The Influence of Color and/or Movement Added to Thematic Apperception Test to Evoke Need Achievement

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THE INFLUENCE OF COLOR AND/OR MOVEMENT ADDED TO THEMATIC APPERCEPTION TEST TO EVOKE NEED ACHIEVEMENT

by

Justin Fred Hurst

A dissertation submitted in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

in

Educational Psychology

Approved:

UTAH STATE UNIVERSITY
Logan, Utah
1969
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Justin Fred Hurst
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ABSTRACT

The Influence of Color and/or Movement Added to Thematic Apperception Test to Evoke Need Achievement

by

Justin Fred Hurst, Doctor of Education

Utah State University, 1969

Major Professor: Dr. E. Wayne Wright
Department: Educational Psychology

This study utilized the theories of David C. McClelland and associates regarding affective arousal, concept of cues arousing motives, and neutral testing procedures. The problem was to study the influence of color and/or movement, as cues added to the McClelland four-picture Thematic Apperception Test, to evoke need achievement responses to determine whether or not the added stimuli of color and/or movement might evoke increased need achievement responses.

Four treatment variations of the test were made: Treatment A, consisted of the standard McClelland test, in black and white pictures. This treatment served as the control. Treatment B used the black and white pictures, but

with movement added to the standard test. Treatment C added color to the pictures, but no movement. Treatment D added both color and movement to the test. A special effects apparatus was used to create the color and/or movement added to the pictures. The treatment variations of the four pictures were recorded on motion picture film in order to standardize the experimental procedures of the study.

A sample of 120 male college students was tested, and subdivided into groups of 30 subjects each. Each group of 30 students saw only one of the four treatment variations. The testing was accomplished by projecting the filmed, four-picture McClelland test, with each of the four pictures being shown for 20 seconds. After each picture was shown, five minutes were allowed for the subjects to write a story about the picture. The stories were scored for need achievement by the McClelland and associates (1953)\textsuperscript{2} scoring system C.

Statistical comparisons were made among the three experimental groups (Treatment B, C, D), as compared with the control group (Treatment A) in terms of the subject's mean scores in need achievement. No significant differences were found in any of the statistical comparisons. It was, therefore, concluded that the study subjects did not respond to the addition of color and/or movement as significant cues related to achievement motivation.

(71 pages)

\textsuperscript{2}Ibid.
CHAPTER I

INTRODUCTION

A variety of theories and research studies have attempted to delineate and clarify the broad concept of human motivation. There have been numerous studies of the factors involved, although little consensus exists of their meaning and use. Traditional biogenic, to highly sociogenic descriptions have been used. Although recent research is concerned with global theories, emphasis is on specific factors within areas of motivation.

The psychology of motivation transcends the traditional boundaries that separate psychic functions, sensory processes, perception, and learning. It suggests a greater interconnectedness of these functions than seems apparent from the variety of psychic phenomena they represent. Although researchers and practitioners have long been interested in human motivation, many concepts regarding this subject have been derived from animal studies.

Some recent research, however, has emphasized motivational systems unique to human behavior. Such studies are beginning to catch up with much of the thinking about mental content, particularly about fantasy behavior as an antecedent and index of motivational processes. This change, which recognizes that human motivation has characteristics not found in animals, evidences a shift away from direct stimulus–response interpretations to cognitive interpretations that reflect the nature of previous experiences.
It is recognized that human motivation depends greatly on inner, affective states, for there is little or no motivated behavior that is not affectively toned. According to Frandsen (1961, p. 56) affect (desire) is an important factor of motivation. Organisms may be motivated to more vigorous action by affect (i.e., feelings of appetite, choice, and desire). Thus, needs, perceptual constancies, and personality traits may in time become the basis for their own perpetuation based on affect.

Cofer and Appley (1966) indicate that affect, rather than physiological drives, may well be the chief concern of the field of motivation in the future. A distinction is usually made between physiological or primary drives, such as hunger, thirst, and sex, and learned or secondary drives or motives, such as fear, affiliation, and need for achievement. It may be argued that learned motives can only be aroused by external stimuli, while such is not the case with primary drives. The concept that all motives are learned and that they are based on affect is useful for the same reason that the concept of primary drives is useful. That is, a learned or secondary motive is a higher-order generalization which allows us to tie together a variety of stimuli and responses.

There have been numerous studies of these factors. Such studies utilize varying theories and approaches to the identification of these factors and the analysis of their relationship to motivation. It frequently happens that one of these approaches provides provocative results. One such theory is presented by McClelland, Atkinson, Clark, and Lowell (1953).
McClelland et al. Theory

An abstract of the McClelland et al. (1953) theory will be presented in Chapter II, Review of the Literature, and only that information necessary for definition of the problem of the present study will be presented here. The present study follows the theory of affective arousal and analysis of achievement motivation as postulated in their book, *The Achievement Motive*, by McClelland et al. (1953).

McClelland's theory of affective arousal breaks with traditional theories of motivation, in that motivation is seen largely as being cue-related, rather than as a factor arising from drive or strong stimuli. Hence, stimuli are not defined by stimulus intensity, but rather by their value as a cue for evoking a response. McClelland et al. (1953) base motivational processes upon affect, a concept for denoting conative (i.e., striving) processes such as feelings, will, emotional, and motivational states.

The most important hypothesis of McClelland's affective arousal theory is in the fundamental definition of motive. "Our definition of a motive is this: A motive is the redintegration [sic] by a cue of a change in an affective situation." (McClelland et al., 1953, p. 28). This theory is unique in two ways: (1) all motives are learned and (2) motivation is based upon affect. The hypothesis that all motives are learned means that biological drives are learned; that biological conditions arising from deprivation are closely associated with motivation. For example, in hunger there is no motive until the cues of hunger are associated
with satisfaction, pleasure (i.e., affect) derived from eating to satisfy the hunger drive.

McClelland and his associates (1953) limited themselves primarily to an investigation of the achievement motive, need Achievement (n Ach)\(^1\), generally conceived to be a capacity for taking pride in accomplishment when success in some activity is attained. Their studies focused mainly on the arousal and measurement of the n Ach motive.

McClelland et al. (1953) began their investigations by studying, experimentally, the influence of presumably motive-arousing antecedent situations on certain categories of thematic fantasy stories. Scores based on these response categories, which were influenced by controllable cues, were then presumed to constitute measures of the motivation that the experimenter had set out to arouse. Thus, the original plan was to devise a way, experimentally, to manipulate a secondary motive (n Ach) and to determine the specific aspects of fantasy which were indicators of the aroused motive rather than simply to rely on guesses about meaning of such material.

They described three kinds of cues to evoke n Ach responses: (1) cues in the everyday environment and cues in relatively autonomous thought processes of the individual, (2) specific, experimentally-introduced situation cues, and (3) controllable cues in the pictures. They theorized that experimentally

\(^{1}\)This abbreviation will be used throughout the study.
controlled cues would influence the content of subjects' thematic fantasy stories. All of the three classes of cues, above, were considered in terms of their influence on the level of n Ach, which was then presumed to determine the level of achievement motivation.

McClelland et al. (1953) used situation cues\(^2\) (relaxed, neutral, or achievement-orientated) and the McClelland Thematic Apperception Test (McTAT)\(^3\) to evoke n Ach responses. The present study utilized the neutral situation\(^4\) and color and movement, \(^5\) both separately and combined, added to the McTAT of traditional design to evoke n Ach responses.

**Statement of the Problem**

The problem was to study the influence of color and/or movement, as cues added to the McTAT pictures to evoke n Ach responses in the recorded story form.

\(^2\)For a complete explanation, refer to McClelland et al., 1953, pp. 99-106.

\(^3\)This abbreviation will be used throughout the study. For a description of the four-picture test, see Description of Instruments, p. 37.

\(^4\)For explanation, refer to Definition of Terms, p. 9 or refer to McClelland et al., 1953, p. 101.

\(^5\)For explanation, see Definition of Terms, pp. 8 and 9.
Importance of the Present Study

The human organism lives in a world of color and movement. On an a priori basis, color and movement may not be separated from the cues that comprise its environment. Hence, color and/or movement are important variables to be studied in connection with n Ach. Moreover, n Ach continues to be influential in man's life because it brings him food, shelter, security, love, esteem, and personal social achievements. Based upon affective arousal theory, n Ach is a useful concept if we can specify the cues under which its level is increased or decreased.

Although many studies have been made of methods to evoke n Ach responses, the literature does not reveal any studies of the influence of color and movement, together or individually, added to the McTAT to evoke n Ach responses.

Hypotheses

To test the problem it was hypothesized that addition of color and/or movement to the McTAT pictures would evoke greater n Ach response as measured through fantasy recorded in story form.

