worry about how well you did on that test? | YES | NO |
| 23. Do you sometimes dream at night that you did badly on a test you had in school that day? | YES | NO |
| 24. When you are doing a test does the hand you write with shake a little? | YES | NO |
| 25. When you are taking a hard test, do you forget somethings you knew very well before you started the test? | YES | NO |
| 26. When your teacher says she is going to give the class a test, do you become afraid that you will do badly? | YES | NO |
| 27. Do you often wish that you didn't worry so much about tests? | YES | NO |
| 28. When the teacher says she is going to give the class a test, do you get a nervous or funny feeling? | YES | NO |
| 29. While you are doing a test do you usually think you are doing badly? | YES | NO |
| 30. While you are on the way to school, do you sometimes worry that your teacher will give your class a test? | YES | NO |

Samples II & III Q.I.

Here are some questions to find out the kind of things that worry people of your age. Please try and answer all the questions, and answer them honestly. No-one will see the answers except myself. When looking at the answers I shall not be interested in you as a person but as an example of your age group. Your name will not be used. You will be given a number. So all the information you give me will be strictly confidential. Answer each question by putting a circle round the answer that applies to you.

- | | | | |
|-----|---|------|-------|
| 1. | When taking an examination, my emotional feelings do not interfere with my performance? | True | False |
| 2. | I often feel frightened when I have to take a surprise exam? | True | False |
| 3. | During tests I find myself thinking of the consequence of failing | True | False |
| 4. | After important test I am frequently so tense that I do not feel well | True | False |
| 5. | While taking an important exam I find myself thinking how much brighter the other students are than I am | True | False |
| 6. | My parents expect the highest possible level of achievement from their children | True | False |
| 7. | I work most effectively under pressure | True | False |
| 8. | When I hear a distinguished person speaking I think of how proud my parents would be if I could be as distinguished | True | False |
| 9. | If I were to take an intelligence test I would worry a great deal before taking it | True | False |
| 10. | It depresses me that I don't do more for my parents | True | False |
| 11. | I sometimes feel my heart beating very fast during important tests | True | False |

- | | | |
|--|------|-------|
| 12. I could not face my family if I fail in school or college work | True | False |
| 13. While I may be nervous before taking an exam, once I start I seem to forget to be nervous | True | False |
| 14. I often worry more about my parents reactions to passing and failing tests than about my own | True | False |
| 15. After taking an exam, I always feel I could have done better than I actually did | True | False |
| 16. My mother and father often made me obey even when I thought it was unreasonable | True | False |
| 17. Nervousness while taking an exam helps me to do better | True | False |
| 18. I used to think about what my parents might do if I did badly at school | True | False |
| 19. When I start an exam nothing is able to distract me | True | False |
| 20. Getting a good mark in one exam doesn't seem to increase my confidence in another | True | False |
| 21. My parents were always especially nice to me when I did well in a test at school | True | False |
| 22. Whenever I brought home a bad report my parents would become quite upset | True | False |
| 23. If I knew I was going to take an intelligence test I would feel confident and relaxed beforehand | True | False |
| 24. I usually get depressed after taking an exam | True | False |
| 25. My parents point out my faults too frequently | True | False |
| 26. I look forward to exams | True | False |
| 27. My parents seem to have modest goals for me | True | False |

- | | | | |
|-----|--|------|-------|
| 28. | While taking an important exam I perspire a great deal | True | False |
| 29. | I owe it to my family to be ambitious | True | False |
| 30. | My family has always stressed the importance of doing well at school or college | True | False |
| 31. | I enjoy taking a difficult exam | True | False |
| 32. | My parents were always very keen for me to go to University | True | False |
| 33. | I do badly on things like intelligence tests and school examinations | True | False |
| 34. | During examinations I find myself thinking of things unrelated to the subject I am doing | True | False |
| 35. | During examinations I frequently get so nervous that I forget facts I really know | True | False |
| 36. | In order to please my parents I work extra hard at my academic work | True | False |
| 37. | The more important an exam the better I seem to do | True | False |
| 38. | I have an uneasy feeling before taking an examination | True | False |
| 39. | My parents have always encouraged me to develop intellectual and cultural interests | True | False |
| 40. | Anxiety helps me do better during examinations and tests | True | False |

Q.I. Item Content

Test Anxiety Questions (16 items)

Nos. 1, 2, 3, 4, 5, 9, 11, 15, 20, 23, 24, 28, 33, 34, 35, 38.

Need Achievement Questions (16 items)

Nos. 6, 8, 10, 12, 14, 16, 18, 21, 22, 25, 27, 29, 30, 32, 36,
39.

Facilitating Anxiety Questions (8 items)

Nos. 7, 13, 17, 19, 26, 31, 37, 40.

Sample I Q.IIInstructions

Please answer each question by putting a circle around the "YES" or the "NO" following the question. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of each question.

REMEMBER TO ANSWER EACH QUESTION

- | | | | |
|-----|---|-----|----|
| 1. | Do you like plenty of excitement going on around you? | YES | NO |
| 2. | Do you often need kind friends to cheer you up? | YES | NO |
| 3. | Do you nearly always have a quick answer when people talk to you? | YES | NO |
| 4. | Do you sometimes get cross? | YES | NO |
| 5. | Are you moody? | YES | NO |
| 6. | Would you rather be alone instead of meeting other children? | YES | NO |
| 7. | Do ideas run through your head so that you cannot sleep? | YES | NO |
| 8. | Do you always do as you are told at once? | YES | NO |
| 9. | Do you like practical jokes? | YES | NO |
| 10. | Do you ever feel "just miserable" for no good reason? | YES | NO |
| 11. | Are you rather lively? | YES | NO |
| 12. | Have you ever broken any rules at school? | YES | NO |
| 13. | Do lots of things annoy you? | YES | NO |
| 14. | Do you like doing things where you have to act quickly? | YES | NO |
| 15. | Do you worry about awful things that might happen? | YES | NO |

- | | | |
|---|-----|----|
| 16. Can you always keep every secret? | YES | NO |
| 17. When you make new friends do you usually make the first move? | YES | NO |
| 18. Have you ever told a lie? | YES | NO |
| 19. Are you easily hurt when people find fault with you or the work you do? | YES | NO |
| 20. Do you like telling jokes or funny stories to your friends? | YES | NO |
| 21. Do you often feel tired for no good reason? | YES | NO |
| 22. Do you always finish your homework before you play? | YES | NO |

Sample II and II Q.II M.P.I.
Instructions

Here are some questions regarding the way you behave, feel and act. After each question there is a "yes", a "?" and a "no".

Try and decide whether "yes" or "no" represents your usual way of acting or feeling; then put a circle around the "yes" or "no". If you find it absolutely impossible to decide, put a circle round the "?", but do not use this answer except very occasionally. Work quickly, and don't spend too much time over any question; we want your first reaction, not a long drawn-out thought process! The whole questionnaire shouldn't take more than a few minutes. Be sure not to omit any questions. Now go ahead, work quickly, and remember to answer every question. There are no right or wrong answers, and this isn't a test of intelligence or ability, but simply a measure of the way you behave.

