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MOTIVATIONAL INDUCTION AND THE BEHAVIORAL CORRELATES
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by
Walter Ralph Reitman

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MOTIVATIONAL INDUCTION AND THE BEHAVIORAL CORRELATES
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By Walter Ralph Reitman

D. C. McClelland, J. W. Atkinson, and their collaborators have developed content analytic systems which, when applied to modified Thematic Apperceptive Test (TAT) protocols, yield scores which are interpreted as indices of motive strength. Measures of the achievement and affiliation motives obtained in this way have been utilized in numerous investigations of memory, perception, and performance as functions of motive strength. Occasional inconsistent findings and failures to replicate previously obtained results, however, suggest the desirability of more precise theoretical formulation and methodological improvement of the techniques and conditions used in assessing both motives and also performance criteria.

According to a theoretical model proposed by Atkinson, aroused motivation resulting in goal-directed action is a function of the latent strength of a given motive and of the environmentally activated expectancy that action will lead to the attainment of the goal of that motive. This implies that a given motive-performance relation will be maximal if the only expectancy aroused is that performance is relevant to the goal of the motive in question.

One of two forms of a TAT-type measure was administered to 258 male college students under neutral classroom conditions. Eleven weeks later, subjects worked at three performance tasks under one of five performance conditions: Achievement-Oriented, group administration; Achievement-Oriented, individual administration; Neutral, group; Neutral, individual; and Relaxed-Affiliation, group. Printed instructions were used to induce the Achievement, Neutral, and Relaxed-Affiliation orientations. The Achievement instructions attempted to engage expectancies that performance

at the tasks would lead to attainment of an achievement goal; the Relaxed-Affiliation instructions suggested that performance would result in attainment of an affiliation goal.

Under these conditions, the model permits three predictions. 1. Significant motive-performance correlations will be positive under all experimental conditions. 2. The achievement motive will correlate maximally with performance under Achievement-Oriented. 3. The affiliation motive will correlate maximally with performance under the Relaxed-Affiliation condition.

A fourth prediction derives from a previous study. 4. Motive indices from the first three pictures of the present six-picture TAT-type form will yield larger positive correlations with performance than the corresponding indices based on the last three pictures.

The Achievement-Oriented conditions showed significant performance increments on all measures over Neutral conditions, proving the efficacy of the printed instructions. This result was independent of individual vs. group administration of the response measures and of differences among Ss in quantitative and linguistic ability. The four predictions were not confirmed, however; neither motive measure correlated systematically with any of the performance measures under any of the conditions. Detailed supplementary analyses revealed no obvious reason for this non-confirmation.

The impossibility of adequate inter-experimental comparison is noted as an important consideration, and the resultant endemic disagreement over the conditions required for motive-performance correlations together with the lack of transitivity and additivity is pointed out. The urgent need for standardized response measures and more precisely controlled induction techniques is stressed.

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CHAPTER I

THE PROBLEM OF MEASUREMENT

Introduction

Science strives to develop laws which accurately describe and accord with the phenomena of the real world. Prediction of relationships among events depends, however, upon adequate classification of events. For this reason, the increasingly precise specification and measurement of variables is a necessary requirement for scientific progress.

More comprehensive specification and measurement would seem especially necessary for advance in imprecise sciences such as psychology. Here inadequate determination of relevant factors typically results in sources of uncontrolled error variance so large as to distort or obscure completely relationships among the variables under investigation.

The history of the psychology of human motivation nicely illustrates this dependence of scientific progress upon the adequacy of the available measurement techniques. Sigmund Freud proposed the earliest of his brilliant hypotheses about unconscious motivational processes before the turn of the century; experimental verification was not even potentially feasible, however, until the development in the 1930's, notably by H. A. Murray and his associates, of rudimentary and quasi-objective measures of uncognized motives.

The first steps taken by these investigators were necessarily tentative, exploratory, and unsystematic, as is evident from Murray's characteristically vivid evocation of the atmosphere in which the work took place.

. . . every investigator at the Harvard Psychological Clinic was a pioneer with his own chosen area of wilderness to map. Each area was an aspect of human personality--a virgin forest of peculiar problems. Here he lost and sometimes found himself. Though there were plenty of opportunities for communication, his obligations to other experimenters were minimal and he was free to follow the wilful drifts of his own elusive thought (50, p. vii).

The most important psychological instrument to emerge from these explorations was the Thematic Apperception Test, or TAT (48). This test consists of a series of ambiguous pictures which are used to elicit stories from the subject. It is based on the assumptions that apperceptions of the ambiguous test stimuli will vary with the feelings and thoughts of the subject, and that skilled interpreters will be able to infer something of the subject's basic orientations to the world from the stories he tells. Typically, however, such analyses are made with little concern for objective validation of the interpretive categories employed. When used in this fashion, the TAT is to be regarded more as a diagnostic aid than as a means of measurement.

The Development and Use of the Thematic Apperceptive Measure of Achievement Motivation

Within the past decade, however, D. C. McClelland, J. W. Atkinson, R. A. Clark, and their collaborators have developed a modification of the TAT which they utilize as an almost entirely objective measure of basic motivational tendencies. Assuming that the thought content elicited in thematic apperceptive stories might serve as an indicator of the strength of characteristic motives, these in-

investigators contrived experimentally different motivating conditions as criteria, and then devised coding systems which enabled them to categorize and count reliably the classes of content which they wished to use as an index of motive strength. They then conducted a series of validation studies to assess the predictive utility of this index.

Their investigations primarily concerned a measure of the need for achievement (n Achievement), which they defined operationally as a concern over "success in competition with some standard of excellence" (44, p. 110). When in 1953 McClelland et al. published The Achievement Motive (44), they could point to a sizable body of evidence suggesting that their thematic apperceptive technique did in fact measure a broad disposition to be concerned about successful competition and performance.

In addition to the repeatedly reported relationship between the n Achievement index and superior performance at such laboratory measures as a Scrambled Words test and several sorts of arithmetic tasks (12, 16, 18, 35, 36, 44, 53, 61), investigators also uncovered evidence of the effects of several motives measured by thematic apperceptive methods upon other areas of psychological functioning. Thus, such motive scores might be associated with differences in perceptual sensitivity (13, 47), recall of interrupted and completed tasks (5, 6, 11), selective recall of meaningful material (25, 51, 52), graphic expression (3, 4), and with yielding behavior and conformity (23, 54). Furthermore, although used in most studies to provide an index of the strength of the achievement motive, the technique also was applied to the measurement of hunger (10) and fear (60), and of the sexual (21, 22), affiliation (9, 11, 23, 27, 28, 32, 54, 55), and power (58, 59) motives.

With the publication of The Achievement Motive, interest in n Achievement increased. A bibliography compiled as of September, 1956 (31) listed over 125 relevant references. The theoretical scope of the research program also rapidly began to expand beyond the confines of the laboratory situation. McClelland, for example, outlined a hypothesis relating Protestant self-reliance values, early independence training, high n Achievement, and economic and technological progress (37). D. E. Berlew sought to show that the rise and fall of classical Greek civilization could be correlated with changes in the prevalence of achievement motivation as inferred from a content analysis of the literature of the times (15).

Methodological Problems in the Use of the Measure

But while this growing net of interrelationships adequately demonstrated the fruitfulness and potential of the n Achievement measure, several concurrent failures to reproduce earlier findings^{1,2} (16) seemed to indicate a need for improved specification of the basic assessment procedures utilized in obtaining the index itself. Methodological improvements might also be expected to increase the test-retest reliability of the instrument, which occasionally had been a cause for some concern. The approximate upper limit for the reliability of the measure as generally used seemed to be defined by the uncorrected equivalent form coefficient of .56 reported by Atkinson (5, p. 24). While this estimate, based on a split-half presentation, was matched by two of the three test-retest figures, .54 and .59, reported by R. N. Haber and

¹Personal communication from R. N. Haber, April, 1955.

²Personal communication from R. N. Haber, April, 1956.