The study was designed to test the following specific hypotheses:

1. Movement will evoke greater n Ach response than no movement.
   a. N Ach response will be greater for Treatment B (black and white with movement) than for Treatment A (black and white, no movement).
b. N Ach response will be greater for Treatment D (color with movement) than for Treatment C (color, no movement).

2. Color will evoke greater n Ach response than black and white.
   a. N Ach response will be greater for Treatment C (color, no movement) than for Treatment A (black and white, no movement).
   b. N Ach response will be greater for Treatment D (color with movement) than for Treatment B (black and white, with movement).

3. Color and movement together will evoke greater n Ach response than color alone or movement alone.
   a. N Ach response will be greater for Treatment D (color with movement) than for Treatment A (black and white, no movement).
   b. N Ach response will be greater for Treatment D (color with movement) than for Treatment B (black and white, with movement).
   c. N Ach response will be greater for Treatment D (color with movement) than for Treatment C (color, no movement).
Rationale

The rationale for these hypotheses and expected outcomes follows:

(1) aside from the pictures and the standardized test conditions used, the scoring system, which has been tested and validated by McClelland et al. (1953), is the most important part of the experimental method utilized in the present study to measure n Ach responses; (2) n Ach responses are measurable in fantasy stories through the use of projective testing methods; (3) it should be possible to evoke n Ach responses experimentally by adding such cues as color and/or movement to the McTAT; and (4) the similarity of the pictures used in the present study to the original McTAT test suggests that they can be used without starting completely afresh in developing an experimental background for interpretation.

Definition of Terms

Color

Color refers to red, yellow, and blue which are added to the McTAT pictures by using gelatin color filters over the three light sources of the special effects apparatus.

Four treatments

A motion-picture film was made of color and/or movement added to the four McTAT pictures. The film programmed the four treatment sequences described as follows:
1. Treatment A (black and white, no movement—standard McTAT)

2. Treatment B (black and white with movement added to standard McTAT)

3. Treatment C (color, no movement added to standard McTAT)

4. Treatment D (color with movement added to standard McTAT)

For more detail of the process used, see "Programming the Four Treatments," Chapter III, page 40.

McTAT—McClelland et al (1953) Thematic Apperception Test

The four pictures (standard McTAT) used in the present study are from the original n Ach set published by McClelland et al. (1953). For more detail of these pictures, see "Description of Instruments," Chapter III, page 37.

Movement

The term, "movement" refers to the revolving, somewhat animated McTAT pictures as used for the present study. This effect was created by rotating the light source of the experimental, special effects apparatus, as the lights projected the McTAT pictures on the viewing screen.

Neutral situation

The term "neutral" is described by McClelland et al. (1953, p. 101) as "the condition in which the imaginative measure of achievement motivation was presented without any extensive attempts to manipulate the motivation of the subjects."
Special effects apparatus

The experimental special effects apparatus used for the present study is designed to provide a convenient facility for producing a wide variety of color and/or movement effects on a frosted glass screen for recording on motion-picture film. For more detail of this apparatus, see "Description of Instruments," Chapter III, page 37.
CHAPTER II

REVIEW OF THE LITERATURE

This chapter will not attempt to provide a comprehensive survey of the literature available on motivation. It will present, however, an abstract of the theory of McClelland et al. (1953) and a review of studies in which color or movement have been experimentally added to pictures to influence responses in fantasized thematic stories.

Abstract of the McClelland et al. (1953) Theory

This abstract is taken primarily from the book, The Achievement Motive, by David C. McClelland, John W. Atkinson, Russell A. Clark, and Edgar L. Lowell (1953). The objective of these authors was to develop a satisfactory method for measuring human motivation, and their primary focus was on the arousal of measurement of need achievement (n Ach).

The structure of the theory

McClelland et al. (1953) have presented a theory which breaks with the traditional theories of motivation. Their dissatisfaction with existing

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6Reference was also made to McClelland, 1951, pp. 468-475 and McClelland, 1955, pp. 226-234.
motivational theories led them to develop their own systematic views in the form of an affective arousal model of motivation. Hedonism, a philosophy persisting from the time of the ancient Greeks to the present day, is important to affective arousal theory in that behavior is regulated by pleasantness or unpleasantness of its expected or actual outcomes.

McClelland et al. (1953) considered that pleasantness is determined from birth by moderate increases in stimulus intensity, with greater increases determining unpleasantness. Pleasantness and unpleasantness are instances of that group of affective states called feelings and emotions. For example, organisms may be motivated to more vigorous action by affect (i.e., feelings) of appetite, choice, and desire rather than by homeostatic needs, strong stimuli, and physiological drives. Thus, needs, perceptual constancies, and personality traits may in time seem to become the basis for their own perpetuation based on affect.

The theory of McClelland and his associates is unique in two ways: (1) all motives are learned and (2) motivation is based upon affect. The hypothesis that all motives are learned means that biological drives are learned and that biological conditions arising from deprivation are closely associated with motivation. For example, in hunger there is no motive until the cues of hunger are associated with satisfaction, e.g., pleasure (affect) derived from eating to satisfy the hunger drive. The authors give
several reasons for having chosen affect as a basis for motives. First, they find the general biological theories insufficient. Secondly, they find that their theory can explain such widely different observations as P. T. Young's (in McClelland et al., 1953) experiments on primary affect on palatability in relation to need, and Tinbergen's (in McClelland et al., 1953) experiments on releasing stimuli (i.e., instinctual energy). They also feel that their theory helps to explain everyday observations of the influence of emotions upon behavior.

Traditional theories of motivation support the view that affect is the by-product of motives. According to McClelland et al. (1953), affect is the cause of motives. They say,

... none ... can argue conclusively that motives cannot result from affect anyway. Because affect results from motives in various ways, this is no reason to assume that it cannot therefore be the cause of motives. (McClelland et al., 1953, p. 89)

From this particular point of view, affect is considered to be the primary energy source of motivation. Hence, affect acts as a central hierarchical control of motivational energies released through innate modifiable channels.

Thus, McClelland and his associates regard all motives as learned approach-avoidance tendencies. They postulate that approach is undertaken when a cue triggers an expectation of positive affect, and that avoidance will occur when the cue arouses an expectation of unpleasantness. Cues are defined by their value to arouse positive or negative affect. Positive affect arises from small discrepancies in adaptation level (e.g., expectation), while negative affect arises from large discrepancies in adaptation level.
McClelland et al. (1953) criticized all theories which explain motivation on biologically defined survival needs (e.g., Clark Hull) as being insufficient to explain human motivation. Their criticisms are summarized as follows:

1. ... some survival needs produce a motive and some do not.
2. ... it is often hard to determine just what the organism's survival needs are. . .
3. . . . biological needs provide only a very partial basis for explaining how behavior is guided and controlled, particularly in lower animals.
4. . . . the extraordinary persistence and strength characteristic of learned human motives argues against their continued dependence on biological needs. (McClelland et al., 1953, pp. 15-17)

The stimulus intensity model (e.g., Neal E. Miller and John Dollard) was criticized because it defines motivation as a strong stimulus which impels action.

What this evidence seems to add up to is that although strong stimulation often does give rise to pain or negative affect and thus provides a source of motivation, it does not always produce negative affect. And when it does not, it appears not to be a source of motivation. Therefore, negative affect would seem to be the causative motivational factor and not strong stimulation per se. (McClelland et al., 1953, p. 20)

McClelland et al. maintain that increases or decreases in stimulus intensity can be related to motivation only if adaptation level and learning are also taken into account. Adaptation level represents a pooling process and is the central tendency computed from such variables as focal and background stimuli, with residuals from past experiences. Adaptation level is cognate to threshold and represents the affective state of the organism at any given time. This point of
view differs from the traditional stimulus theories of motivation in two ways: (1) the effect of changes in stimulus intensity is always taken from adaptation level, not on an absolute basis (e.g., zero threshold); and (2) it is assumed that such changes produce affective states immediately, but motives become effective only through learning.

McClelland's criticism of the survival model and the stimulus intensity model does not imply that he and his associates do not consider survival needs and stimulus intensity important conditions, but only that these conditions, alone, are not sufficient. Stimulus theories of motivation, based on classical concepts, do not account for the neutralization and change to opposite quality of repeated stimulation.

The major difficulty with drive and stimulus theories of motivation is they take the absolute threshold as the zero of intensity. According to McClelland et al. (1953), the absolute zero of intensity of stimuli should be taken from adaptation level of the organism. According to adaptation level theory, every stimulus pulls adaptation towards itself (McClelland et al., 1953). Hence, cues (stimuli) are defined by their value to arouse positive or negative affect and not by stimulus intensity value.