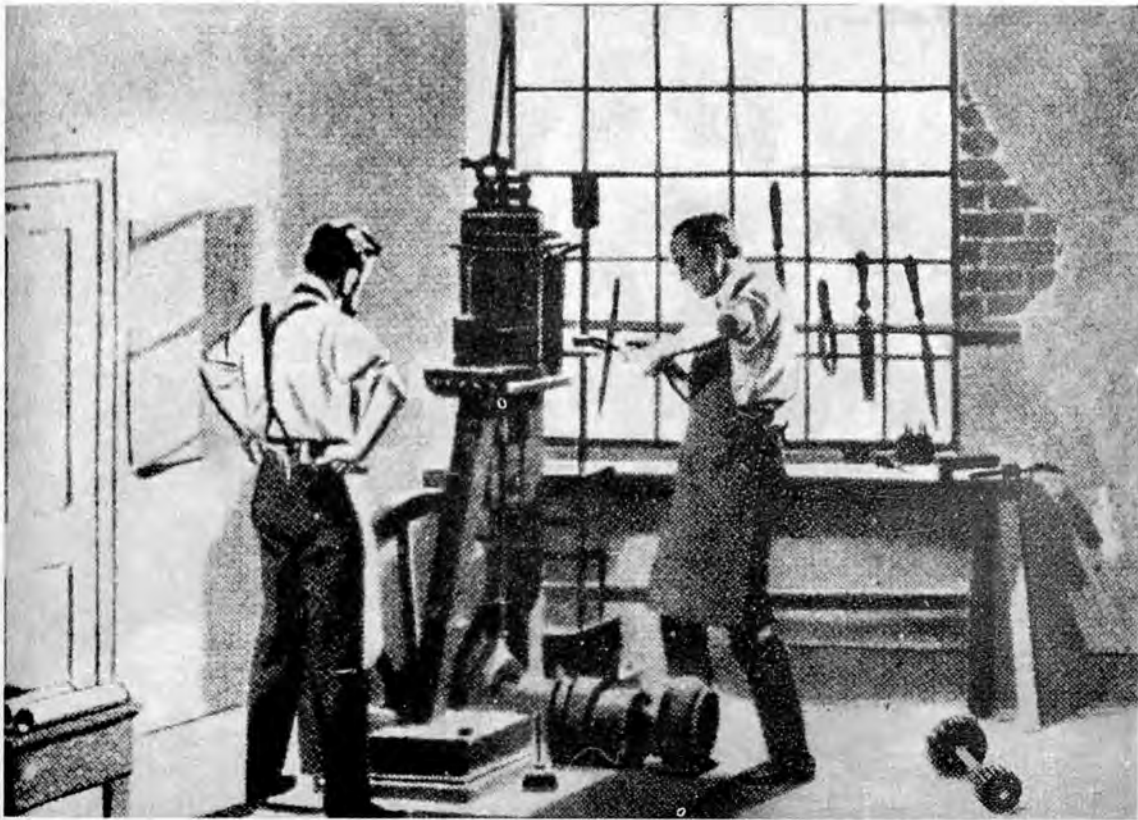
- | | | | | |
|-----|--|-----|---|----|
| 1. | Are you happiest when you get involved in some project that calls for rapid action? | YES | ? | NO |
| 2. | Do you sometimes feel happy, sometimes depressed, without any apparent reason? | YES | ? | NO |
| 3. | Does your mind often wander while you are trying to concentrate? | YES | ? | NO |
| 4. | Do you usually take the initiative in making new friends? | YES | ? | NO |
| 5. | Are you inclined to be quick and sure in your actions? | YES | ? | NO |
| 6. | Are you frequently "lost in thought" even when supposed to be taking part in a conversation? | YES | ? | NO |
| 7. | Are you sometimes babbling over with energy and sometimes very sluggish? | YES | ? | NO |
| 8. | Would you rate yourself as a lively individual? | YES | ? | NO |
| 9. | Would you be very unhappy if you were prevented from making numerous social contacts? | YES | ? | NO |
| 10. | Are you inclined to be moody? | YES | ? | NO |

- | | | | |
|--|-----|---|----|
| 11. Do you have frequent ups and downs in mood, either with or without apparent cause? | YES | ? | NO |
| 12. Do you prefer action to planning for action? | YES | ? | NO |
| 13. Are your daydreams frequently about things that can never come true? | YES | ? | NO |
| 14. Are you inclined to keep in the background on social occasions? | YES | ? | NO |
| 15. Are you inclined to ponder over your past? | YES | ? | NO |
| 16. Is it difficult to "lose yourself" even at a lively party? | YES | ? | NO |
| 17. Do you ever feel "just miserable" for no good reason at all? | YES | ? | NO |
| 18. Are you inclined to be overconscientious? | YES | ? | NO |
| 19. Do you often find that you have made up your mind too late? | YES | ? | NO |
| 20. Do you like to mix socially with people? | YES | ? | NO |
| 21. Have you often lost sleep over your worries? | YES | ? | NO |
| 22. Are you inclined to limit your acquaintances to a select few? | YES | ? | NO |
| 23. Are you often troubled about feelings of guilt? | YES | ? | NO |
| 24. Do you ever take your work as if it were a matter of life or death? | YES | ? | NO |
| 25. Are your feelings rather easily hurt? | YES | ? | NO |
| 26. Do you like to have many social engagements? | YES | ? | NO |
| 27. Would you rate yourself as a tense or "highly-strung" individual? | YES | ? | NO |

- | | | | | |
|-----|---|-----|---|----|
| 28. | Do you generally prefer to take the lead in group activities? | YES | ? | NO |
| 29. | Do you often experience periods of loneliness? | YES | ? | NO |
| 30. | Are you inclined to be shy in the presence of the opposite sex? | YES | ? | NO |
| 31. | Do you like to indulge in a reverie (daydreaming)? | YES | ? | NO |
| 32. | Do you nearly always have a "ready answer" for remarks directed at you? | YES | ? | NO |
| 33. | Do you spend much time in thinking over good times you have had in the past? | YES | ? | NO |
| 34. | Would you rate yourself as a happy-go-lucky individual? | YES | ? | NO |
| 35. | Have you often felt listless and tired for no good reason? | YES | ? | NO |
| 36. | Are you inclined to keep quite when out in a social group? | YES | ? | NO |
| 37. | After a critical moment is over, do you usually think of something you should have done but failed to do? | YES | ? | NO |
| 38. | Can you usually let yourself go and have a hilariously good time at a gay party? | YES | ? | NO |
| 39. | Do ideas run through your head so that you cannot sleep? | YES | ? | NO |
| 40. | Do you like work that requires considerable attention? | YES | ? | NO |
| 41. | Have you ever been bothered by having a useless thought come into your mind repeatedly? | YES | ? | NO |
| 42. | Are you inclined to take your work casually, that is as a matter of course? | YES | ? | NO |
| 43. | Are you touchy on various subjects? | YES | ? | NO |

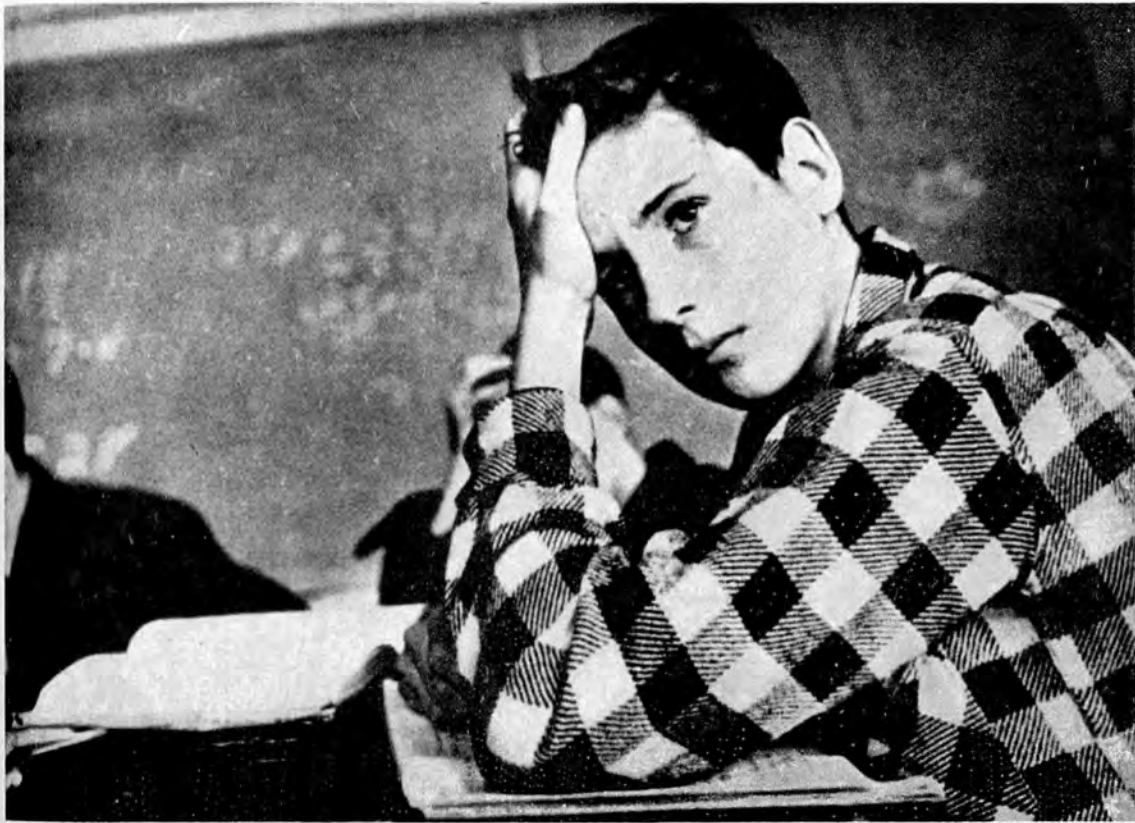
- | | | | |
|---|-----|---|----|
| 44. Do other people regard you as a lively individual? | YES | ? | NO |
| 45. Do you often feel disgruntled? | YES | ? | NO |
| 46. Would you rate yourself as a talkative individual? | YES | ? | NO |
| 47. Do you have periods of such great restlessness that you cannot sit long in a chair? | YES | ? | NO |
| 48. Do you like to play pranks upon others? | YES | ? | NO |

PT I

Picture I.