R. Alpert (30), it was somewhat larger than the third figure, .36, which they also reported. This latter figure, in turn, was roughly comparable in size to the split-half coefficients of .28, .32, and .38 reported by W. R. Reitman and J. W. Atkinson (53), who did not, however, employ equivalent subsets of pictures. E. L. Lowell, who administered, one week apart, the two three-picture equivalent forms utilized by Atkinson, obtained a correlation of .22 (44, p. 192), which probably defines the lower limit for such estimates of reliability. Taken as a whole, these figures seemed to suggest that it might be possible to make considerable improvements in the reliability of the instrument, and this increased reliability clearly would be a factor making for added stability in the relationships reported between achievement motive indices and behavioral criteria.

Finally, even significant correlations between Achievement and performance measures seldom were larger than .40, and occasionally were rather smaller. In part, this absence of more pronounced relationships could be ascribed to the relative unreliability of the motive index. On the other hand, it seemed reasonable to expect that more precise knowledge of the variables affecting relationships between motive and performance also might make it possible to increase their size considerably.

Although several discussions of the research on these largely methodological problems have appeared recently (17, 30, 39, 53), a brief consideration of the two studies which provided much of the immediate stimulus for the present investigation may nonetheless be of some value.

In one of these two studies, J. W. Atkinson and W. R. Reitman

(12) sought to improve the predictive efficiency of thematic apperceptive measures by a more adequate theoretical and empirical analysis of the conditions determining the extent of the correlation between motive index and performance score. McClelland et al. (44) had provided evidence that the size of the relationship was dependent upon environmental cues obtaining during the measurement of performance; they tended, however, to think of motive strength as the summed resultant of relevant cues in the environment and of associative processes in the individual conditioned by previous related affective experience. To illustrate the role of this second component, they pointed out that "some people, even if they start thinking about scrambling an egg, will end up thinking about how to scramble it well" (44, p. 201).

Although the existence of some evidence (e.g., 44, p. 258; 47, 52) of a limited inverse relationship between the presence of certain classes of internal achievement-related associative processes and sensitivity to environmental cues conceivably might have complicated prediction from such a model, McClelland et al. did not refer to any such possibility in their analysis of the determinants of motive strength. Their conceptualization therefore seems quite clearly to predict that in identical situations, subjects with high internal motivation should always excel in performance subjects who have little or no such internal component, since the contribution of environmental cues must be approximately equal for the two groups. H.-W. Wendt (61), and E. G. French (26) in fact make use of such an argument. McClelland et al., however, qualify their position to some extent. Analyzing an experiment under relaxed conditions in which subjects with high n Achievement scores actually did less well than subjects with lower scores, they suggest

that perhaps the highly motivated subjects have "a certain reality orientation" (44, p. 225).

The inclusion of such an informal additional postulate might seem to make the McClelland et al. formulation a somewhat looser predictive system. Interestingly enough, however, it also seems to bring it somewhat closer to the possibility suggested somewhat earlier by Atkinson (5, 6, 7, 11), who considers the aroused motivation resulting in goal-directed action to depend not only on the strength of the motive, conceived of as a latent disposition, but also on the arousal by environmental cues of an expectancy that performance will be instrumental in reaching the goal of the motive. It is this latter conception which Atkinson and Reitman (12) elaborate in their attempt to develop a more comprehensive theoretical analysis of the conditions under which the motive measured by the thematic apperceptive index will maximally be related to performance. If, they argue, the total aroused motivation leading to performance of any act is the sum of the contributions from all of the motives which have been engaged by environmental arousal of the appropriate expectancies, then the larger the number of engaged motives, the smaller the correlation should be between any one of them and the performance. Conversely, "this conception implies that a positive relationship between a particular motive (e.g., n Achievement) and performance can be maximized by engaging that motive and no others . . ." (12, p. 361).

These investigators designed two conditions, the Achievement-Orientation condition, in which they attempted to engage only the achievement motive, and the Multi-Incentive condition, in which they attempted to engage the affiliation motive (n Affiliation) and monetary motives

as well. One of their two tasks (the Xs-in-circles measure) showed no relation to n Achievement within either condition. However, performance at an arithmetic task was significantly better in the high n Achievement group than in the low group under the Achievement-Oriented condition as predicted, and also proved unrelated to n Achievement in the Multi-Incentive condition. Finally, the difference between the differences obtained in the two conditions was significant in the predicted direction.

As is true of the study by Atkinson and Reitman, the present investigation also attempts to specify more precisely the conditions under which motive indices will maximally relate to performance. Rather than contrasting a situation designed to engage maximally one and only one expectancy with a situation intended to engage a variety of expectancies, however, the present experiment is intended as a somewhat more "atomistic" investigation of several of the narrower but potentially independent parameters manipulated together in the previous study. The principal parameter investigated in this fashion is the content of the motivational induction instructions utilized to engage the expectancy that performance will be instrumental to the attainment of the goal of a given motive. The present design also serves to measure apart from the effects of motivational induction instructions effects which may have been due to an additional difference between the two conditions of the earlier study: subjects under the Achievement-Oriented condition worked alone, whereas those under the Multi-Incentive condition worked in groups.

In conjunction with this first study (12), designed to clarify the conditions under which optimal relations between motive indices and performance might be anticipated, Reitman and Atkinson also conducted a

second investigation of the effects upon motive-performance relations of parameters intrinsic to thematic apperceptive measures, such as picture cues and serial position of pictures.

The results showed that serial position of pictures was a principal factor in determining the extent to which motive indices could predict behavior. That is, predictions to behavior from motive scores derived from stories written to the first four pictures of an eight picture form were significantly better than those based on stories written to the last four pictures. Furthermore, a comparison of predictions made from the first four pictures with those made from all eight indicated that the increased length actually made for a slight, though non-significant, decrease in predictive efficiency. This finding, which goes contrary to so much evidence in the realm of psychometric testing, is sufficiently important in its implications for the experimental and clinical use of thematic apperceptive measures to require further investigation to determine more exactly the extent to which these results may be generalized. For as the writers point out, the substantiation of this finding for a new population, with additional pictures, and with new behavioral criteria, would suggest that any of the many variables coded from any form of the thematic apperceptive test "quite possibly may have one meaning when coded from stories written early on the TAT and quite another when coded from later stories, entirely apart from any effects of the cues of the specific pictures upon the stories they elicit" (53, p. 12). The present investigation should provide this requisite opportunity for the replication and extension of these findings.

In summary, then, the two principal antecedents of the present investigation may be regarded as complementary contributions to the im-

provement of the predictive utility of the n Achievement measure. The first, based on a theoretical model defining aroused motivation as a joint function of latent motives and environmentally-induced expectancies, sought a more precise specification in terms of the model of the conditions under which assessment of relations between motive index and performance would yield optimal results. The second attempted to determine and to make amenable to control the effects of a number of variables intrinsic to the test, with much the same aim in view.

Although the principal results of this second investigation are supported by a cohesive set of supplementary findings, the exploratory intent of the study should not be ignored. Certainly, in view of their potential implications for research with thematic apperceptive measures, it would seem well to have an independent verification before considering them to have been firmly established.

A similar conservatism also may be appropriate in evaluating the results of the first study, although to a much lesser degree. While the principal results reported there clearly were predicted in advance, they were based on the same motive scores utilized in the second investigation. As the writers indicate, the predictions of the first study (12, p. 362) were tested using motive scores based on the first four pictures (rather than those based on the last four pictures or on the total eight-picture form) because, as reported in (53), these scores initially resulted in the largest difference in performance under the Achievement-Oriented condition between the groups they defined as high and low in n Achievement. Since the Achievement-Oriented condition was selected beforehand on theoretical grounds as the appropriate one in which to compare the predictive efficiency of the three alternative sets of motive scores, the

designation of the scores from the first four pictures as optimal on the basis of their predictive efficiency in this condition seemed a reasonable procedure. Confirmation of the basic hypothesis of the first study required, however, that the mean difference in performance under the Achievement-Orientation condition between groups high and low in n Achievement be significantly greater than the corresponding difference under the Multi-Incentive condition. As the scores from the first four pictures which were used to define the high and low n Achievement groups under both conditions for this comparison had initially been chosen, in connection with the second study, because they were the ones which yielded maximal differences under the Achievement-Orientation condition, the reported significance of the difference between the differences obtained under the two conditions actually may well be an overestimation due to the inadvertent capitalization on error variance.