Hebb's (1949) neurological model of the origin of affect holds that nerve impulses reaching the cortex set up into cell assemblies which create patterns of excitation with definite patterns of firing. Incoming impulses which add a new pattern, or which moderately differ from
existing assemblies result in pleasure. Larger discrepancies from assemblies result in displeasure. 7

McClelland et al. (1953) call Hebb's model the stimulus pattern model because it states that motivation is determined by a stimulus pattern where there is a moderate discrepancy between expectation and perception. They criticize Hebb on the grounds that (1) one must know the relationship between learning and present perception in order to set up a motive and (2) his theory is so general that the experimentalist trying to work with such a model is puzzled to know when he is working with a motive or how to measure its effects. At the same time, they indicated that "Hebb's ideas have proved immensely

7 In 1949, Hebb wrote that "... the chief problem that the psychologist is concerned with, when he speaks of motivation, is not arousal of activity but its patterning and direction" (p. 172). He further writes: "The term motivation then refers (1) to the existence of an organized phase sequence, (2) to its direction or content, and (3) to its persistence in a given direction, or stability of content" (p. 381). "This definition means that 'motivation' is not a distinctive process, but a reference in another context to the same processes to which 'insight' refers; it also means that the waking, normal adult animal always had some motivation ..." (p. 181). Hebb later re-examined the question, and in an excellent example of self-correction on the basis of further evidence and analysis, reversed himself, separating cue and arousal aspect of sensory events. Only the latter are motivational concepts: "Without a foundation of arousal, the cue function cannot exist ... arousal ... is synonymous with a general drive state ... the drive is an energizer, but not a guide ..." (1955, p. 249). Hebb (1958) considers weak and strong stimulation as two messages using the same nervous system. This is explained on the basis of activation of neurons occasioned by each type of stimulation. This modification by Hebb places his theory as an activation theory rather than an affective arousal theory.
stimulating to us, and our own theory in many respects picks up where he leaves off" (McClelland et al., 1953, p. 25).

Definition of motive. The most important hypothesis of the McClelland, et al. theory of affective arousal is their fundamental definition of a motive. They define a motive as an affective association manifesting itself in purposive behavior and determined by previous associations between cues and pleasantness and unpleasantness. Specifically their definition says, "... a motive is the redintegration by a cue of a change in an affective situation" (McClelland et al., 1953, p. 28). They suggest that cues may exist in an external situation and/or may result from cues arising in one's own thoughts or affective state.

According to McClelland et al. (1953), certain cues, either in the affective state or in the external conditions producing it, get associated with the affective state so that they can partially redintegrate it on a later occasion. They state that "the ... assumption ... [is similar to] the one that Hull made ... to the effect that a cue paired with a goal response will evoke a fractional anticipatory portion of it" (McClelland et al., 1953, p. 36). The anticipation (expectation) of a change in the affective state is defined, by McClelland et al., as a "motive."

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McClelland et al. (1953) emphasize that the cues cannot reactivate the entire affective state because if they did, there would be no affective arousal.
Two kinds of motives become possible: (1) the positive, or approaching motive (n Ach), which is an expectation of pleasantness or satisfaction, and (2) the negative or avoiding motive (f-failure), which is an expectation of unpleasantness or pain. N Ach (pleasantness) and f-failure (unpleasantness) are, then, two different motives; but no distinction is made between physiological or primary drives and learned or secondary motives, since all motives are learned. However, motives are defined and classified primarily in terms of the expectations and in terms of the results of action. Motives common to all men will develop "... to the extent that conditions can be identified which will give rise regularly to affective change either through biological or cultural arrangements" (McClelland et al., 1953, p. 77). Moreover, physiological drives almost always determine behavior which sooner or later results in satisfaction and consequent pleasure. Otherwise, the organism would die. Expectations of increased pleasure in connection with physiological drives are learned very early in life. Secondary motives (e.g., n Ach), also universal in human beings, are determined by external stimuli. While external stimuli may be common in all cultures (e.g., all forms of education), secondary motives are learned early and remain just as intense for the rest of the life of the individual as do the physiologically-determined motives.

**Motivation and learning processes.** A motive is the learned result of pairing cues with affect or with the conditions which produce affect based on
traditional laws of learning. McClelland et al. (1953, p. 95) report that "... learning results from contiguity but it is especially influenced by the presence of a motivational association based on the past contiguity of cues and affective states." In other words, contiguity and frequency of occurrence of cues with the affective state will redintegrate on a later occasion.

The discrepancy hypothesis: antecedent conditions for affective arousal. The affective arousal model and theory of McClelland and his associates are presented in the form of 12 hypotheses. The purpose of these authors is to explain which empirical variables determine the existence of the hypothetical dependent variable called affective arousal; and the antecedent conditions for affective arousal are formulated to describe the independent, empirical variables which determine affective arousal. According to McClelland, "If we know them, we are in a position, according to the theory, of knowing how to create a motive by pairing cues with those conditions ..." (McClelland, et al., 1953, page 42). The 12 hypotheses of the McClelland theory follow:

Hypothesis 1: Affective arousal is the innate consequence of certain sensory or perceptual events.
Hypothesis 2: Positive affect is the result of smaller discrepancies of a sensory or perceptual event from the adaptation level of the organism; negative affect is the result of larger discrepancies.
Hypothesis 3: Natural adaptation levels for various sensory receptors differ.
Hypothesis 4: A discrepancy between adaptation level and a sensation or event must persist for a finite length of time before it gives rise to an hedonic response.
Hypothesis 5: Discrepancies from adaptation level will give rise to a positive-negative affect function in either direction along a continuum.

Hypothesis 6: Increases and decreases in stimulus intensity can be related to motivation only if adaptation level and learning are taken into account.

Hypothesis 7: Changes in adaptation level, with attendant hedonic changes, may be produced by somatic conditions.

Hypothesis 8: Changes in adaptation level, with attendant hedonic changes, may be produced by experience.

Hypothesis 9: Events can differ from expectations on a variety of dimensions.

Hypothesis 10: Frustration is a source of negative affect.

Hypothesis 11: The achievement motive develops out of growing expectations.

Hypothesis 12: In human adults adaptation levels are numerous and complex so that a single event may have several hedonic consequences. (McClelland, et al., 1953, pp. 43-66)

Adaptation level is a fundamental variable in the McClelland theory. It may be influenced by learning, maturation, and experience. In addition, McClelland and his associates include expectation levels in their application of the concept of adaptation level to affectivity and motivation. However, adaptation level is considered a more exact and objective variable than expectation. It has a physiological surplus meaning that makes it different from expectation level (see, Hypothesis 7). Also, the affective reaction to discrepancies from adaptation level is immediate, since once the adaptation level is given, affect depends only upon discrepancy from level. If expectation levels are considered to be adaptation levels, then changes in patterns of stimulation may be involved in affective arousal just as differences in sensory stimulation may give rise to affective states. Adaptation level (expectation), adaptation level (physiological) are cognate with threshold
in the affective arousal process. Associations mediated by the central nervous system are seen as more often instrument in character, whereas those involving the automatic nervous system are considered motivational in nature. Moreover, all motives are learned and motivation depends upon affect. Motives only become meaningful when adaptation level and learning (expectation levels) are taken into consideration.

**Thought sampling.** Although McClelland et al. (1953) are not the first to use thematic fantasy productions in the study of motivation, they point out the possibility that the objective study of thematic stories can form a synthesis of behavioral and introspective methods.

Thus I find it conceptually clarifying to dispense with all the usual terminology with which we become burdened when the study of mental content was bootlegged back into psychology via the projective testing movement, after the failure of Titchener's prior efforts . . . . " (McClelland, 1966, p. 479)

McClelland et al. (1953) stress explicitly the difference between traditional introspection and their method. In traditional introspectionism, the subjects give a phenomenological description of their experiences as content analysis of protocol statements. McClelland et al. (1953) collect protocol statements, i.e. thought samples, and then subject them to a public system of content analysis. "Actually the TAT is not a test in the conventional sense; it is a sample of operant behavior, that is, thoughts" (McClelland, 1966, p. 479).

The system can be repeated with a high degree of reliability by any observer who knows it. The term, "thought sampling" is used by McClelland et al. to distinguish their method from clinical projective methods.
To the extent that we can develop a truly objective method of scoring "thought samples," we tend to close the gap between a psychology of "experience" and of "behavior." That is, the experimenter will be able to point to achievement imagery in a protocol with nearly the same degree of objectivity with which he can point to a "right turn" in a maze for a rat. (McClelland et al., 1953, p. 323)

Aside from the pictures and the standardized test conditions used, the scoring of McClelland's TAT system is the most important part of the method that has been tested and validated.

**Test of n Ach**

McClelland et al. took the work of Henry A. Murray as a starting point to begin a research project at Wesleyan University in 1947. Their project, which resulted in a provocative approach to the study of n Ach, is summarized in their book, *The Achievement Motive* (1953).