1. What is happening?
2. What has led up to this situation?
3. What is being thought?
4. What will happen?

Picture 2.



1. What is happening?
2. What has led up to this situation?
3. What is being thought?
4. What will happen?



1. What is happening?
2. What has led up to this situation?
3. What is being thought?
4. What will happen?

Picture 4.

1. What is happening?
2. What has led up to this situation?
3. What is being thought?
4. What will happen?

NAME

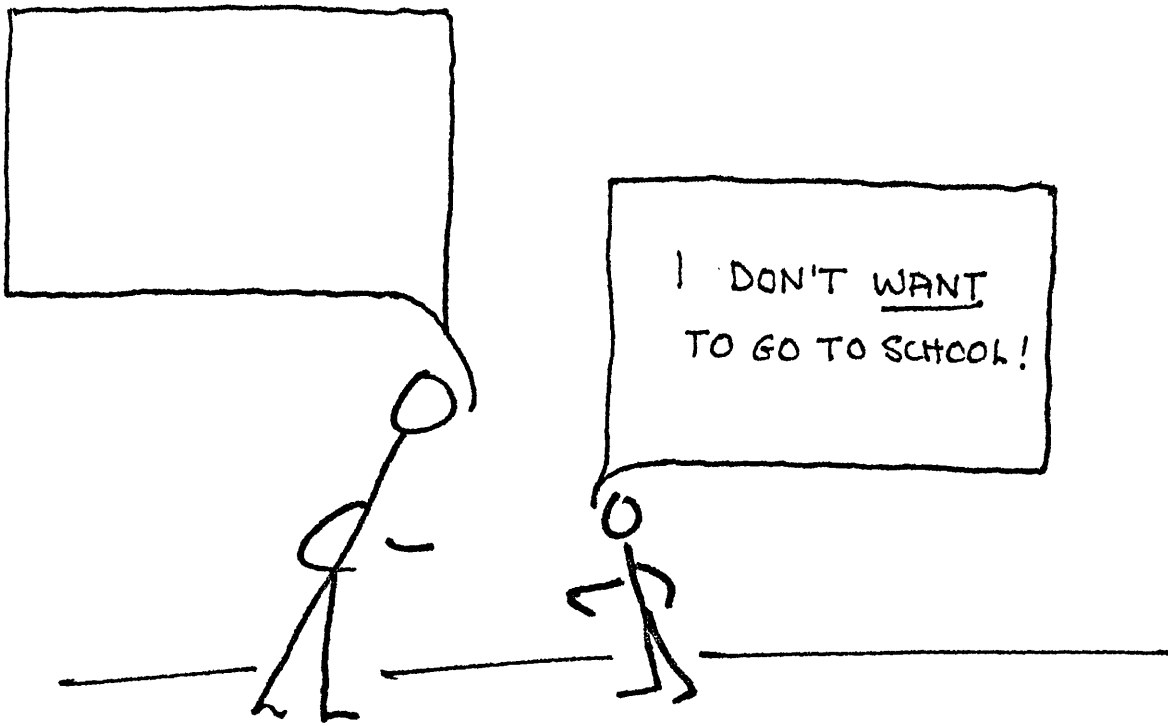
AGE

SEX

SCHOOL

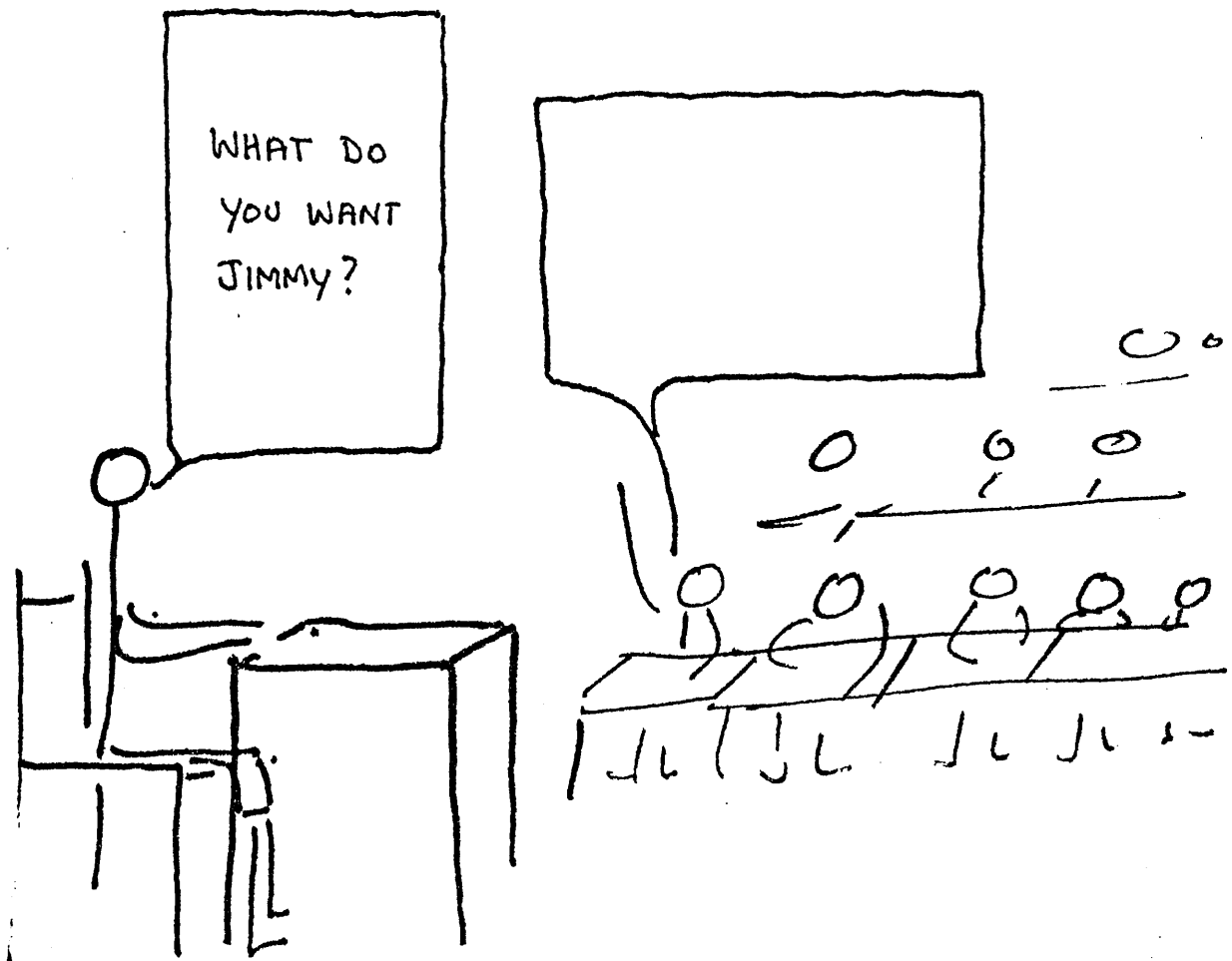
DATE

Inside this book are some pictures
In each picture are some people doing
and saying different things.
Look at the pictures carefully one at
a time. One person is always shown
talking. Read what that person is
saying. Write in the empty space what
you think the boy or girl would answer.
The answer you give should be the 1st
thing you think of.
Work as fast as you can.