In view of these considerations, an exact replication of the first antecedent study would be desirable. Although the present investigation is hardly a strict replication of the earlier study, within the limitations of the changes made for other purposes, it does attempt to reproduce an Achievement-Orientation condition similar to that created by Atkinson and Reitman (12). A comparison of results obtained under this condition with those obtained under the other conditions of this study will thus provide a further test of the original suggestion that maximal motive-performance relations are to be obtained by engaging a given motive and no other.

While the present study is intended as an extension of the two antecedent investigations, it also is designed to further the solution of several important parametric problems. There is a characteristic

but unfortunate tendency for psychological research to follow a peculiarly vicious circle: many studies are "exploratory" because too few of the relevant parameters are known; but by virtue of being exploratory they typically contribute nothing but speculations to the determination of these same basic parameters. Even the relatively integrated and interrelated investigations dealing with the attributes of Achievement have varied among themselves enough so that the formulation of any firmly supported experimental generalizations which would apply to the group as a whole is an almost impossible task. Such factors as individual versus group administration of response measures, intelligence, the presence or absence of pacing, the status and prestige of the experimenter, and the type of response measure employed are only a few of the many variables, usually uncontrolled, which have been credited with important effects upon the obtained relationship between the index of motive strength and the performance criterion. Motivation-inducing instructions traditionally are presented orally, and this procedure almost certainly results in still further uncontrolled differences among investigations. In fact, although the problem has not been explored systematically, variations in performance have been observed even when different experimenters administer orally the same set of instructions¹; furthermore, the basic induction techniques occasionally are supplemented by deliberate manipulation of the dress and bearing of the experimenter, (e.g., 20), additionally contributing to differences among investigations.

The detrimental effects of these minor variations can hardly be overemphasized. In the absence of studies evaluating their effects,

¹Personal communication from Dr. John W. Atkinson, May, 1957.

differing results from otherwise almost identical investigations are often impossible to reconcile. There are even occasional reports of failure to obtain the expected increment in performance with the achievement-orienting instructional technique (e.g., 24).

The third major purpose of the present study, therefore, is to investigate some of the parameters which may determine the effectiveness of achievement-orienting instructions. Specifically, it provides tests of the extent to which the effectiveness of these instructions varies as a function of individual vs. group administration of response measures, of differences among subjects in ability, and of the specific response measure employed. Written instructions are utilized throughout, and other forms of interaction with subjects are held as constant as possible for all subjects. These operations are intended to minimize variations in parameters not under investigation among the several conditions of the experiment.

In view of our previous comments on uncontrolled differences among experiments, the present use of written rather than the usual oral instructions would seem to require an explanation. Although this procedure does represent an innovation, it offers at least two important advantages. First, in contrast to orally administered instructions, which probably vary considerably in their effectiveness as a function of the administrator, written instructions make it possible to maintain the exact induction material essentially constant from one study to the next. Furthermore, the exact results obtainable with this more precisely specified inductational content are described in the present study, together with an analysis of the effects of the several parameters investigated. This knowledge of the precise extent of arousal obtained here, as de-

fined by the level of performance on the response measures employed, means that the use of these instructions in future experiments will permit considerably more advance control over the degree of achievement orientation to be elicited than would be possible were oral instructions to be employed. In fact, should the use of printed instructions sufficiently reduce the "experimenter effect" (16) and bring most of the motivational induction variance under the control of the investigator, it might well make possible the elimination of the cumbersome network of control groups which now must be included in every new experiment due to uncertainty over the degree of arousal which will result with each new combination of experimenter and oral instruction.

Concisely summarized, the third main purpose of the present study is to tie down inferred differences in instructionally-induced motivation as firmly as possible to easily and exactly replicable operations on stimulus and response variables, and to determine the extent to which relations between these variables are altered by interaction with several other potentially critical parameters.

Sequence of Analyses and Predictions of Results

The individual analyses reported in subsequent chapters are not independent of one another; some predictions assume specific antecedent results. To obtain maximal information from the data, and to provide statistically valid tests of all predictions, it is necessary that the order of analysis be determined beforehand and that conditional predictions be designated as such.

The analysis of the effectiveness of the motivational induction instructions in creating the expected differences in performance levels must come first. All predictions about the relationship of motive

scores to performance under specified motivational conditions presuppose the demonstrated existence of such conditions.

Were exactly standardized instructions and response measures widely used in research of this kind, it might be possible to infer the attainment of a desired motivational condition in any new experiment with a considerable degree of precision. The operational identity of a new condition with some criterion condition would be defined by identity of the antecedent instructions utilized, and of the consequent performance levels obtained. As suggested above, printed instructions and precisely standardized performance measures may one day permit such direct inter-experimental comparison.

At the present time, however, it is possible to demonstrate the existence of achievement-oriented and neutral conditions in a given experiment only relative to one another. Consequently, these two conditions will be considered to obtain in the present experiment if subjects working under achievement-orienting instructions show a significant performance increment as compared with subjects working under neutral instructions.

Satisfactory achievement-oriented and neutral conditions will permit analysis of performance, and of the relationship between motivational induction instructions and performance, as functions of the several additional parameters under investigation. Individual vs. group administration of response measures is conveniently considered next. Analyses of the other parameters do not depend on this one, but if the administration parameter proves to account for an insignificant portion of response variance, its omission from subsequent analyses will simplify them considerably.

Provided that achievement-oriented and neutral conditions are attained, and that none of the preceding analyses reveal interaction with the relationship between induction instructions and performance, correlation coefficients between motive indices and performance within each experimental condition provide the most adequate tests of the specific predictions which follow. Three of these predictions derive directly from the theoretical model outlined by Atkinson and Reitman (12); the fourth follows from an interpretation of the results reported by Reitman and Atkinson (53).

According to the theoretical model (12), aroused motivation resulting in goal-directed action is a function of the latent strength of a given motive and also of the environmentally aroused expectancy that the action will be instrumental in attaining the goal of the motive. If expectancies related to several motives are aroused, then the total aroused motivation is the sum of the contributions from all motives which have been engaged by aroused expectancies of the possibility of goal-attainment. This conception implies that a maximal relation between performance and an index of the strength of a particular motive (e.g., n Achievement or n Affiliation) may be obtained by arousing only the expectancy that performance will lead to attainment of the goal of that motive.

1. If it be assumed that the induction instructions used in the present study to arouse expectancies do not engage any motives negatively correlated with either n Achievement or n Affiliation, then it follows from the model that significant correlations between motive indices and performance will be positive under all experimental conditions.

Three sets of motivational induction instructions are used in

the present investigation to manipulate expectancies in the Achievement-Orientation, Neutral, and Relaxed-Affiliation conditions respectively. The Neutral instructions suggest that subjects are participating in a demonstration intended to familiarize them with some psychological measures, in accordance with a course requirement. The Achievement-Orientation instructions are designed to arouse a strong expectancy that performance on the laboratory tasks provided will be related to attainment or non-attainment of an achievement goal, and to minimize all other expectancies. The Relaxed-Affiliation instructions are designed to arouse a strong expectancy that performance will be related to attainment or non-attainment of an affiliation goal, and to minimize all other expectancies. Under these circumstances, the theoretical model permits two predictions about the conditions under which maximal motive-performance correlations will be obtained.

2. Performance will correlate maximally with indices of the strength of the achievement motive under the Achievement-Orientation conditions.

3. Performance will correlate maximally with indices of the strength of the affiliation motive under the Relaxed-Affiliation condition.

Reitman and Atkinson (53) found achievement motive scores derived from stories written to the first four pictures of an eight picture thematic apperceptive measure to predict behavior more accurately than the corresponding scores either from the last four pictures or from all eight. In their study, furthermore, this superiority was independent of gross differences in picture content. A possible interpretation of this finding is that the predictive efficiency of motive

scores is inversely related to the serial positions of the pictures from which they are derived; the closer a picture is to the beginning of the measure, the better will the motive scores derived from stories written to it relate to behavior.