Their approach was guided by several ideas: (1) the psychoanalytic theory of dreams, (2) the Murray Thematic Apperception Test (TAT)\(^9\), (3) the experimental investigation of animal motivation, and (4) the belief that no satisfactory method existed for measuring motivation at the human level. They accepted from Freud's theory and from Murray's TAT the hypothesis that an excellent place to look for and measure the effect of motivation is in fantasy. The TAT was chosen as a measuring device because fantasy, which is analogous to Freud's use of dreams, appeared to be a good place to look for the effects of

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\(^9\)This abbreviation will be used throughout the study.
motivation. They differ, however, from Freud's and Murray's use of dynamic content of fantasy, in that they do not attempt to make inferences about the strength of motivation on the basis of thematic fantasy material alone. They accepted from experimental studies of animals the notions that motives could be experimentally aroused, and that the intensity of motives could be controlled by manipulating arousal conditions and cues.

Three general hypotheses underly their research: (1) that motives might best be measured in fantasy, (2) that motives could be experimentally aroused, and (3) that a method could be developed for measuring n Ach which would not be identical with those measuring techniques already in use to measure perception and learning. Their original plan was to devise an experimental method to manipulate and arouse affect and to determine the effect of this manipulation on thematic fantasy stories. Using this procedure they were able to determine the specific aspects of fantasy which were indicators of the aroused motive rather than simply to rely on guesses about the meaning of such material.

The first experiments of McClelland and his research associates were carried out, not with a learned motive, but rather with hunger. The reason for this was that Atkinson and McClelland (1948) wanted to establish the premise that thematic fantasy stories would reflect a state of hunger, which is in fact, motivational. A group of 81 male Navy personnel were selected as the subjects, and were asked to write stories around standard questions in response to seven TAT pictures projected onto a screen. The subjects, deprived of food
for 1, 4, and 16 hours, wrote brief fantasy stories which changed in a number of important ways as hunger increased. Significant relationships were found between hours of food deprivation and fantasy theme which reflected such content as (1) an increase in the presence of food deprivation, (2) activity successful in overcoming food deprivation, and (3) a decrease in the amount of eating or invitations to eating in the stories. The study confirmed that thematic apperception or fantasy, if suitably scored, can differentiate need or motive states. The data from this and other initial studies became the basis for the authors' interest in measurement of the strength of the achievement motive expressed in thematic fantasy. They indicated that

Here we are collecting a thought sample under specified conditions and then applying to it a public system of content analysis which can be repeated by any observer who knows the system. (McClelland et al., 1953, p. 324)

Since their initial investigations, McClelland et al. have made prolific use of thematic fantasy productions in studying motivation, and they have investigated human motivation through the intensive study of n Ach. They state that the appearance of achievement fantasy in a thematic story is a joint function of three factors: (1) cues in the everyday environment and cues in relatively autonomous thought processes of the individual, (2) specific, experimentally introduced cues, and (3) controllable cues in a particular picture (McClelland et al., 1953, p. 196).

Further, they have developed experimental methods to arouse and control the intensity of human motives and to measure the experimental
results of the antecedent arousal condition of thematic fantasy. To account for the antecedents of affective arousal (i.e., pleasure and pain), McClelland and his colleagues go on to state that affective arousal is a function of the size of the discrepancy between the stimulus (perception) and the adaptation level (expectation) of the organism. This discrepancy hypothesis attempts to account for a number of experimental findings pertaining to preferences for stimuli.

**Construction of test.** The test construction procedure used by McClelland et al. followed a general plan of having experimental groups write thematic fantasy stories under achievement arousing conditions and under non-arousing conditions. The stories were scored according to a number of achievement related categories and compared statistically to determine which categories were reliable indicators of aroused n Ach (McClelland et al., 1953). In the process of validating the system for measuring n Ach, McClelland and his researchers saw a need for a measure of achievement motivation independent of the subjects' symbolic behavior. Initially, the researchers' definition of achievement motivation resided in the experimental procedures for arousing it, and the motivational status of n Ach was measured on the responsiveness of the scores to variations in the experimental procedures. In the test construction procedures, an experimental manipulation was made of the achievement motive to identify and to validate those aspects of fantasy material which were influenced by motive arousal.
Six experimental situations were used: relaxed, neutral, achievement-orientated, success, failure, and success-failure. The first three, relaxed, neutral, and achievement-orientated, represent three degrees on an n Ach arousal scale. The last three situations, i.e., success, failure, and success-failure, represent three possible outcomes which may influence the degree of n Ach arousal, although in and of themselves, they do not produce affect. N Ach varies as a dependent variable in response to stimulus changes; but in a standard neutral situation, individual differences occur in the strength of n Ach.

In most of the subsequent research on n Ach, the McTAT pictures are given and the subject's thematic fantasy stories written in a neutral situation. The assumption is made that differences in achievement fantasy in a neutral situation reflect differences in the characteristic level of this motive for each individual.

The general technique developed by McClelland et al. (1953) for measuring achievement motivation involves the presentation of a series of TAT pictures or slides in which the pictorial and background cues evoking the achievement motive are controlled. The test is administered to small groups in a neutral situation. The purpose of the neutral situation

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10 For a complete description, refer to McClelland et al., 1953, pp. 99-106.

11 For a more detailed description of test administration, refer to McClelland et al., 1953, pp. 97-106.
is to avoid any extensive attempts to manipulate the motivation of the subjects. The subjects are instructed to write a complete story about each picture, and to develop the stories around four main questions: (1) What is happening? Who are the persons?, (2) What has led up to this situation—that is, what has happened in the past?, (3) What is being thought—what is wanted? By whom?, and (4) What will happen? What will be done?. These same four questions are asked about each picture. The purpose of the questions is to help the subject write a complete story with a plot and characters. Usually a set of four TAT pictures is used. The pictures are projected onto a screen for a period of twenty seconds, with a five-minute writing period follows each picture. The basic rationale underlying the method of analyzing the stories for achievement motivation is described in detail by McClelland et al (1953, pp. 107-138), who also give specific instructions and illustrations for using the scoring system C. 12

Reliability. The standardized scoring system of content analysis developed by McClelland et al. (1953) has reflected high agreement between a score, re-score method and also between two trained judges working with the same thematic productions independently. For those interested in learning about scoring the McTAT, a detailed description of the scoring categories,

12 For detailed description, refer to McClelland et al., 1953, pp. 147-149.
with examples of scorable and non-scorable responses in each category are provided elsewhere.\textsuperscript{13} On the average, an individual can be expected to learn the scoring system well enough in about 12 hours of preparation to attain an index of agreement of .90 and higher. The indexes of agreement are based on the scores of two judges scoring the same material independently, or by one judge scoring the same material on two widely separated occasions.

\textbf{Cognate Forms of the TAT}

Although the literature reviewed does not reveal any studies that added color and/or movement as cues to the McTAT pictures to evoke an Ach responses, several investigators have modified TAT-like pictures to study the influence of color and movement on fantasy stories. The present study and the studies reviewed in this section have used cognate forms of TAT pictures to determine the influence of color and movement on fantasy stories. The present study investigated the influence of color and/or movement as cues added to the standard McTAT pictures to evoke an Ach responses.

Thompson and Bachrach (1951) hypothesized that individuals deal with color impressions in a manner consistent with their affective life.

\textsuperscript{13}See McClelland et al., 1953, pp. 110–138 and McClelland et al., 1958, pp. 179–204.
They used the Thompson TAT and the standard Murray TAT. Lifelike color was added to both series and the Negro chromatic and achromatic versions were administered to two Negro groups (N = 80) in ABBA form. The tests were also administered, in a similar manner, to white subjects (N = 30). In all groups, an interval of seven days separated the testing sessions between the two forms. Using word count as an index of emotional impact, the authors found that both Negroes and whites projected significantly more words to the chromatic versions than they did with the achromatic versions (P < .05). The findings indicated that color, added to TAT pictures, increased responsivity, irrespective of race.

The effect of adding color to the TAT to influence fantasy responses was also studied by Brackbill (1951). He administered six oil-tinted pictures and their achromatic counterparts to a sample of psychiatric in-patients at a Veterans Administration Hospital, and to a group of out-patients from a Mental Hygiene Clinic. Four groups of 25 subjects each were exposed to testing with both the chromatic and the achromatic pictures; and it was found that the chromatic pictures evoked more depressive stories among the in-patient groups than did the achromatic pictures. The out-patient groups showed more positive themes to chromatic pictures. Brackbill noted that while the two groups could not be distinguished by their responses to achromatic pictures, they could be distinguished on all categories by their responses to the chromatic pictures. It was concluded that the addition of color influenced the fantasy responses and that the mood of the TAT stories
was more a function of the test picture than it was of the personality of the subject.