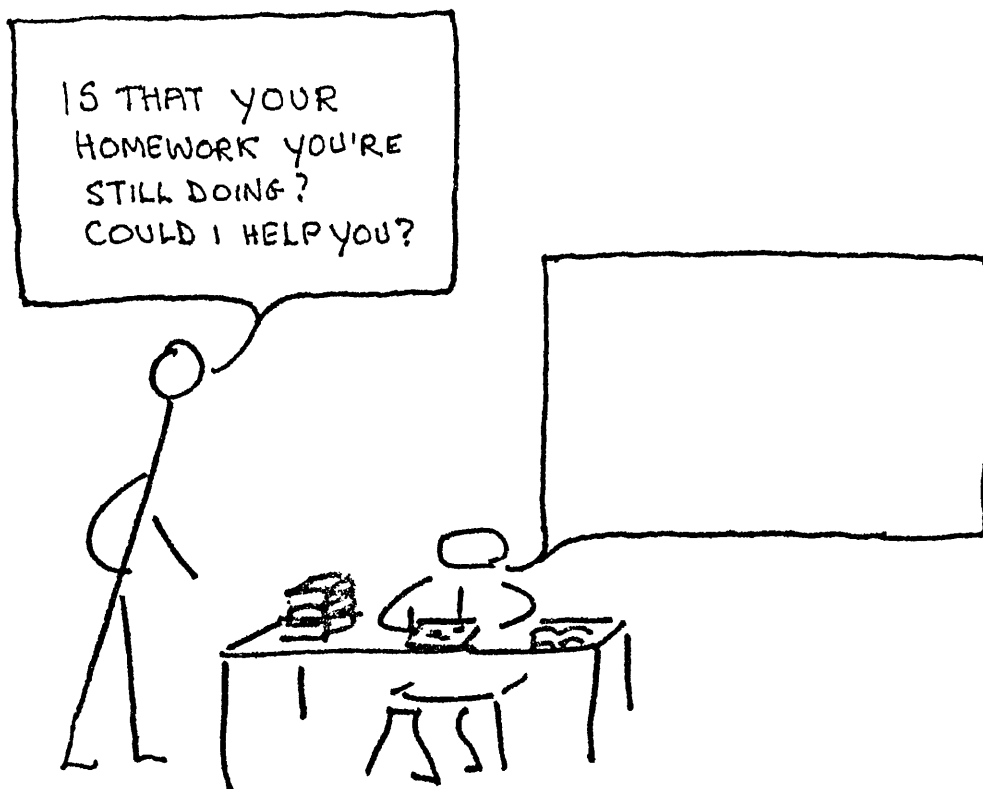
360.

2.

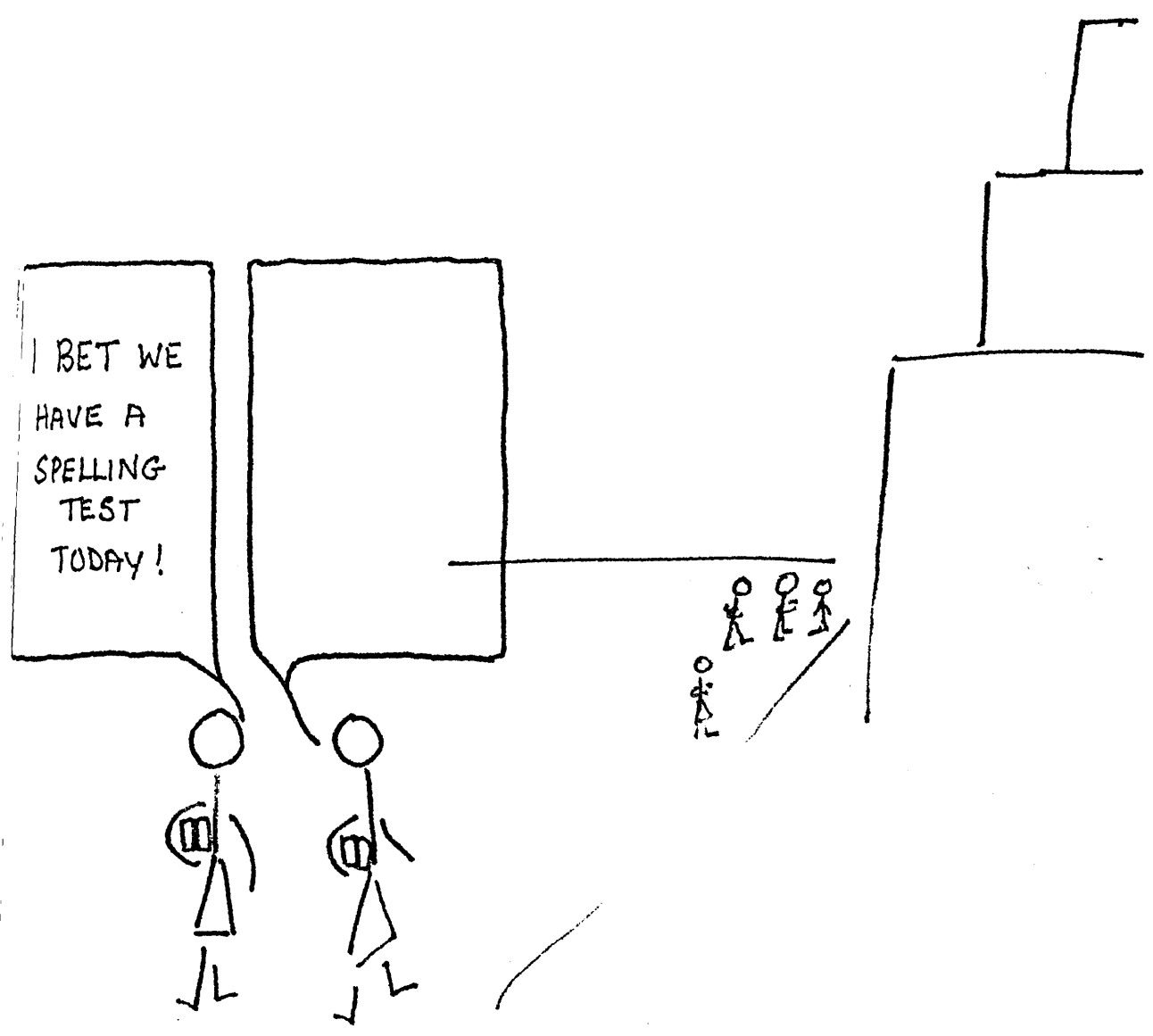


361.

3.

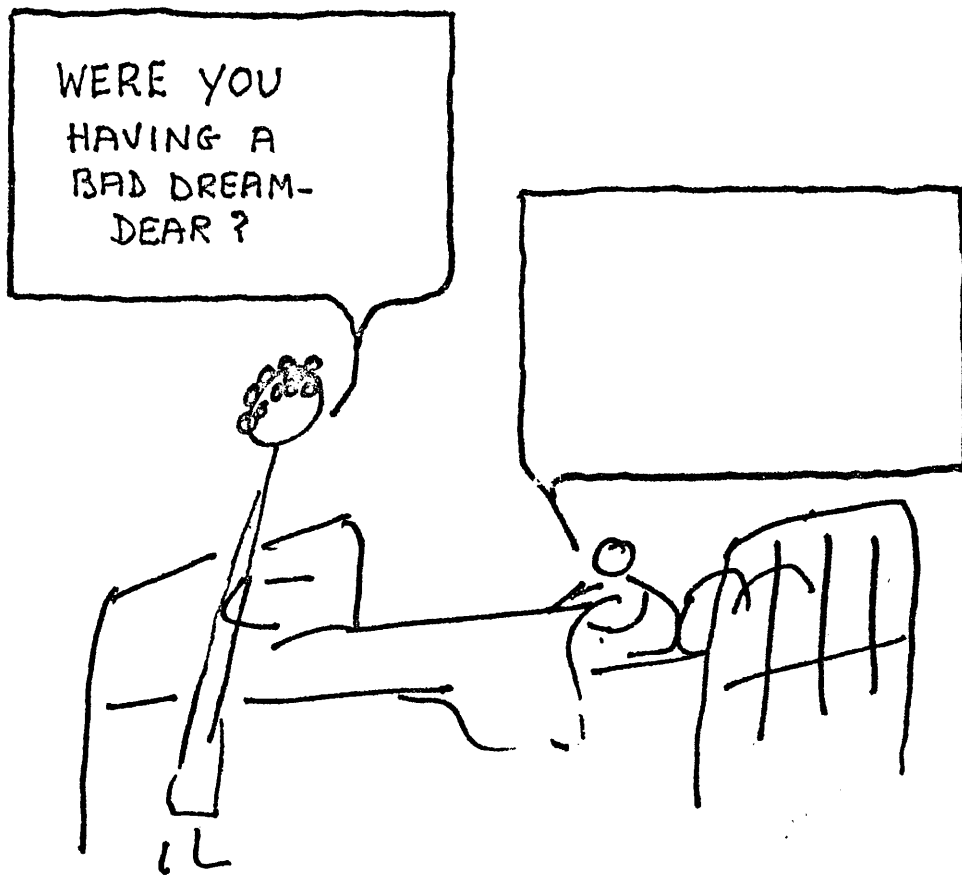


4.