4. This interpretation suggests that for all experimental conditions in the present investigation under which n Achievement or n Affiliation is significantly related to performance, the motive index based on the first three pictures of the present six-picture form of the test will yield larger positive correlations than that based on the last three pictures.

CHAPTER II

PROCEDURES

Overview of experimental design.--All Ss participated in two separate experimental sessions. At the first session, one of two forms of the thematic apperceptive motive measure was administered. At the second session, Ss worked at three performance tasks under one of five performance conditions. Each of these five performance conditions was defined by a combination of achievement-orienting, neutral, or relaxed-affiliation instructions with either individual or group administration of the performance measures. Specifically, the five performance conditions were defined by:

1. Achievement-orienting instructions and group administration of performance measures.
2. Achievement-orienting instructions and individual administration.
3. Neutral instructions and group administration.
4. Neutral instructions and individual administration.
5. Relaxed-Affiliation instructions and group administration.

Selection of Subjects and Assessment of Motives

Subjects.--A total of 258 male students from five lecture sections of the elementary psychology course at the University of Michigan participated in the two parts of this experiment during the fall semester, 1955-6, in fulfillment of the experimental participation require-

ment of the course.

Measurement of Achievement and Affiliation Motives.--Subjects wrote six four-minute thematic apperceptive stories under neutral (44) classroom conditions ten to eleven weeks before the administration of the performance measures. The neutral condition is the usual assessment condition; no attempt is made to manipulate Ss' motivation.

Two different six-picture forms of the thematic apperceptive measure were used to elicit the stories. In the first form, three pictures chosen a priori for their apparent relatedness to achievement, and normally used to measure the achievement motive (1B, 1H, 1D), were followed by three pictures selected from among those normally used to measure the affiliation motive (3E, 3A, 3B). This form, presenting the three pictures with apparent achievement cues first, is hereafter as a convenience referred to in tables and occasionally in the text as the form with "Ach-related pictures first." In the second form, the two subsets of pictures were reversed, the three pictures related to affiliation now preceding the three pictures related to achievement. Again as a convenience, this second form is hereafter occasionally referred to as the "Aff-related pictures first" form. The order of the three pictures within each of the two subsets was constant from the first to the second form so that only the two subsets alternated position in an A-B, B-A design.

The first form of the thematic apperceptive measure was administered in three lecture sections (C, S, T), the second form in two (A, F). Of the Ss who participated in the entire experiment, 139 were from sections C, S, and T, and 119 were from sections A and F. The instructions and pictures used are reproduced in Appendix A. Standard administration

procedures were used throughout (cf. 44, p. 98). The three achievement-related pictures shown are described as follows by McClelland et al. (44, p. 375):

1B. Two men ("inventors") in a shop working at a machine.

1H. Boy in checkered shirt at a desk, an open book in front of him.

1D. "Cub reporter" scene: older man handing papers to a younger man.

These descriptions of the three affiliation-related pictures are given by J. W. Atkinson, R. W. Heyns, and J. Veroff (9, p. 405):

3E. Four men sitting and lounging informally in a furnished room.

3A. The heads of two young men facing each other in conversation.

3B. A man standing in an open doorway looking away from the viewer at the landscape outside.

Pictures 1B, 1H, 3A, and 3B were used in the two antecedent studies by Atkinson and Reitman (12) and Reitman and Atkinson (53).

All six pictures were scored for both the achievement and the affiliation motives by experienced scorers,¹ all of whom had obtained scoring correlations above .90 with one of the original authors of the scoring systems² in previous checks of their scoring reliability. During all scoring operations, each story was identified only by a single eight-digit "random" code number which each S had made up and placed at the top of every page of his form. A further partial check of scoring re-

¹Stories to pictures 1D and 3B were scored for n Affiliation by Miss Patricia O'Connor and for n Achievement by Mr. Berne Jacobs. Stories to pictures 1B, 1H, 3E, and 3A were scored for n Affiliation by Mrs. Renee Reitman, and for n Achievement by the writer.

²Dr. John W. Atkinson

liability, incidental to a final verification of all data analysis procedures (cf. below, p. 68), was made by the writer, who rescored after thirteen months a random sample of thirty six-story sets which originally had been scored by Mr. Jacobs and himself. A correlation of .88 with the original scores was obtained. The same thirty sets also were coded by an experienced scorer¹ who, however, had not participated extensively in scoring seminars with the other scorers and with Dr. Atkinson (cf. 53). It is interesting to note that the correlation with the original scores, .76, is almost identical with the correlation of .73 obtained under very similar circumstances which is reported by F. Samelson (54, p. 72). Such results give some indication of the importance of the shared informal conventions arrived at in the course of seminars on scoring problems, and they provide further evidence that, as McClelland has remarked (39), "the published scoring manual simply does not convey all the information needed to become a reliable scorer."

Assessment of Performance

Quantitative (Q) and Linguistic (L) aptitude scores from the ACE examination (1) were available for 195 of the 258 Ss who took part in the experiment. Since the sixty-three Ss who lacked Q and L scores could not be included in groups which were to provide the data for the parametric analyses, they were scheduled separately and worked at the performance measures under the third motivational condition, the Relaxed-Affiliation condition.

Materials.--Each S used a booklet which contained one of the three sets of motivational induction instructions (Appendix B) and the

¹Mr. H. William Morrison.

three performance measures (Appendix C). The performance measures, consisting of instructions for working the problems and the problems themselves, were constant for all Ss in the experiment. Each set of motivational induction materials consisted of a long introductory instruction, which formed the first page of the booklet, and briefer "explanatory remarks" about each of the three performance measures. The "explanatory remark" for each measure appeared together with the instruction for working the problems on a single page. These briefer remarks were interspersed in this fashion in order to maintain motivation levels induced by the longer introductory instruction. The same very brief "explanatory remark" introduced the number matching measure in the Neutral and Relaxed-Affiliation conditions. Neutral and achievement-orienting instructions were modified from (44). The Relaxed-Affiliation instructions were designed specifically for this experiment.

The achievement-orienting instructions were designed to lead Ss to believe that performance would be evaluated in comparison with some standard of excellence, and therefore that their efforts would be instrumental in attaining an achievement goal. For this reason, the measures were referred to as "tests," and Ss were asked to fill in their full names on the introductory instruction sheets. Every effort was made to emphasize that performance would be evaluated, and even compared with previous measures of performance and ability. The S was told to comment "if you think you can do better if you really try."

The neutral instructions introduced the tasks as part of a demonstration rather than as a test situation in which performance would be evaluated. The intent was to motivate S to behave as he would in a situation in which performance was not clearly instrumental to the at-

tainment either of achievement or of affiliation goals.

The relaxed-affiliation instructions stressed E's ignorance of what the performance tasks actually measured. This was designed to accomplish two purposes. In the first place, it indicated that Ss' results could not be evaluated in comparison with some standard of excellence because no such standard existed. Secondly, it allowed E to ask S's help in working out preliminary details necessary for the standardization of the measures. Thus, with these instructions, an S's performance on the three measures should be a function of the strength of his need to establish a positive affective relationship with the E by gaining his gratitude and approval (i.e., of his need to attain an affiliation goal).

The first of the three performance measures was a set of three-step arithmetic problems which previously had been used successfully as a behavioral criterion for the assessment of motivational differences (12, 53, 61). In each problem, two sets of three numbers each are added and subtracted separately; the final solution is obtained by addition or subtraction of the two intermediate results.

The problem material for the spacial perception measure, which followed the arithmetic test, was taken from Thurstone's Space Ability (Figures) Test (57). In each group of items, S must discriminate test figures which are rotations of an inspection figure from those which are not.

The third measure consisted of items from a Number Matching Test developed by Sperber (56), which is analogous to the Number Comparison section of the Minnesota Vocational Test for Clerical Workers (2). The S inspects both members of a pair of numbers and indicates whether they

are the same or different.