Lubin (1955) hypothesized that with color, identification will increase responsivity to the chromatic TAT pictures. A sample (N = 30) of mentally retarded subjects between the ages of 15 and 32 years were studied. The subjects were residents of an institution in Oklahoma for the training and care of mentally retarded individuals. The I.Q. range was 51 to 75. The sample was divided into two sub-groups. The picture stimuli were presented to group A, chromatic to achromatic, and to group B, achromatic to chromatic. After a two week interval the procedure was reversed. The results indicated that mentally retarded subjects manifested a significantly (P< .01) greater number of words and themes to the chromatic stimuli TAT cards as a group, than they did to the achromatic cards. The individual responses were significantly (P< .01) greater to the chromatic stimuli as compared with the achromatic stimuli. Since the correlation plots did not lend themselves to the interpretation that there were any easily identifiable relationship between I.Q. and responsivity scores, it was concluded that any difference was due to the chromatic and achromatic variables.

Johnson and Dana (1966) studied a group of males (N = 13) and a group of females (N = 13), using TAT pictures (card numbers 2, 3 BM, 4, 6 BM, and 7 BM) which had been colored with water colors. The subjects were presented with achromatic and chromatic slides of the same stimulus pictures.
The purpose of the study was to explore some of the parameters of the color-affect relationship with verbal productivity of subject, sex, and order of presentation. Repeat- and scorer-reliabilities for four measures were assessed, with repeat reliabilities for the emotional tone scale and word productivity showing a correlation range between .75 and .98. A two by two by two latin square, counter balance design was used to determine the main effect of sex, order of presentation, and color. Although it was concluded that color alone did not have a measurable effect, it was felt that a conceptual and aesthetic effect may have occurred. For example, males and females indicated a difference with respect to response productivity ($P < .01$) to both sets of pictures; responsivity measures were also sensitive to change ($P < .05$) resulting from an order-color interaction; and responsivity was significantly higher for 6BM and the overall set when chromatic preceded achromatic pictures. These results suggest that while color seems to be related to affect, the conditions under which the relationship exists remains unspecified.

Further use of chromatic and achromatic TAT pictures to evoke fantasy stories has also been reported by Yudin and Reznikoff (1966). Student nurses ($N = 120$) were asked to respond to TAT pictures projected onto a screen, with half of the subjects writing stories to chromatic pictures and the other half responding to achromatic pictures. Four subgroups were tested during the first week of their psychiatric training, and
the remaining sub-groups were tested during their twelfth week of training. Yudin and Reznikoff analyzed the TAT fantasy stories for emotional tone, outcome, and number of words per story. The result indicated that longer stories and somewhat-more positive themes were evoked by the chromatic pictures. Significant differences (P < .02) were reported between the groups, with the greatest source of variance (P < .01) being contributed by picture difference. It was concluded that color does have, at least, a subtle effect on fantasy productions. An important aspect of the Yudin-Reznikoff study over the Johnson and Dana (1965) study was the method used to collect the data, i.e., the division of the sample into four sub-groups, which allowed for more objective analysis of the responses to the stimuli, thus eliminating carry over effects inherent in latin square designs.

The term animation or movement embraces a variety of sensory expectations related to operant and respondent fantasy behavior. Eiserer (1949) investigated the use of the motion picture as a projective technique. He compared six motion pictures with six similar, still pictures as stimuli to evoke fantasy responses. The motion pictures were created by using live actors depicting various situations. The situation contained one figure with whom the subject could identify, i.e., a family member, such as father, mother daughter, and son. The motion pictures (16 mm, 16 f.p.s.) were made by photographing subject in front of a white screen, and lights placed behind the screen gave a silhouette effect of the actors. The series of
motion and still pictures were presented (15 to 20 seconds) in an ABBA order to a sample (N = 50) of tenth grade boys of the Laboratory School, University of Chicago. The usual TAT instructions were given, but in addition, verbal structuring (e.g., Here is a boy) was given before each picture. The fantasy responses were analyzed into need-press, intraceptive language, discomfort-relief words, and length of stories. The results showed that the motion pictures did not evoke significantly more fantasy responses than did the still pictures.

**Summary and Conclusions Drawn from the Literature**

The McClelland et al. (1953) affective arousal theory differs from most traditional theories of motivation in the following two assumptions: (1) all motives are learned and (2) affect is the cause of motives. Traditional theories of motivation view motives as arising from drive, need, or strong stimuli, and affect as the by-product of motives, rather than the cause. The most important hypothesis of the McClelland et al. (1953) theory, however, is their definition of motive, which they define as "the redintegration [sic] by a cue of a change in an affective situation" (McClelland et al. 1953, p. 28).

The research of McClelland et al. (1953) has made extensive use of thematic fantasy stories for the study of motivation (n Ach); and they have primarily used TAT pictures and situational conditions to evoke n Ach
responses in thematic stories. Their research has also demonstrated the potential of the McTAT (four-picture test and scoring system for n Ach) as a measure of n Ach. Their research reports on three kinds of cues to evoke n Ach responses: (1) cues in the everyday environment and cues in the relatively autonomous thought processes of the individual, (2) specific experimentally introduced cues (e.g., neutral condition), and (3) controllable cues in the pictures.

Although many studies have investigated various methods for evoking n Ach responses, the literature does not reveal any research in which the influence of color and movement, together or individually have been studied as cues added to the standard four-picture McTAT to evoke n Ach responses in thematic stories.

The influence of color on fantasy stories has been studied by Thompson and Bachrach (1951), Brackbill (1951), Lubin (1955), Johnson and Dana (1965), and Yudin and Reznikoff (1966). These studies, considered as a whole, support the hypothesis that the addition of color to TAT pictures facilitates differentiation between the thematic responses of psychiatric and normal patients as well as between intellectually normal and handicapped groups.

Eiserer (1949) studied the influence of movement on thematic fantasy stories. He concluded that motion pictures did not evoke significantly more fantasy responses over still pictures.

Although the authors cited above suggest that color did have some influence on thematic responses in their respective studies, the conditions
under which this influence could be consistently determined was not ade-
quately specified.
CHAPTER III
METHOD OF PROCEDURE

This chapter includes a description of the study sample, the instruments used, and the procedures for programming the treatment variables, collecting the data, and analyzing the results.

Description of Sample

The study of 120 subjects was randomly selected from a total of 168 male students enrolled in Elementary General Physiology, winter quarter, 1967-68 at Utah State University, Logan, Utah. The selection of the subjects was accomplished in the following manner:

(1) Since the subjects were already registered for weekly laboratory periods as a part of their general psychology course, the testing for the present study was done during the regular laboratory periods. There were 12 laboratory sections with an average of 14 students in each section.

(2) Each of the four experimental treatments of the study was administered alternately to three different laboratory sections, i.e., Lab Section 3 received treatment C, and Lab Section 4 received treatment D. The same order of treatments was followed with Lab Sections 5, 6, 7, 8 (i.e., treatment A, B, C, D
respectively and with Lab Sections 9, 10, 11, and 12).

(3) Of the total 168 students tested in the 12 Lab Sections, the number receiving each treatment was as follows: Treatment A, \( N = 43 \); Treatment B, \( N = 42 \); Treatment C, \( N = 42 \); and Treatment D, \( N = 41 \). Treatment A served as the control group, with Treatments B, C, and D the experimental groups.

(4) At the time of testing, all subjects in each lab section were given test booklets which had been consecutively numbered and coded for each experimental treatment. Following the testing 30 subjects were selected from the total number tested in each treatment group. This selection was done by a table of random numbers, using the test booklet numbers for identifying the subjects.

(5) The resultant sample of 120 subjects consisted of 74 freshmen, 31 sophomores, 8 juniors and 7 seniors. Ages of the subjects ranged from 17 to 32 years, with the average age being 20 years.

Description of Instruments

McTAT—(McClelland et al. (1953)
Thematic Apperception Test)

The McTAT is a projective test in which subjects reveal themselves through fantasy stories which the subjects tell in response to ambiguous
pictures shown them by the test examiner. In this method the strength of motivation is best measured in an experimental, unstructured, ambiguous situation in which free responses are expressed through the stories the subjects make up about the test pictures. The McTAT a particularly useful in measuring the strength of the achievement motive, with the measurement of this motive being obtained from a quantitative analysis of the content of the stories written by the subjects. The four achromatic (black and white) pictures of the McTAT are described as follows:

Picture 1—Two men ("Inventors") in a shop working at a machine.

Picture 2—Boy in checked shirt at a desk, an open book in front of him.

Picture 3—"Father-Son"—a man apparently talking with a boy

(Card 7BM from the Murray Tematic Apperception Test).

Picture 4—Boy with vague operation scene in background (Card 8BM from the Murray Thematic Apperception Test).

Special effects apparatus for adding color and/or movement to the pictures

Color and movement effects, separately or together, were created by a special effects apparatus\textsuperscript{14} which was constructed so as to permit color and/or movement effects to be projected onto the test picture (inserted in the

\textsuperscript{14}U. S. Patent #2,937,564, patented May 24, 1960.
experimental apparatus) and thence onto a frosted glass screen. By rotating the lights inside the apparatus, and by changing the illuminating light colors, a wide variety of color and/or movement effects can be created. The resultant effects can also be photographically recorded on moving picture film with a camera positioned in front of the screen.