363.

5.



364.

6.



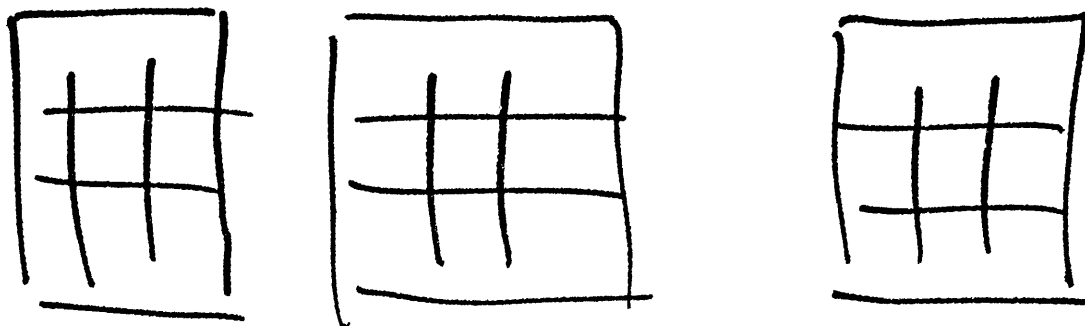
365.

7.

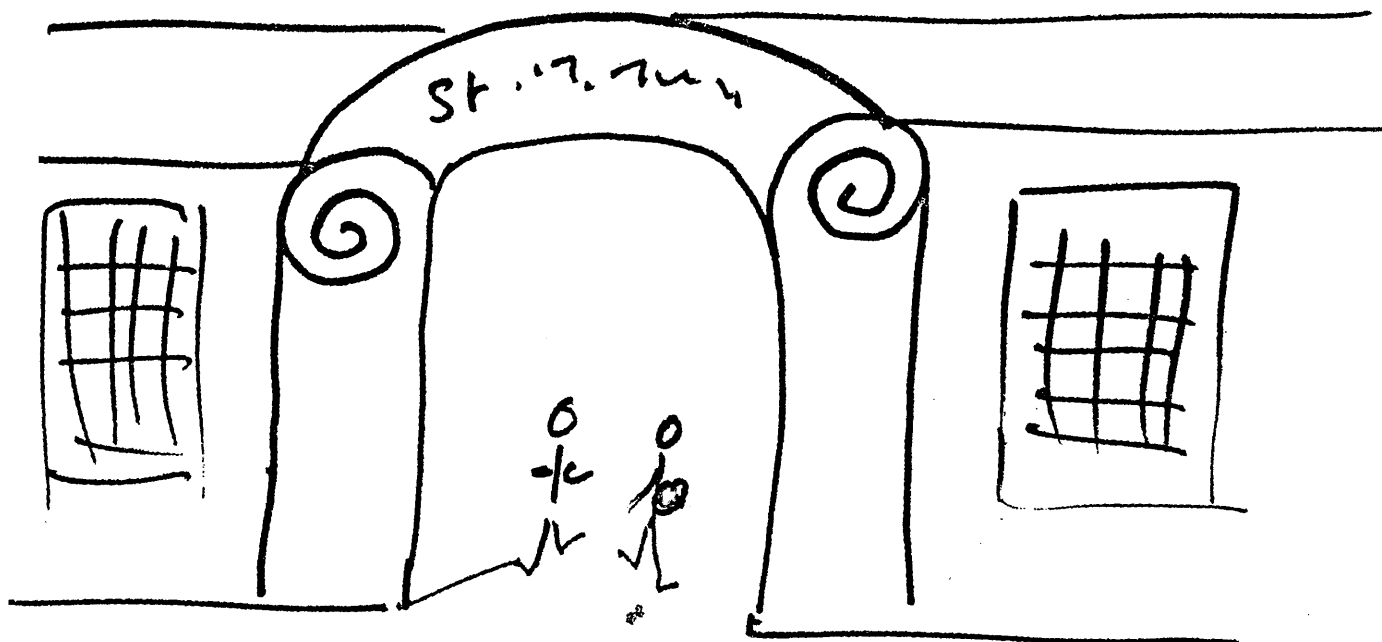




367.

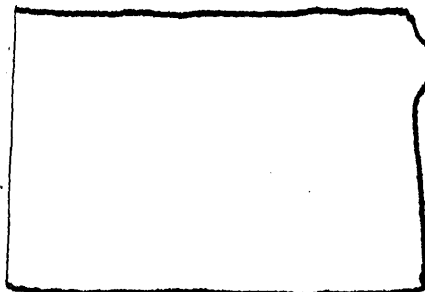
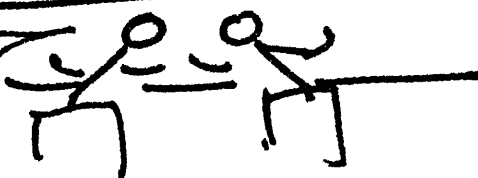
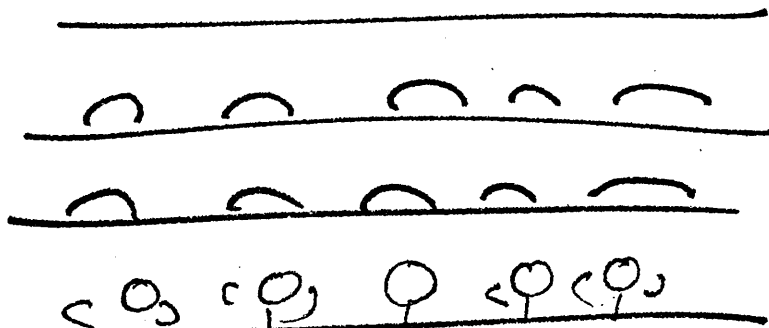
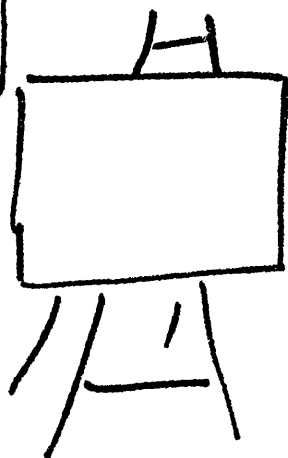
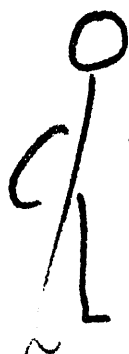


9.