Immediately before the first performance measure, Ss read a short story and were instructed that they would be asked to recall it later. The administration of this memory measure replicates exactly the experimental conditions of the two antecedent studies. Two additional brief measures, of artistic judgment and verbal fluency, were presented after the arithmetic problems and before the last two performance measures; they required a total of eleven minutes. These measures were introduced for other purposes and are not analyzed here. Recall of the memory story and a subsequent questionnaire also are not analyzed here, except for one item on the questionnaire included to check a hypothesis offered by Atkinson and Reitman (12, p. 363) concerning differential effects of recall upon performance.

Experimental administration.--Two administration procedures were used. In the individual administration condition, as Ss arrived for the experiment they were brought into one of eight small laboratory rooms on either side of a central corridor, one S per room. The booklet containing the experimental materials was placed face down on the desk, and S was told to wait for further instructions. The individual rooms were closed during the experiment, which E conducted from the corridor. In the group administration condition, individual Ss entering the classroom in which the experiment was to take place were asked to sit down and wait until all Ss scheduled had arrived. The E again distributed the booklets, face down, and told Ss to wait for further instructions.

When all Ss had arrived, E said, "Okay, please turn over your booklets and begin reading the introductory instructions." Groups administered under achievement-oriented conditions were told to fill in

the information requested on the introductory instruction sheet. The Ss also were told that they were not to begin work on a measure or to go on to a new one until instructed to do so. The E did not thereafter communicate with Ss except to direct them to begin reading a new instruction or to begin or stop work on one of the performance measures.

Two minutes were allowed for the introductory instructions, two and one-half for the arithmetic instructions, one and one-half for the spacial perception instructions, and one minute for the number matching instructions. The Ss worked nine minutes on the arithmetic problems, four minutes on the spacial perception problems, and three minutes on the number matching problems. Three and then six minutes after beginning the arithmetic problems, and two minutes after beginning the spacial perception problems, all Ss were instructed to mark an "X" next to the problem they were working on. This was done so that were part scores needed during analyses of results they might be computed.

Except for the three Relaxed-Affiliation groups of approximately twenty-one Ss each, about seven Ss on the average participated in each experimental session. Six such groups, a total of forty-six Ss, received achievement-orienting instructions and worked under the group administration condition. A second set of fifty-three Ss in nine experimental groups received the achievement-orienting instructions but worked under the individual administration condition. Forty-six Ss in six groups received neutral instructions and worked under the group administration condition. The remaining fifty Ss in seven groups also received the neutral instructions but worked under the individual administration condition. These four combinations of the two instructions and the two administration conditions are referred to below as the four

basic groups.

All experimental sessions were administered by the writer or one of two other experimenters. One of these¹ administered the three Relaxed-Affiliation groups; the other² administered two groups under the achievement-oriented, individual condition.

Although E knew in advance whether a given experimental group was to have the achievement-orienting, neutral, or relaxed-affiliation instructions, his limited verbal communications to all groups were the same, except that the response measures were referred to as "tests" with achievement-oriented groups, and as "tasks" for neutral and relaxed-affiliation groups, in keeping with the characteristic wordings of the respective induction instructions.

Efforts were made to attain proportional distribution of Ss in the four basic groups with regard to the form of the thematic apperceptive measure they had taken and also with respect to ACE scores. Due to the restrictions imposed by Ss' schedules, such proportionality could only be approximated. Aside from limitations imposed by Ss' schedules and the desire for proportionality, however, Ss were allotted at random to the individual experimental groups.

Computational procedure.--The use of high speed electronic computation equipment in the analysis of experimental results interposed several additional steps between raw data and final statistics. As these computation procedures were not initially familiar to the writer, and as the additional steps not only increased the possibility of procedural errors but also made such errors more difficult to detect, it seemed

¹Dr. David Birch.

²Dr. Robert Davage.

advisable to introduce appropriate precautions. All protocols were scored twice. The coded data sheets were proofread against the raw data sheets, and the subsequently punched cards similarly proofread against the code sheets. The machine computation programs utilized were verified in advance with mock data, and systematic redundancy was introduced into the actual data in order to facilitate checks of computer accuracy. Finally, a sample of five correlations was computed by hand and compared with the machine computations; no discrepancies could be detected. The results which follow, therefore, may be presumed accurate.

CHAPTER III.

RESULTS

Motivational Induction and Performance

Performance as a function of achievement-orienting vs. neutral instructions and individual vs. group administration.--Evaluation of the effectiveness of the two principal induction instructions is the first step in the analytic sequence. The extent of differences in amount of motivation between the Achievement-Orientation and Neutral conditions may be inferred directly from a comparison of performance levels under the two conditions. It is convenient to evaluate the instruction effects together with those due to individual vs. group administration of the response measures. Such a combined analysis additionally provides an estimate of performance variance due to interaction between these two factors in the four basic groups.

Correct, error, and total attempted scores were computed for the arithmetic, spacial perception, and number matching measures. Due to the generally low error scores, total attempted and correct scores were highly correlated for all three measures. In the four basic groups, the two sets of scores correlated .94 or higher for the arithmetic measure, .83 or higher for the spacial perception measure, and .99 or higher for the number matching measure. These very high correlations were reflected in the outcome of analyses of variance of total attempted scores on the three measures as functions of motivational instructions and administra-

tion conditions; the resulting F ratios were virtually identical to those obtained with correct scores (Table 2). Because of this redundancy, only the analyses based on correct scores are reported here, and subsequent analyses of the effects of Q and L ACE scores upon performance, and upon relations between induction instructions and performance, also utilize correct scores only.

As the Ns in the four basic group are not quite proportional, three hypothetical cases are added at appropriate treatment group means to provide orthogonality for the analyses of variance summarized in Table 2. Two Ss in the neutral instruction, individual administration basic group did not attempt the spacial perception measure, and they are assigned hypothetical spacial perception correct scores at the appropriate treatment group means. Appropriate hypothetical cases similarly are added for orthogonality in the analyses reported in Tables 4 and 6.

The variances of correct scores on the spacial perception measure over several sets of treatment groups tend towards heterogeneity, and Bartlett's test, applied to the most divergent set (Table 3) indicates inhomogeneity significant beyond the $P = .05$ level. Despite this moderate inhomogeneity, however, the practical advantage of consistent statistical analyses for all three response measures argues for the use of analysis of variance, and in view of Lindquist's conclusion that "heterogeneity must be quite extreme to be of any serious consequence" (34, p. 86), and the unambiguous F ratios obtained (Tables 2, 4, 6), the use of the F statistic in this case seems justified.

Table 1 presents means and SDs of correct scores for the arithmetic, spacial perception, and number matching response measures for each of the four basic groups. Corresponding means and SDs for the Relaxed-

TABLE 1

MEAN CORRECT SCORES ON ARITHMETIC, SPACIAL PERCEPTION, AND NUMBER
MATCHING RESPONSE MEASURES AS FUNCTIONS OF MOTIVATIONAL
INDUCTION INSTRUCTIONS AND INDIVIDUAL VS. GROUP
ADMINISTRATION OF RESPONSE MEASURES

Performance Conditions	<u>N</u>	<u>Response Measure</u>					
		Arithmetic		Spacial		Number Matching	
		Mean	<u>SD</u>	Mean	<u>SD</u>	Mean	<u>SD</u>
Achievement instruc- tions, group ad- ministration	46	42.85	12.46	50.83	22.83	47.35	10.30
Achievement instruc- tions, individual administration	53	43.87	14.72	56.76	27.51	48.34	11.38
Neutral instructions, group administration	46	36.91	13.04	46.20	19.63	43.70	9.59
Neutral instructions, individual admin- istration	50*	41.46	13.62	45.70	21.80	45.72	10.44
Relaxed-Affiliation instructions, group administration	63	36.81	14.05	47.52	19.33	45.53	6.90

*N = 48 for spacial perception measure; cf. p. 30.