The apparatus consists of a rectangular box, approximately 2 by 3 by 4 feet which serves as a housing for a light source and a rack assembly for supporting photographic transparencies between the light source and the screen. The light source, capable of rotation by an electric motor, is a round disk fitted with several electric light bulbs. The bulbs are arranged in a concentric path on the disk. Each bulb is separated by an open-ended tubular shield that opens toward the screen. The light intensity of each bulb and the rotation speed of the light source are controlled by rheostats.

Movement effects are created in the following way: for example, when a transparency having one image is positioned in the rack and the three bulbs of the light source are used, three images of the transparency will be produced on the screen. Upon rotation of the disk, the images produced will rotate on the screen creating a movement effect.

Color is added by placing a color filter over each bulb. The color filters used in the present study were red, yellow, and blue.
Four treatments

A motion-picture film was made of each of the treatment pictures including those with the color and/or movement effects added to the four McTAT pictures. The film was, thus, programmed for the four sequences described below:

1. Treatment A (black and white, no movement standard McTAT)
2. Treatment B (black and white with movement added to the standard McTAT)
3. Treatment C (color, but no movement added to the standard McTAT)
4. Treatment D (color and movement added to the standard McTAT)

Programming the Four Treatments

In order to standardize the experimental methods for all subjects, the four treatment variations were programmed by making a 16 mm silent, color movie film of the original projections made by the special effects apparatus. A 9 by 12 inch achromatic, positive photographic transparency was made for each of the four pictures of the McTAT. Each transparency was placed in the apparatus and both adjusted to create the four treatments in the desired order and sequence. Color (red, yellow, and blue) was added by placing a color filter over the light source. Movement was added by rotating the illuminating disc. The projected images were photographically recorded with the camera positioned in front of the screen, and the resultant movie film was then used as the "programmed" McTAT for the present study.
The programmed filmed sequences made it possible to test the influence of color and movement, together or individually, as cues added to the four pictures, to evoke an A-ch response.

**Experimental Procedures**

The McClelland et al. (1953) testing procedures\(^{15}\) were followed as closely as possible. The students were tested in 12 small groups (average of 14 students per group) during the regular laboratory periods which the subjects attended as part of their university class in Psychology. The testing procedures were the same for all groups except for the treatment variation of the McTAT. Each group was administered only one of the four treatments. After the students were introduced to the writer by their laboratory instructor,\(^{16}\) each student was given a pencil and a test booklet. The test booklets had been numbered consecutively and coded according to the treatment being given. Four questions were printed on each of the 8-1/2 by 14 inch sheets of the test booklet to encourage the development of a complete story. The questions were spaced so that one-quarter of the page was allowed the subjects to write about each test item. The four questions asked were as follows: (1) What is happening? Who are

\(^{15}\) For a detailed description of testing procedures, refer to McClelland et al., 1953, pp. 97-106.

\(^{16}\) For introduction read, refer to Appendix A, p. 62.
the persons?; (2) What has led up to this situation—that is, what has happened in the past?; (3) What is being thought—what is wanted? By whom? and (4) What will happen? What will be done?. The test was administered under the "neutral" situation\textsuperscript{17} described by McClelland. The instructions\textsuperscript{18} for taking the test under the neutral situation were played from a tape recorder.

The programmed presentation of each picture was projected onto a screen for a period of 20 seconds. A five-minute writing period followed each picture. After four minutes had passed, the writer told the students that they had one minute in which to finish their story and to get ready for the next picture. Each student wrote four stories. A total of 168 students were tested, distributed by treatment group as follows: Treatment A, 43 (control group); Treatment B, 42; Treatment C, 42; and Treatment D, 41. A table of random numbers was then used to select 30 subjects from among the total number tested in each treatment group, resulting in a total $N$ of 120 subjects in the study sample.

\textsuperscript{17} For explanation, refer to Definition of Terms, p. 8, or refer to McClelland et al., 1953, p. 101.

\textsuperscript{18} The instructions given for taking the test are found in Appendix B, p. 63.
Scoring Procedures and Reliability

In order to learn the scoring system and determine the scoring reliability the author of the present study followed the procedures described by McClelland et al. (1953) pp. 179-204) and Smith and Feld (1958, pp. 685-737).

A scoring sheet was used to record the scores for each student. The content analysis of the stories was determined by using the categorized scoring system developed and validated by McClelland et al. (1953). Each story was analyzed separately, with the content categories then being totaled for each student, to provide an n Ach score for all the stories written by each subject.

The 480 stories were scored on two separate occasions, six months apart. Reliability was determined by a check-recheck method and a rank difference method. A percentage of agreement of .90 was obtained between the first and second scoring.

Statistical Analysis of the Data

Mean n Ach scores and standard deviations were computed for each of the four treatment groups and for each of the pictures within each treatment. The study hypotheses were tested by the analysis of variance and t-test techniques.

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19 For detailed explanation, refer to McClelland et al., 1953, pp. 108-138.
Analysis of variance was used to measure the influence of the treatment variables on the n Ach means among each treatment. To test the specific hypotheses, t-tests were used to determine the influence of color and/or movement between mean n Ach scores of each treatment and between mean n Ach scores of each picture between treatments. A one-tailed test of significance was used to determine the significance level of any differences in mean scores.

Attempt to measure the general equivalence of the treatment groups in terms of academic performance was made by comparing the treatment groups on distribution of course grades, i.e., proportion of the students in each group who received a course grade of A, B, C, D, or F.
CHAPTER IV
RESULTS

The results of this study are presented under the following headings: (1) equivalence of the treatment groups, (2) influence of the treatment variables on the length of stories, (3) testing the hypotheses and (4) related data to the hypotheses.

The analysis of the distribution of course grades was made to determine the proportion of students in each group who were above average, average, and below average in academic performance in Elementary General Psychology. It was considered that by this method the general equivalence of the groups to produce thematic stories could be shown. The length of the stories was measured by word count. These data indicate an attempt to determine the influence of the treatment variable to produce longer stories. Each of the treatment groups wrote their stories to one treatment because no suitable method was available to eliminate the carry-over effect from one treatment to another had each group received all four treatments and written their stories after each treatment. The hypotheses were tested to determine the influence of color and/or movement as cues added to the standard McTAT to evoke Ach responses. Analysis of the data related to the hypotheses indicates the influence of the treatment variables on the stories written to each of the four pictures.
The equivalence of the groups by course grades is shown in Table 1. Tables 2 and 3 show the influence of the treatment variables on the length of the stories as measured by word count. The data testing the hypotheses are shown in Tables 4, 5, and 6 and the related data to the hypotheses are shown in Table 7.

**The Equivalence of Groups**

As shown by Table 1, the analysis of variance for the groups by course grade (Elementary General Psychology) does not produce a significant F ratio. Based on these data it was concluded that the distribution of course grades was similar for each treatment group. Therefore, the subjects in each treatment group were assumed to be relatively equal in terms of their general academic performance and/or capabilities for this particular course.

**Influence of The Treatment Variable on Length of Stories**

Each of the 120 students wrote four stories, one for each picture. The McClelland et al. (1953) scoring system C was used to score the stories for n Ach. The 480 stories were analyzed by word count, a measure of the length of stories. A frequency distribution of the word count per student (four stories) is given in Table 2. The word count of the four stories written by each student ranged from 221 to 614 words. The lowest word count of 221 words appears in Treatment D and the highest of 614 words appears in Treatment C.
Table 1. Analysis of variance and means for groups\(^a\) by course grade
(Elementary General Psychology)

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Degrees of freedom</th>
<th>Mean variance</th>
<th>F ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Among groups</td>
<td>3</td>
<td>1.96</td>
<td>1.75(^b)</td>
</tr>
<tr>
<td>Within groups</td>
<td>116</td>
<td>1.12</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course grade means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment A (black and white no movement)</td>
</tr>
<tr>
<td>Treatment B (black and white with movement)</td>
</tr>
<tr>
<td>Treatment C (color no movement)</td>
</tr>
<tr>
<td>Treatment D (color with movement)</td>
</tr>
</tbody>
</table>

\(^a\)30 students per group, total 120
\(^b\)Not statistically significant

As shown by Table 3, the analysis of variance for the groups by word count does not produce a significant F ratio. It was concluded from the data shown in Tables 2 and 3 that adding color and/or movement to the McTAT pictures did not significantly increase the length of the stories.
Table 2. Frequency distribution of students\textsuperscript{a} by word count (number of words for 4 stories)