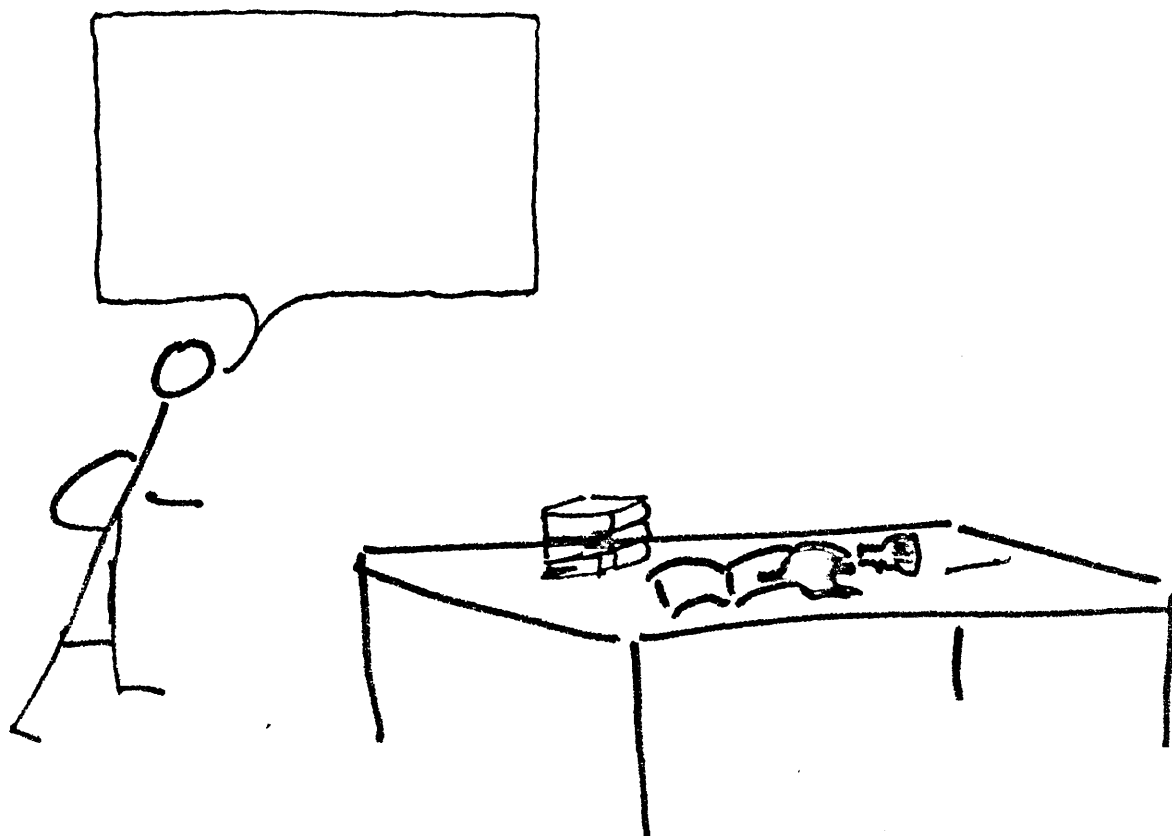
368.
10.

THAT'S THE
THIRD TIME I HAVE
TOLD YOU TO STOP
TALKING.



369.

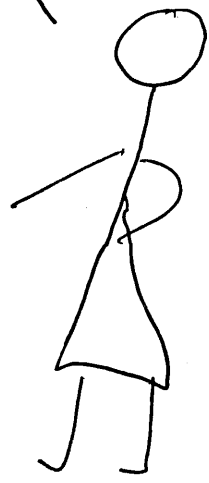
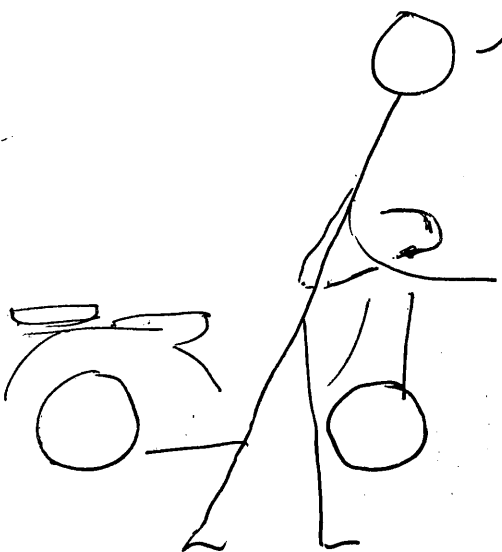
11.

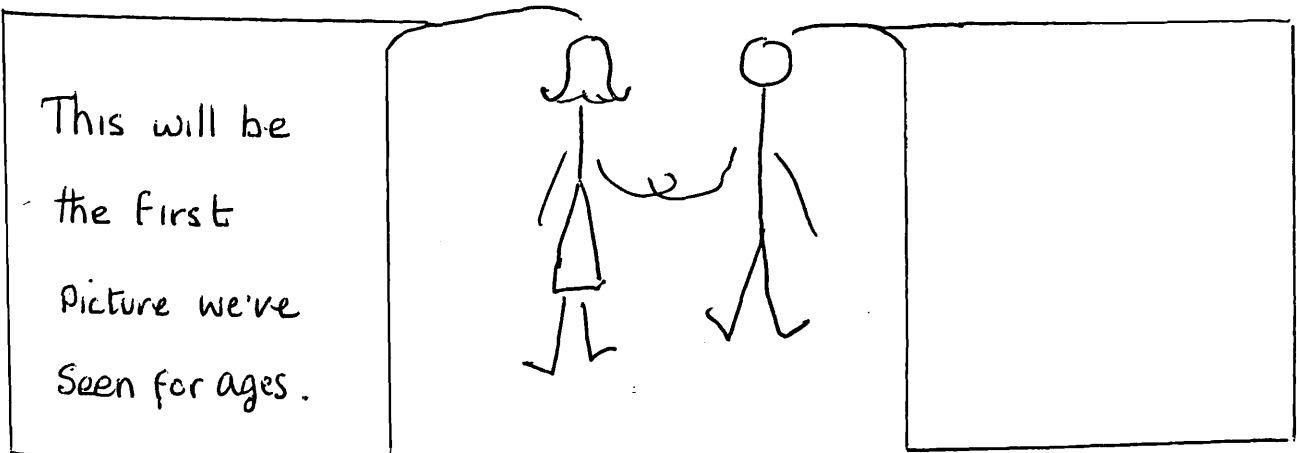
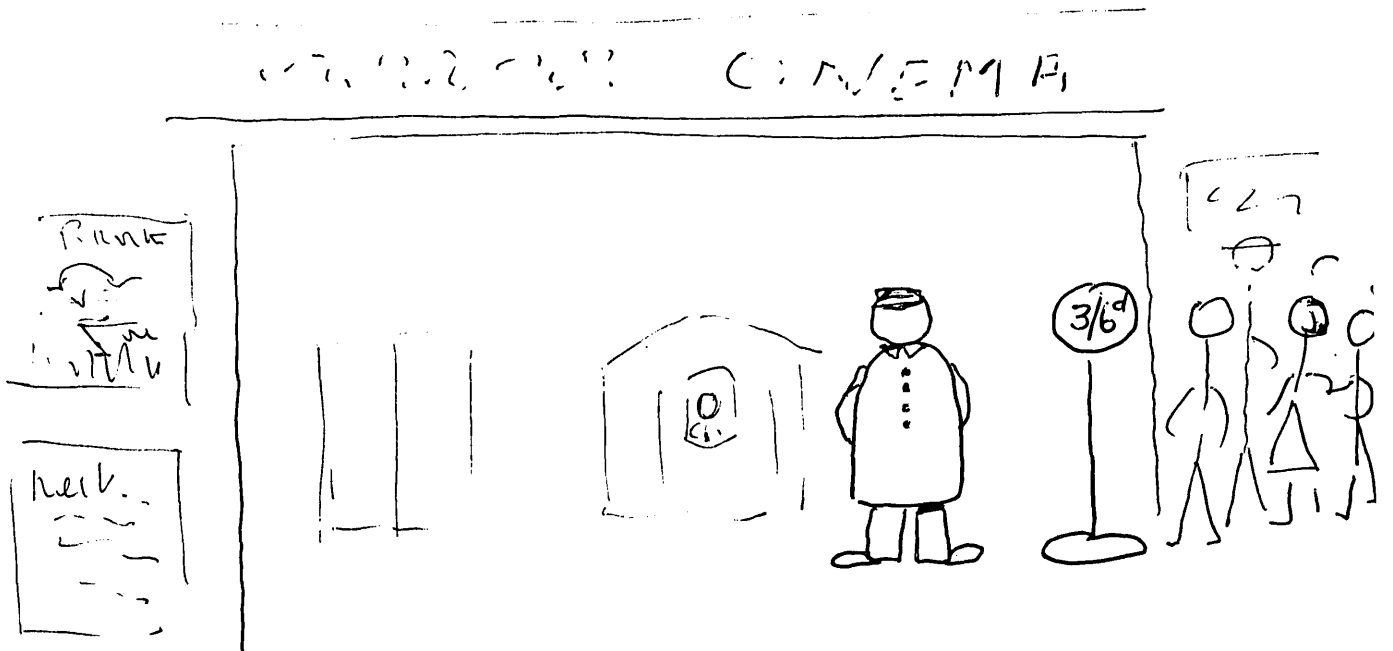


INSTRUCTIONS

Here are some pictures of people doing and saying different things. Look at the pictures carefully one at a time. Read what one person is saying and then write in the empty space what you imagine the other person would answer. If the person is alone write what you think he or she is thinking. Write the very first reply that comes into your head. Work as quickly as you can.