Affiliation group also are presented. Table 2 summarizes the three analyses of variance evaluating performance on each measure as a function of motivational instructions and individual vs. group administration of the experiment. As is evident from the summary, the printed achievement-orienting instructions as compared with the neutral instructions yield a significant increment ($P < .05$) in number of correct solutions on all three measures. Achievement-Oriented and Neutral conditions as de-

TABLE 2

ANALYSES OF VARIANCE OF CORRECT SCORES ON ARITHMETIC, SPACIAL PERCEPTION,
AND NUMBER MATCHING RESPONSE MEASURES AS FUNCTIONS OF MOTIVATIONAL
INDUCTION INSTRUCTIONS AND INDIVIDUAL VS. GROUP
ADMINISTRATION OF RESPONSE MEASURES

Source of Variance	df	<u>Response Measure</u>					
		Arithmetic		Spacial		Number Matching	
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>
Achievement vs. neu- tral instructions	1	810.09	4.33*	3223.44	5.82*	475.68	4.24*
Individual vs. group	1	381.90	2.04	363.42	.66	111.93	1.00
Interaction	1	151.44	.81	509.49	.92	15.51	.14
Within group (error)	191 [†]	187.02		553.53		112.17	

*P = .05

[†]df = 189 for spacial perception measure; cf. p. 30.

findings therefore are demonstrated to have obtained in the present investigation.

On the other hand, although it is apparent from Table 1 that mean performance under individual administration conditions tends to be slightly higher than under the corresponding group conditions, the three analyses of variance summarized in Table 2 provide no evidence of a significant difference between the individual and group administration conditions. There also is no suggestion of interaction between motivational induction instructions and administration conditions. The two

TABLE 3

MEAN CORRECT SCORES ON ARITHMETIC, SPACIAL PERCEPTION, AND NUMBER MATCHING RESPONSE MEASURES AS FUNCTIONS OF MOTIVATIONAL INDUCTION INSTRUCTIONS AND LOW, MODERATE, OR HIGH QUANTITATIVE APTITUDE (Q) SCORES

Motiva- tional Instruc- tions	Quantitative Aptitude	N	<u>Response Measure</u>					
			Arithmetic		Spacial		Number Matching	
			Mean	<u>SD</u>	Mean	<u>SD</u>	Mean	<u>SD</u>
Achieve- ment	High	29	51.42	14.37	60.79	28.11	52.98	11.46
	Moderate	38	42.30	11.85	55.30	25.20	48.00	10.11
	Low	32	37.41	11.64	46.27	21.18	43.14	9.00
Neutral	High	28	47.37	13.50	56.08	19.62	44.88	9.33
	Moderate	37*	35.76	11.25	47.08	21.45	45.48	10.47
	Low	31 [†]	36.18	12.87	35.10	15.25	43.74	10.17

* N = 36 for spacial perception measure; cf. p. 30.

[†] N = 30 for spacial perception measure; cf. p. 30.

administration conditions are therefore combined together in the subsequent analyses of the effects of Q and L scores.

Performance and the relation between instructions and performance as functions of quantitative and linguistic aptitude.--To determine the effects of quantitative and linguistic aptitude, Ss were divided as closely as possible into three equal groups, first according to their Q ACE scores and then according to their L ACE scores. Table 3 shows correct score means and SDs on each of the three response measures for

TABLE 4

ANALYSES OF VARIANCE OF CORRECT SCORES ON ARITHMETIC, SPACIAL PERCEPTION,
AND NUMBER MATCHING RESPONSE MEASURES AS FUNCTIONS OF MOTIVATIONAL
INDUCTION INSTRUCTIONS AND LOW, MODERATE, OR HIGH
QUANTITATIVE APTITUDE (Q) SCORES

Source of Variance	df	<u>Response Measure</u>					
		Arithmetic		Spacial		Number Matching	
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>
Achievement vs. neutral instructions	1	830.79	5.13*	3208.95	6.27*	484.11	4.58*
Quantitative Aptitude	2	2738.34	16.92**	4785.66	9.35**	470.88	4.45*
Interaction	2	119.88	.74	112.14	.22	292.95	2.77
Within group (error)	189 [†]	161.82		511.92		105.75	

* $\underline{P} = .05$

** $\underline{P} = .01$

[†] $\underline{df} = 187$ for spacial perception measure; cf. p. 30.

Ss classified with respect to low, moderate, or high Q scores and achievement-orienting or neutral instructions.

Table 4 summarizes the three analyses of variance evaluating performance on the arithmetic, spacial perception, and number matching response measures as a function of motivational instructions and quantitative aptitude. The Q scores are highly significant determinants of the number of correct solutions on both the arithmetic and spacial percep-

TABLE 5

MEAN CORRECT SCORES ON ARITHMETIC, SPACIAL PERCEPTION, AND NUMBER MATCHING RESPONSE MEASURES AS FUNCTIONS OF MOTIVATIONAL INDUCTION INSTRUCTIONS AND LOW, MODERATE, OR HIGH LINGUISTIC APTITUDE (L) SCORES

Motiva- tional Instruc- tions	Quantitative Aptitude	N	<u>Response Measure</u>					
			Arithmetic		Spacial		Number Matching	
			Mean	<u>SD</u>	Mean	<u>SD</u>	Mean	<u>SD</u>
Achieve- ment	High	28	45.75	14.67	55.96	24.33	47.25	11.55
	Moderate	33	47.01	12.81	51.73	28.92	49.83	11.73
	Low	38	38.52	12.24	54.52	23.13	46.65	9.24
Neutral	High	31	39.09	14.43	44.44	18.39	43.74	9.00
	Moderate	37*	39.96	14.10	50.05	22.76	45.96	9.48
	Low	28	38.58	11.46	42.46	19.83	44.25	11.67

* N = 35 for spacial perception measure; cf. p. 30.

tion measures ($P < .01$), and also result in significantly more correct responses on the number matching measure ($P < .05$). There is some tendency for Q scores and motivational instructions to interact in determining correct solutions on the number matching measure, but it does not reach significance; the results for the three measures taken together provide no reason to reject the null hypothesis.

Means and SDs of correct scores on each of the three response measures for Ss with low, moderate, or high L scores and either achieve-

TABLE 6

ANALYSES OF VARIANCE OF CORRECT SCORES ON ARITHMETIC, SPACIAL PERCEPTION,
AND NUMBER MATCHING RESPONSE MEASURES AS FUNCTIONS OF MOTIVATIONAL
INDUCTION INSTRUCTIONS AND LOW, MODERATE, OR HIGH
LINGUISTIC APTITUDE (L) SCORES

Source of Variance	<u>df</u>	<u>Response Measure</u>					
		Arithmetic		Spacial		Number Matching	
		<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>	<u>MS</u>	<u>F</u>
Achievement vs. neutral instructions	1	1018.62	5.56*	3704.49	6.65*	552.69	4.93*
Linguistic Aptitude	2	502.56	2.74	104.58	.19	141.48	1.26
Interaction	2	280.62	1.53	576.63	1.04	7.38	.07
Within group (error)	189 [†]	183.24		556.74		112.05	

* $P = .05$

[†] $df = 187$ for spacial perception measure; cf. p. 30.

ment-orienting or neutral instructions are shown in Table 5.

Table 6 summarizes the three analyses of variance evaluating performance on the three response measures as a function of motivational instructions and linguistic aptitude. These results do not indicate that L scores either determine performance on the response measures or interact with the motivational instructions to do so.

Summary.--The results for correct and total scores are easily stated and quite clear-cut. The printed achievement-orienting instruc-

tions consistently induce a higher level of performance than do the neutral instructions, and this difference is independent both of individual vs. group administration of the performance measures and also of broad differences in general aptitude. Quantitative aptitude is an important determinant of response level on all three measures. Individual vs. group administration and linguistic aptitude, on the other hand, have no effect upon the scores obtained.

Motive Indices and Performance

Intercorrelations among motive indices.--Reitman and Atkinson (53) evaluated the extent to which the scoring of the same stories for two different motives (n Achievement and n Affiliation) introduced as artefacts correlations between the motives which otherwise would not have appeared. Analysis of the corresponding coefficients in the present study, which makes use of shorter picture subsets (three vs. four pictures) and two pictures not employed in the previous investigation, provides an excellent opportunity to assess the extent to which the original findings may be generalized.