<table>
<thead>
<tr>
<th>Number of words</th>
<th>Treatment of Students by Treatment Group</th>
<th>Movement</th>
<th>Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A Black/white</td>
<td>B Black/white with Color</td>
<td>C Color</td>
</tr>
<tr>
<td>601 - 625</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>576 - 600</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>551 - 575</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>526 - 550</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>501 - 525</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>476 - 500</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>451 - 475</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>426 - 450</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>401 - 425</td>
<td>6</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>376 - 400</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>351 - 375</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>326 - 350</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>301 - 325</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>276 - 300</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>251 - 275</td>
<td>2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>226 - 250</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>200 - 225</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Range</td>
<td>283 - 549</td>
<td>225 - 595</td>
<td>242 - 614</td>
</tr>
<tr>
<td>Mean</td>
<td>393.80</td>
<td>394.93</td>
<td>405.80</td>
</tr>
<tr>
<td>F ratio</td>
<td>.28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{a}The total number of stories in each treatment is 120 (30 students, 4 stories each). The word count is based on the total words written by each subject for the 4 stories.
Table 3. Analysis of variance for the groups by word count

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Degrees of freedom</th>
<th>Mean variance</th>
<th>F ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Among groups</td>
<td>3</td>
<td>1733.01</td>
<td>.28b</td>
</tr>
<tr>
<td>Within groups</td>
<td>116</td>
<td>6188.80</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[^{a}\text{30 students per group, total 120. Word count is based on the total words in the four stories written by each student.}\]

\[^{b}\text{Not statistically significant.}\]

Testing the Hypotheses

General hypothesis

To test the problem it was hypothesized that addition of color and/or movement to the McTAT pictures would evoke greater n Ach response as measured through fantasy recorded in story form.

Table 4 shows the mean n Ach scores for each of the four treatments. These data show that: (1) Treatment B, black and white with movement, evoked the most n Ach responses; (2) Treatment C, color with no movement, was the next highest; (3) Treatment D, color with movement, was third; and (4) Treatment A, black and white with no movement, was the lowest in n Ach responses.

The analysis of variance by mean n Ach scores for the treatment groups is shown in Table 5. The F ratio of .95 indicates that no significant difference exists among the treatment means. The influence of color and/or movement was not great enough to significantly differentiate the mean n Ach score of the treatment groups.
Table 4. Mean n Ach scores of the four treatments, \(^a\) highest to lowest

<table>
<thead>
<tr>
<th>Treatments</th>
<th>N Ach score</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>B (black and white with movement)</td>
<td>11.30</td>
<td>6.15</td>
</tr>
<tr>
<td>C (color, no movement)</td>
<td>9.97</td>
<td>6.94</td>
</tr>
<tr>
<td>D (color with movement)</td>
<td>9.33</td>
<td>5.39</td>
</tr>
<tr>
<td>A (black and white, no movement)</td>
<td>8.60</td>
<td>6.50</td>
</tr>
</tbody>
</table>

\(^a\) 30 students per treatment, total 120.

Table 5. Analysis of variance by mean n Ach scores for the treatment groups\(^a\)

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Degrees of freedom</th>
<th>Mean variance</th>
<th>F ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Among groups</td>
<td>3</td>
<td>39.36</td>
<td>.95(^b)</td>
</tr>
<tr>
<td>Within groups</td>
<td>116</td>
<td>41.25</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) 30 students per group, total 120; 1 n Ach score per student.  
\(^b\) Not statistically significant

Specific hypotheses

To test the influence of color and/or movement, seven specific hypotheses were tested and analyzed using t-tests. These data are summarized in Table 6. The acceptance or rejection of these hypotheses was based on the results of the t-test between the n Ach means of the various treatment comparisons.
Table 6. Comparison of n Ach means among the four treatment groups

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean n Ach</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (black and white no movement)</td>
<td>8.60</td>
<td>6.50</td>
</tr>
<tr>
<td>B (black and white with movement)</td>
<td>11.30</td>
<td>6.15</td>
</tr>
<tr>
<td>C (color, no movement)</td>
<td>9.97</td>
<td>6.94</td>
</tr>
<tr>
<td>D (color with movement)</td>
<td>9.33</td>
<td>5.39</td>
</tr>
</tbody>
</table>

Analysis of n Ach means

<table>
<thead>
<tr>
<th>Analysis of n Ach means</th>
<th>B to A</th>
<th>D to C</th>
<th>C to A</th>
<th>D to B</th>
<th>D to A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diff. between means</td>
<td>2.70</td>
<td>.64</td>
<td>1.37</td>
<td>1.97</td>
<td>.73</td>
</tr>
<tr>
<td>SE_D</td>
<td>1.63</td>
<td>1.61</td>
<td>1.74</td>
<td>1.49</td>
<td>1.54</td>
</tr>
<tr>
<td>t ratio</td>
<td>1.66</td>
<td>.40</td>
<td>.79</td>
<td>1.32</td>
<td>.47</td>
</tr>
<tr>
<td>Significant</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

30 students per treatment, total 120; one n Ach score per student.

Hypothesis la.

Movement will evoke greater n Ach response than no movement. N Ach response will be greater for Treatment B (black and white with movement) than for Treatment A (black and white, no movement).

Treatment B has a mean n Ach score of 11.30, and Treatment A has a mean of 8.60. These data show that the n Ach response was greater for Treatment B than for Treatment A. The t ratio of 1.66 between the n Ach means of Treatments B and A is not statistically significant. Therefore, hypothesis la is rejected.

Hypothesis lb.

Color with movement will evoke greater n Ach response than color without movement. N Ach response will be greater for Treatment D (color with movement) than for Treatment C (color, no movement).
The mean n Ach score of 9.33 for Treatment D is less than the mean 9.97 for Treatment C. Since the n Ach mean of Treatment D is less than Treatment C and the t-test between these means is not statistically significant, hypothesis 1b is rejected.

**Hypothesis 2a.**

Color will evoke greater n Ach response than black and white. N Ach response will be greater for Treatment C (color, no movement) than for Treatment A (black and white, no movement).

Table 6 shows mean n Ach scores of 9.97 for Treatment C and 8.60 for Treatment A. Although the n Ach mean of Treatment C is higher than Treatment A, the t-test between these means is not statistically significant. Therefore, hypothesis 2a is rejected.

**Hypothesis 2b.**

Color and movement combined will evoke greater n Ach response than black and white with movement. N Ach response will be greater for Treatment D (color with movement) than for Treatment B (black and white with movement).

While the n Ach mean of Treatment D (9.33) is less than the mean for Treatment B (11.30), the t-test between these means is not statistically significant. Therefore, hypothesis 2b is rejected.

**Hypothesis 3a.**

Color and movement combined will evoke greater n Ach response than color alone or movement alone. N Ach response will be greater for Treatment D (color with movement) than for Treatment A (black and white, no movement).

The data show that Treatment D has a mean n Ach score of 9.33 and Treatment A, a mean of 8.60. Although the mean of Treatment D is higher
than Treatment A, the difference is not statistically significant. Therefore, hypothesis 3a is rejected.

Hypothesis 3b.

Color with movement will evoke greater n Ach response than black and white with movement. N Ach response will be greater for Treatment D (color with movement) than for Treatment B (black and white with movement).

The n Ach mean for Treatment D (9.33) is less than the mean of Treatment B (11.30). However, since this difference was not statistically different, hypothesis 3b is rejected.

Hypothesis 3c.

Color with movement will evoke greater n Ach response than color without movement. N Ach response will be greater for Treatment D (color with movement) than for Treatment C (color, no movement).

The mean n Ach score of 9.33 for Treatment D is less than the mean of 9.97 for Treatment C. However, since this difference is not statistically significant, hypothesis 3c is rejected.

Related Data to Hypotheses

Although the general hypothesis of the study, as well as the seven specific hypotheses were all rejected, the n Ach response to certain pictures was significantly influenced by the treatment variables. Table 7 shows a comparison of the group n Ach means for each individual picture; and these data indicate that the addition of color and movement evoked significantly more n Ach responses to picture 4 than to the other three pictures. The greatest difference between treatment groups was obtained in comparing Treatment
Table 7. Comparison of n Ach means between the treatment groups\(^a\) for each of the McTAT pictures

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Picture 1</th>
<th>Picture 2</th>
<th>Picture 3</th>
<th>Picture 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean n Ach</td>
<td>SD</td>
<td>Mean n Ach</td>
<td>SD</td>
</tr>
<tr>
<td>A (black and white no movement)</td>
<td>3.23</td>
<td>2.56</td>
<td>1.67(^b)</td>
<td>2.72</td>
</tr>
<tr>
<td>B (black and white with movement)</td>
<td>3.43</td>
<td>2.62</td>
<td>3.40(^c)</td>
<td>2.63</td>
</tr>
<tr>
<td>C (color no movement)</td>
<td>2.73(^b)</td>
<td>2.42</td>
<td>1.93</td>
<td>2.73</td>
</tr>
<tr>
<td>D (color with movement)</td>
<td>3.57(^c)</td>
<td>2.45</td>
<td>2.23</td>
<td>2.82</td>
</tr>
</tbody>
</table>