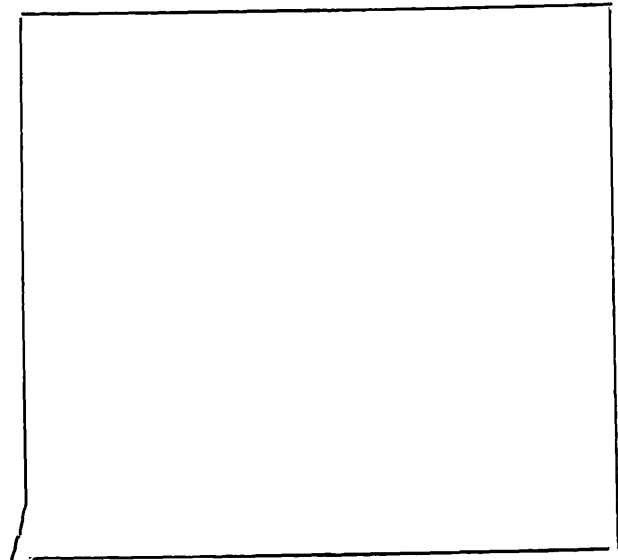
Now the exams are
over we can relax
at last!



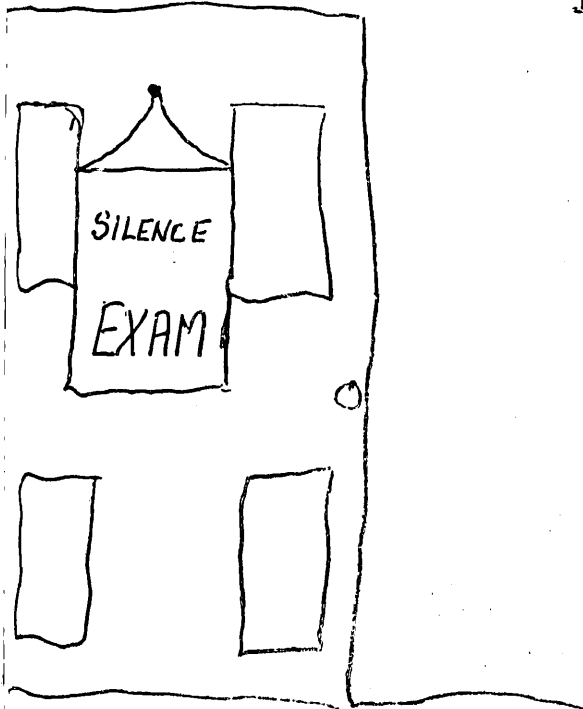


This will be
the first
picture we've
seen for ages.

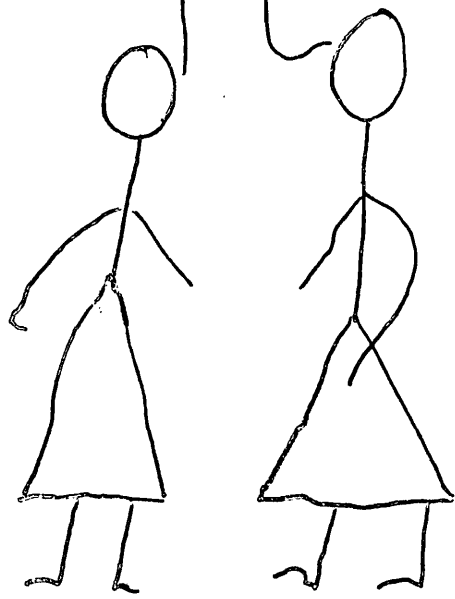
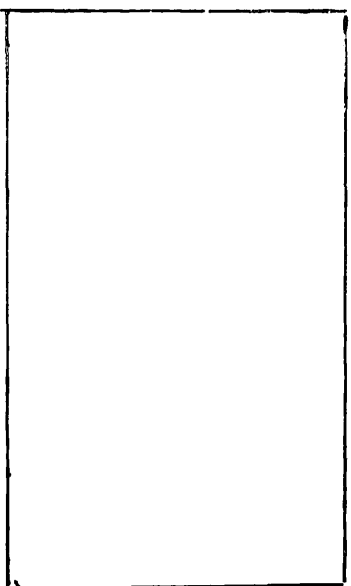
You have five minutes
more. Please finish
what you are writing,
and then stop.



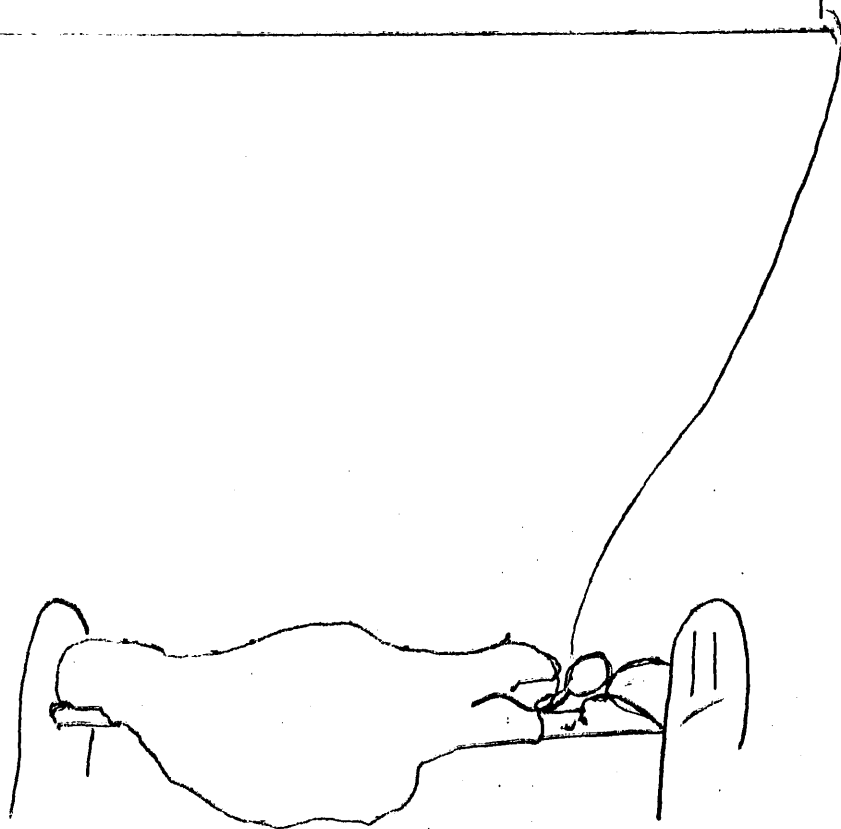




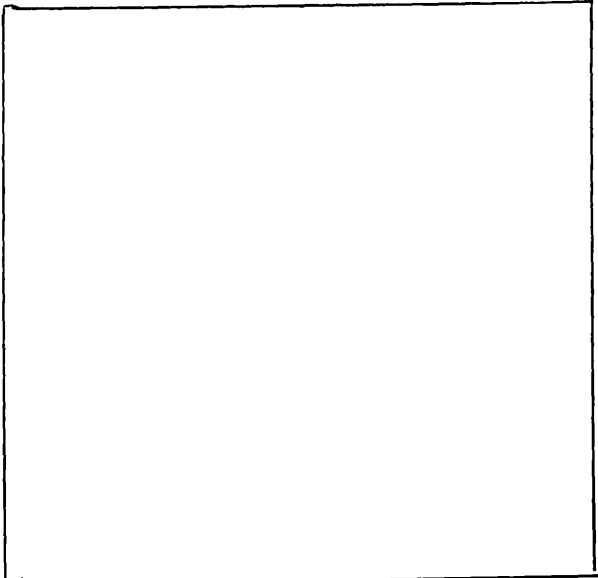
Our turn
next week!



Handwritten text inside a rectangular box, possibly a signature or name.



YOU really must
stop working now.
dear... it's nearly
11 o'clock... or you
won't be able to do
your best in the morning.