Reitman and Atkinson utilized as their best estimates of the correlation between the achievement and affiliation motives the coefficients obtained when the scores for each motive came only from the pictures related to it; in other words, these coefficients represented the correlation between scores for each motive derived from separate and non-overlapping sets of stories. This correlation between achievement and affiliation motives for Ss who had been administered their "Ach-related pictures first" form (N=44) was reported as $-.03$; for Ss administered their "Aff-related pictures first" form (N=48), the correlation was

-.21. The corresponding coefficients in the present study are -.02 (N=139) and -.04 (N=119).

With both sets of motive indices scored from all eight pictures, Reitman and Atkinson reported coefficients of -.15 and -.20 for their two forms. In the present study (with both sets of motive scores based on all six pictures), the corresponding figures are -.15 and -.14. If both sets of motive scores were coded from the first four pictures, coefficients of -.24 and -.21 were obtained in the earlier study. Achievement and affiliation motive scores from the first three pictures of the present six-picture forms correlate -.17 and -.22.

The close overall correspondence between these two sets of results clearly strengthens the conclusions of the previous study: the achievement and affiliation motives are negligibly correlated, and multiple scoring does not visibly affect the correlation between indices of these two motives.

On the other hand, the correlations obtained in the present investigation between achievement motive indices derived from the Ach- and Aff-related picture subsets of the same form are lower than those reported by Reitman and Atkinson. The earlier correlations between the two sets of achievement scores were .32 and .28 for the "Ach-related pictures first" and "Aff-related pictures first" forms respectively. The corresponding coefficients in the present study are .18 and .13. The analogous comparison of the correlations between affiliation motive indices from Ach- and Aff-related picture subsets reveals no difference between the two sets of results. The coefficients obtained in the present study, -.02 and .10, are virtually identical with the -.06 and .05 reported previously. Affiliation motive scores from Ach- and Aff-related

picture subsets thus would seem quite definitely to be uncorrelated with one another, so long as the pictures from each subset are not alternated with each other. Although the correlation of .56 reported between affiliation motive scores derived from alternated Ach- and Aff-related pictures (53) has not yet been substantiated by a replication of the original experiment, the alternation of pictures from different subsets may very well have a material effect upon the correlation between the resulting scores.

Tests of the predictions relating motive indices to performance.--

Analyses of performance variance as a function of motivational induction instructions have demonstrated that the printed achievement-orienting instructions induce a consistently higher level of performance than do the neutral instructions. This difference, furthermore, is independent of individual vs. group administration of the performance measures and also of differences in linguistic and quantitative aptitude. All of the prerequisites have thus been met (cf. above, pp. 14-16); the four predictions dealing with the relationships between motive indices and performance may now be tested.

According to the first prediction, all significant correlations will be positive. This amounts in effect to a two-fold stipulation: one-tailed levels are to be used in evaluating the significance of positive correlations, and the other three predictions are to presuppose and apply to positive correlations only.

All correlations between motive indices and performance scores are reproduced in Tables 7-12. To facilitate easy comparisons of related statistics, the correlations are tabulated by motivational induction conditions. Correlations between n Achievement and performance

under achievement-oriented, neutral and relaxed-affiliation conditions appear in Tables 7-9 respectively; analogous correlations for n Affiliation are presented in Tables 10-12. Although only positive correlations are potential support for the present predictions, the tabulation of significance levels is sufficiently complete so that negative correlations also may conveniently be evaluated for other purposes. In testing correlations against two-tailed hypotheses, of course, the indicated significance levels should be doubled.

The second prediction states that the n Achievement index will be maximally correlated with performance under Achievement-Orientation conditions.

The data do not confirm this prediction. Consider the twelve representative correlations between achievement motive scores based on all six pictures and correct scores for the three performance measures under achievement-oriented conditions (Table 7). Only the one correlation with the arithmetic measure for S_s from sections A and F working under the individual condition is significant at the $P = .05$ level; five of the twelve are actually negative. Furthermore, no other combination of any one of the three possible achievement motive indices with either the correct or the total attempted performance scores yields more than one significant correlation in twelve under the achievement-oriented conditions.

By comparison, two correlations out of six between performance scores and indices of n Achievement derived from the three Aff-related pictures are significant at better than the $P = .025$ level under the Relaxed-Affiliation condition (Table 9), although according to the theoretical formulation presented by Atkinson and Reitman (12), this is the

TABLE 7

EFFECTS OF PICTURE CUES, PICTURE ORDER, AND INDIVIDUAL VS. GROUP
RESPONSE MEASURE ADMINISTRATION ON CORRELATIONS OF ACHIEVEMENT
MOTIVE WITH PERFORMANCE UNDER ACHIEVEMENT-ORIENTATION

Source of Motive Scores	Performance Index		<u>Order of Picture Presentation</u>			
			Aff-Related First (Sections A,F)		Ach-Related First (Sections C,S,T)	
	Score	Measure	Group (N = 21)	Individual (N = 23)	Group (N = 25)	Individual (N = 30)
Three Aff Pictures	Number correct	Arithmetic	-.18	.26	-.10	-.16
		Spacial	-.02	.36*	.04	-.23
		Matching	-.44	.25	-.20	-.21
	Number attempted	Arithmetic	-.13	.21	-.09	-.17
		Spacial	-.03	.32	-.04	-.27
		Matching	-.46	.26	-.15	-.21
Three Ach Pictures	Number correct	Arithmetic	.03	.30	.16	-.12
		Spacial	.20	.12	.04	.01
		Matching	.04	.11	.27	-.12
	Number attempted	Arithmetic	-.04	.33	.07	-.13
		Spacial	.07	.12	.00	.05
		Matching	.03	.11	.23	-.12
All Six Pictures	Number correct	Arithmetic	-.09	.37*	.06	-.18
		Spacial	.17	.32	.05	-.11
		Matching	-.24	.24	.09	-.21
	Number attempted	Arithmetic	-.12	.35*	.00	-.20
		Spacial	.05	.29	-.02	-.10
		Matching	-.26	.24	.08	-.21

One-tailed Significance Levels for Correlation Coefficients

*	P = .05	.37	.35	.34	.31
**	<u>P</u> = .025	.43	.41	.40	.36

TABLE 8

EFFECTS OF PICTURE CUES, PICTURE ORDER, AND INDIVIDUAL VS. GROUP
RESPONSE MEASURE ADMINISTRATION ON CORRELATIONS OF ACHIEVEMENT
MOTIVE WITH PERFORMANCE UNDER NEUTRAL ORIENTATION

Source of Motive Scores	Performance Index		<u>Order of Picture Presentation</u>			
			Aff-Related First (Sections A,F)		Ach-Related First (Sections C,S,T)	
	Score	Measure	Group (N=24)	Individual (N=20)	Group (N=22)	Individual (N=30)
Three Aff Pictures	Number correct	Arithmetic	-.18	-.05	.25	-.08
		Spacial	-.18	-.12	.16	-.10
		Matching	-.04	.30	.06	.07
	Number attempted	Arithmetic	-.18	-.01	.27	-.08
		Spacial	-.07	-.04	.13	-.18
		Matching	-.06	.36	.07	.07
Three Ach Pictures	Number correct	Arithmetic	.08	.38*	.02	.08
		Spacial	-.08	.14	.08	-.12
		Matching	-.12	.10	.27	.01
	Number attempted	Arithmetic	.05	.36	.13	.12
		Spacial	-.14	.10	.09	-.04
		Matching	-.10	.12	.26	.03
All Six Pictures	Number correct	Arithmetic	-.03	.24	.13	.01
		Spacial	-.15	.04	.13	-.16
		Matching	-.11	.23	.24	.05
	Number attempted	Arithmetic	-.05	.26	.22	.04
		Spacial	-.14	.05	.13	-.15
		Matching	-.11	.28	.23	.07

One-tailed Significance Levels for Correlation Coefficients

*	P = .05	.34	.38	.36	.31
**	$\bar{P}$ = .025	.41	.44	.42	.36

TABLE 9

EFFECTS OF PICTURE CUES AND PICTURE ORDER ON CORRELATIONS OF ACHIEVEMENT
MOTIVE WITH PERFORMANCE UNDER RELAXED-AFFILIATION ORIENTATION
AND GROUP RESPONSE MEASURE ADMINISTRATION