Analysis of n Ach means

<table>
<thead>
<tr>
<th>TREATMENTS</th>
<th>B to A</th>
<th>D to C</th>
<th>C to A</th>
<th>D to B</th>
<th>D to A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture 1</td>
<td>(''inventors'')</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diff. bet. means</td>
<td>.20</td>
<td>.84</td>
<td>.50</td>
<td>.14</td>
<td>.34</td>
</tr>
<tr>
<td>SE(_D)</td>
<td>.67</td>
<td>.62</td>
<td>.64</td>
<td>.66</td>
<td>.65</td>
</tr>
<tr>
<td>t ratio</td>
<td>.30</td>
<td>1.33</td>
<td>.78</td>
<td>.21</td>
<td>.52</td>
</tr>
<tr>
<td>Significant</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Picture 2</td>
<td>(Boy at desk)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diff. bet. means</td>
<td>1.75</td>
<td>.30</td>
<td>.26</td>
<td>1.17</td>
<td>.56</td>
</tr>
<tr>
<td>SE(_D)</td>
<td>.69</td>
<td>.71</td>
<td>.70</td>
<td>.71</td>
<td>.71</td>
</tr>
<tr>
<td>t ratio</td>
<td>2.57</td>
<td>.42</td>
<td>.37</td>
<td>1.65</td>
<td>.79</td>
</tr>
<tr>
<td>Significant</td>
<td>&gt; .02</td>
<td>no</td>
<td>no</td>
<td>n0</td>
<td>no</td>
</tr>
<tr>
<td>Picture 3</td>
<td>(''Father-Soñ'')</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diff. bet. means</td>
<td>.16</td>
<td>.20</td>
<td>.67</td>
<td>.63</td>
<td>.47</td>
</tr>
<tr>
<td>SE(_D)</td>
<td>.78</td>
<td>.78</td>
<td>.75</td>
<td>.80</td>
<td>.75</td>
</tr>
<tr>
<td>t ratio</td>
<td>.21</td>
<td>.26</td>
<td>.89</td>
<td>.79</td>
<td>.63</td>
</tr>
<tr>
<td>Significant</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>
Table 7. Continued.

<table>
<thead>
<tr>
<th>Analysis of n Ach means</th>
<th>TREATMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B to A</td>
</tr>
<tr>
<td>Picture 4</td>
<td></td>
</tr>
<tr>
<td>(Operation scene)</td>
<td></td>
</tr>
<tr>
<td>Diff. bet. means</td>
<td>.60</td>
</tr>
<tr>
<td>SED</td>
<td>.75</td>
</tr>
<tr>
<td>t ratio</td>
<td>.80</td>
</tr>
<tr>
<td>Significant</td>
<td>no</td>
</tr>
</tbody>
</table>

a30 students per treatment, total 120; one n Ach score per student.
bLowest n Ach score obtained by picture.
cHighest n Ach score obtained by picture.

C (color, no movement) over Treatment A (black and white, no movement), and this difference was in response to picture 4. In other words, the influence of color was demonstrated to some extent, but only on the one picture, #4. However, when the scores of all pictures were combined, the difference for picture #4 was not sufficient to demonstrate an over-all significant influence of the color variable.

The influence of movement was also shown in one picture, #2. Table 7 shows that when Treatment B (black and white with movement) was compared with Treatment A (black and white without movement), Treatment B evoked a significantly larger n Ach response; but here again, the influence of movement on the one picture was negated when the scores of all pictures were considered together.
CHAPTER V

SUMMARY AND CONCLUSIONS

The frame of reference on which the present study was based is essentially that of McClelland et al. (1953). The theories of McClelland et al. which deal with affective arousal and the concept of cues arousing motives was followed as closely as possible in the conduct of this study.

The research of McClelland et al. (1953) is a way of demonstrating the McTAT as a method of measuring the influence of cues to evoke n Ach responses. They did this by selecting an independent variable (cue) which was meaningful to n Ach (motivation) and then determining whether differences in fantasy stories reflected the influence of the independent variable on the dependent variable, n Ach.

McClelland et al. (1953) describe three kinds of cues that may influence a student's n Ach, and hence increase the number of achievement related responses in fantasy stories. The three kinds of cues are: (1) cues in the everyday environment and cues in relatively autonomous thought processes of the individual, (2) specific, experimentally introduced cues (e.g., neutral test instructions—no attempt to verbally arouse n Ach), and (3) controllable cues in the pictures.
Although many studies have dealt with methods to evoke n Ach responses, the literature reviewed did not reveal any studies which investigated specifically, the influence of the color and movement, either separately or combined, added to the standard McTAT to evoke n Ach responses.

The problem of the present study was to investigate the influence of color and movement, separately and combined, as cues added to the traditional McTAT pictures (black and white, no movement) to evoke n Ach responses. It was hypothesized that color and/or movement would increase n Ach responses in fantasy stories.

To test the hypotheses of the study, 120 male college students were randomly divided into four groups of 30 students each and tested under similar conditions, with each group of subjects being exposed to different treatment variation of the standard, four-picture McClelland Thematic Apperception Test. Color and movement were added to the standard black and white pictures by using a special effects apparatus, and each group was tested for n Ach by one of the following experimental treatments: Treatment A, the control group, (black and white, no movement), Treatment B (black and white with movement); Treatment C (color, no movement); or Treatment D (color with movement). The four treatments were recorded on a motion-picture film in order to standardize the testing procedures.

Each of the four McTAT pictures was projected onto a screen for 20 seconds, and the subjects were asked to write fantasy stories in response
to the pictures. The students had five minutes following each picture to write their stories, which were then scored for n Ach responses by using the McClelland et al. (1953) scoring system C.

Analysis of variance and t-test techniques were used for statistical comparisons of the data, in order to analyze the mean n Ach scores of each treatment group. Analysis of variance of mean n Ach scores were made among all four treatment groups as well as among the picture variations of each treatment. No significant differences were found among the mean n Ach scores of the treatment groups. Therefore, the general hypothesis, and seven sub-hypotheses of the study were rejected. Since neither color nor movement had a significant influence on the dependent variable, n Ach, it was concluded that color and movement were apparently not perceived by the subjects as cues associated with achievement motivation (n Ach).
LITERATURE CITED


APPENDIXES
Appendix A

Introduction Read by Laboratory Instructors

Introducing Writer to Subjects

This is Mr. Hurst, who is a graduate student in our department. He is doing a study for his doctor’s degree in psychology. He has developed a new psychological instrument which has been approved by the department. He now wants to establish some norms for this instrument. Today we are asking all of the male students to go with Mr. Hurst and to give him your full cooperation. Your participation and cooperation will help you to gain some practical experience by assisting in the development of this new psychological instrument. Your serious cooperation is necessary if the results are to be meaningful.
Appendix B

Test Instructions

The instructions were recorded on tape and are as follows:

This is a test of your creative imagination. A number of pictures will be projected on the screen before you. You will have twenty seconds to look at the picture and then about four minutes to make up a story about it. Notice that there is one page for each picture. The same four questions are asked. They will guide your thinking and enable you to cover all the elements of a plot in the time allotted. Plan to spend about a minute on each question. I will keep time and tell you when it is about time to go on to the next questions for each story. You will have a little time to finish your story before the next picture is shown.

Obviously there are no right or wrong answers, so you may feel free to make up any kind of a story about the pictures that you choose. Try to make them vivid and dramatic, for this is a test of creative imagination. Do not merely describe the picture you see. Tell a story about it. Work as fast as you can in order to finish in time. Make them interesting. Are there any questions? If you need more space for any question, use the reverse side. (McClelland et al., 1953, p. 98)
VITA

Justin Fred Hurst

Candidate for the Degree of

Doctor of Education

Dissertation: The Influence of Color and/or Movement Added to Thematic Apperception Test to Evoke Need Achievement

Major Field: Educational Psychology

Biographical Information:

Personal Data: Born at Payson, Utah, September 17, 1924, son of Justin E. and Inez Tanner Hurst; married Beverly Willmore, September 7, 1950; two children--Craig, age 14, and Earl, age 9.

Education: Attended public schools in Salt Lake City, Utah; graduated from West High School in 1942; received the Bachelor of Arts degree from University of Utah, with a major in Sociology and Spanish in 1952; did graduate work in Social Work at University of Utah, 1952-54; completed the requirements for the Certificate of Social Work and for the Master of Social Work, specializing in psychiatric Social Work.

Professional Experience: 1968 to present, Counseling Psychologist, Region III-B Mental Health Center, Boise, Idaho; 1961-68, Private Practice, Counseling and Guidance, Bountiful, Utah; 1954-61, District Supervisor and Vocational Counselor, Utah State Department of Public Instruction, Division of Vocational Rehabilitation, Ogden and Salt Lake City, Utah.