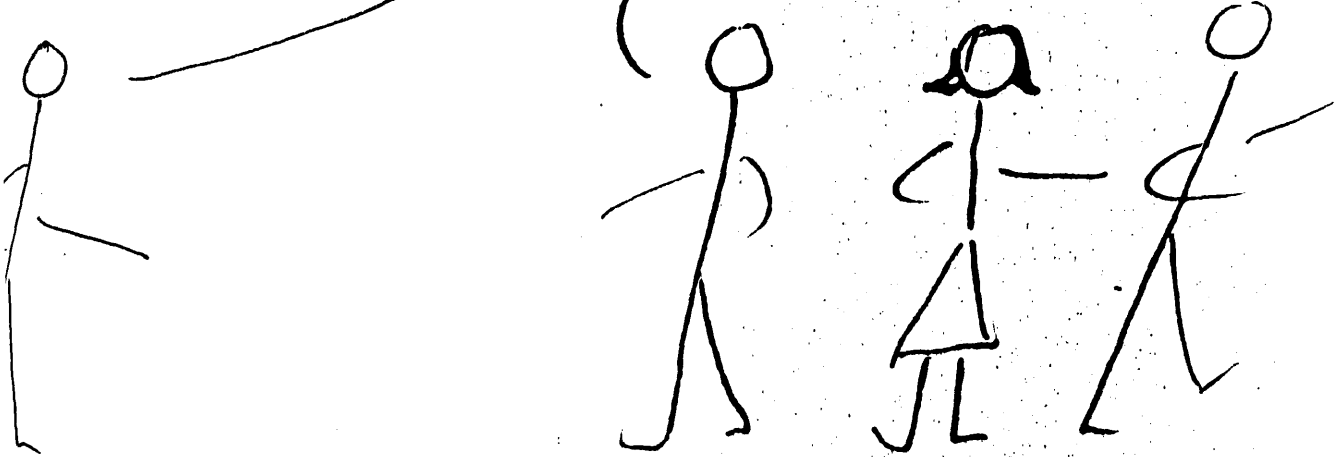
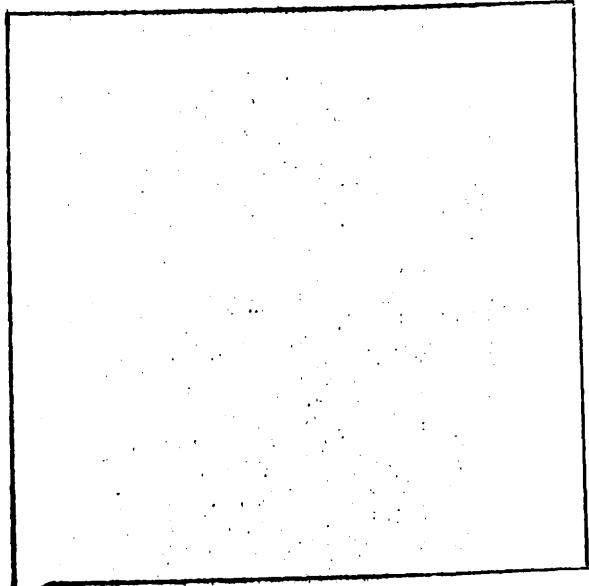
..... but you must
decide what you
want to do soon,
dear. ... your
Father is worrying....



[Empty speech bubble]

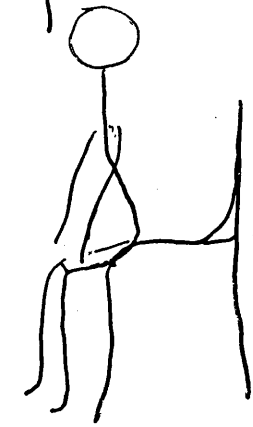
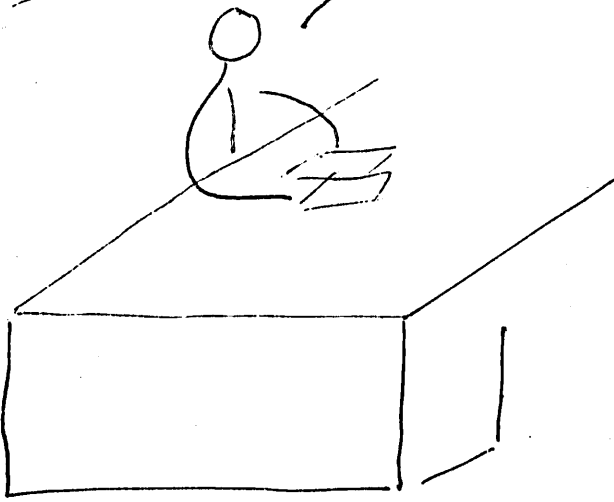


Its all very
well for you lot
you're working
we're still at
School !

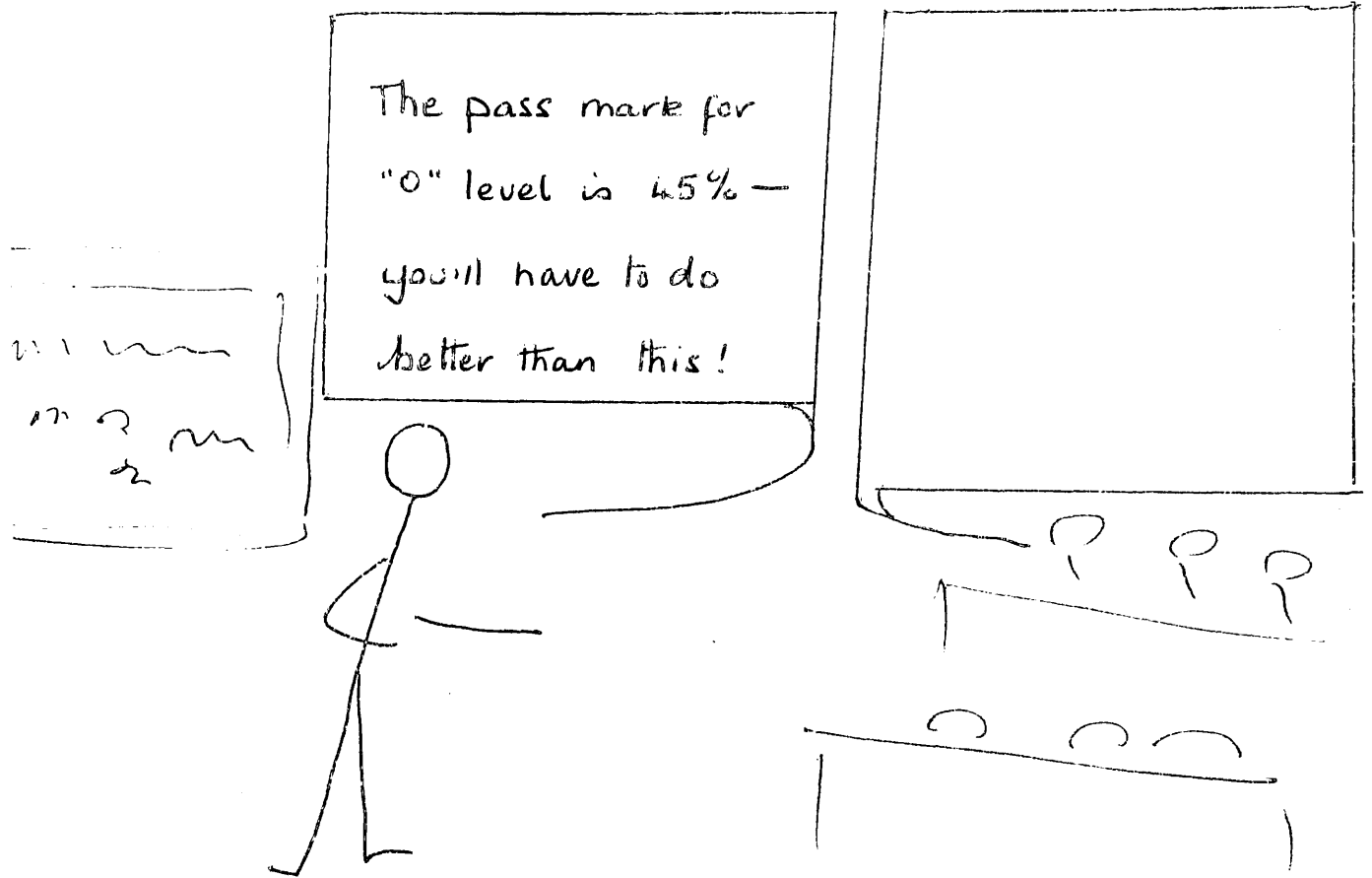


I see. You are waiting for your 'O' level results, but what sort of work interests you?

YOU WILL EMPLOYMENT







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BIBLIOGRAPHY

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