Source of Motive Scores	Performance Index		<u>Order of Picture Presentation</u>	
	Score	Measure	Aff-Related First (Sections A,F) (N = 31)	Ach-Related First (Sections C,S,T) (N = 32)
Three Aff Pictures	Number correct	Arithmetic	.02	.44**
		Spacial	-.22	.00
		Matching	.01	.35**
	Number attempted	Arithmetic	.11	.46***
		Spacial	-.22	-.10
		Matching	.00	.38**
Three Ach Pictures	Number correct	Arithmetic	.20	.12
		Spacial	-.19	-.17
		Matching	.02	-.02
	Number attempted	Arithmetic	.22	.14
		Spacial	-.23	-.23
		Matching	.03	-.03
All Six Pictures	Number correct	Arithmetic	.20	.30*
		Spacial	-.25	-.13
		Matching	.02	.15
	Number attempted	Arithmetic	.20	.32*
		Spacial	-.28	-.22
		Matching	.02	.15

One-tailed Significance Levels for Correlation Coefficients

*	P = .05	.30	.30
**	P = .025		.35
***	P = .005		.45

TABLE 10

EFFECTS OF PICTURE CUES, PICTURE ORDER, AND INDIVIDUAL VS. GROUP
RESPONSE MEASURE ADMINISTRATION ON CORRELATIONS OF AFFILIATION
MOTIVE WITH PERFORMANCE UNDER ACHIEVEMENT-ORIENTATION

Source of Motive Scores	Performance Index		<u>Order of Picture Presentation</u>			
	Score	Measure	Aff-Related First (Sections A,F)		Ach-Related First (Sections C,S,T)	
			Group (N=21)	Individual (N=23)	Group (N=25)	Individual (N=30)
Three Aff Pictures	Number correct	Arithmetic	.25	-.27	-.07	.20
		Spacial	.23	-.14	-.02	.11
		Matching	.37*	-.16	.12	-.07
	Number attempted	Arithmetic	.17	-.04	-.05	.21
		Spacial	.28	-.19	-.10	.05
		Matching	.38*	.14	.10	-.10
Three Ach Pictures	Number correct	Arithmetic	.62***	.05	.08	-.15
		Spacial	.00	-.08	-.29	-.32
		Matching	-.13	.02	-.13	-.01
	Number attempted	Arithmetic	.57***	-.03	.14	-.17
		Spacial	-.09	-.19	-.42	-.30
		Matching	-.18	.03	-.15	.02
All Six Pictures	Number correct	Arithmetic	.53**	-.22	-.05	.11
		Spacial	.17	-.15	-.08	-.04
		Matching	.22	-.14	.09	-.07
	Number attempted	Arithmetic	.43**	-.05	-.01	.11
		Spacial	.17	-.21	-.19	-.09
		Matching	.19	-.12	.06	-.08

One-tailed Significance Levels for Correlation Coefficients

*	P = .05	.37	.35	.34	.31
**	P = .025	.43	.41	.40	.36
***	P = .005	.55	.53	.52	.46

TABLE 11

EFFECTS OF PICTURE CUES, PICTURE ORDER, AND INDIVIDUAL VS. GROUP
RESPONSE MEASURE ADMINISTRATION ON CORRELATIONS OF AFFILIATION
MOTIVE WITH PERFORMANCE UNDER NEUTRAL ORIENTATION

Source of Motive Scores	Performance Index		<u>Order of Picture Presentation</u>			
			Aff-Related First (Sections A,F)		Ach-Related First (Sections C,S,T)	
	Score	Measure	Group (N = 24)	Individual (N = 20)	Group (N = 22)	Individual (N = 30)
Three Aff Pictures	Number correct	Arithmetic	.35*	-.14	.32	.10
		Spacial	-.25	-.23	-.07	.34*
		Matching	.14	-.64	.01	-.05
	Number attempted	Arithmetic	.30	-.21	.28	.13
		Spacial	-.34	-.20	.02	.24
		Matching	.10	-.63	.02	-.04
Three Ach Pictures	Number correct	Arithmetic	-.19	-.13	-.05	.01
		Spacial	-.23	.10	.28	.13
		Matching	-.41	-.26	.18	.04
	Number attempted	Arithmetic	-.15	-.07	-.09	.05
		Spacial	-.05	.02	.24	.03
		Matching	-.32	-.27	.16	.07
All Six Pictures	Number correct	Arithmetic	.28	-.18	.28	.09
		Spacial	-.29	-.15	.09	.35*
		Matching	.00	-.66	.11	-.03
	Number attempted	Arithmetic	.24	-.21	.21	.13
		Spacial	-.32	-.16	.15	.22
		Matching	-.01	-.65	.11	-.01

One-tailed Significance Levels for Correlation Coefficients

*	P = .05	.34	.38	.36	.31
**	P̄ = .025	.41	.44	.42	.36
****	P̄ = .0025		.60		

TABLE 12

EFFECTS OF PICTURE CUES AND PICTURE ORDER ON CORRELATIONS OF AFFILIATION
MOTIVE WITH PERFORMANCE UNDER RELAXED-AFFILIATION ORIENTATION
AND GROUP RESPONSE MEASURE ADMINISTRATION

Source of Motive Scores	Performance Index		Order of Picture Presentation	
	Score	Measure	Aff-Related First (Sections A,F) (N = 31)	Ach-Related First (Sections C,S,T) (N = 32)
Three Aff Pictures	Number correct	Arithmetic	.26	.27
		Spacial	.10	-.08
		Matching	.00	-.12
	Number attempted	Arithmetic	.19	.25
		Spacial	-.07	.03
		Matching	.01	-.14
Three Ach Pictures	Number correct	Arithmetic	-.25	.14
		Spacial	-.18	-.13
		Matching	-.12	.14
	Number attempted	Arithmetic	-.31	.20
		Spacial	-.22	-.01
		Matching	-.08	.14
All Six Pictures	Number correct	Arithmetic	.08	.30*
		Spacial	-.01	-.11
		Matching	-.06	-.09
	Number attempted	Arithmetic	.00	.30*
		Spacial	-.17	.03
		Matching	-.03	-.11

One-tailed Significance Levels for Correlation Coefficients

*	P = .05	.30	.30
**	P̄ = .025	.36	.35
***	P̄ = .01	.42	.41

condition in the present investigation under which one should least expect such relationships. If the prediction be considered relatively, therefore, as it was intended, it is clear that the data tend to contradict rather than to confirm it.

The most to be said in support of the second prediction is that if only the Achievement-Orientation conditions are considered, and only Ss from sections A and F who worked as individuals, all correlations between correct or total attempted performance scores and the three achievement motive indices are positive and frequently not very far short of significance. And in fact, Atkinson and Reitman do suggest (12, p. 362) that the individual administration condition minimizes distracting cues which otherwise, perhaps, might engage conflicting motives and lessen any relationship between n Achievement and performance. Granting this potential superiority of the individual administration condition, however, it still is to be noted that all other previous studies reporting relations between n Achievement and performance (e.g., 16, 18, 35) obtained them under group administration conditions; in the present study, no such relations are to be observed with group administration except as noted above, under the Relaxed-Affiliation condition. Furthermore, there seems to be no reason why the results for Ss from sections C, S, and T should merit less attention than those for Ss from sections A and F. The administration conditions for the thematic apperceptive measure were virtually the same for all sections, and as thematic apperceptive stories were ordered and identified for scoring purposes by the Ss' "random" numbers, they were thoroughly intermixed when scored. Finally, there is no reason to believe that the reversal of picture subset order interfered with the predictive power of all three motive indices for Ss from sections

C, S, and T; Reitman and Atkinson (53) get the same results for both of their forms. In conclusion, this single line of supporting evidence is to be considered as at best only suggestive; too many ad hoc hypotheses about the remaining relevant correlations would be required to make it count for anything more.

The third prediction states that the *n* Affiliation index will be maximally correlated with performance under the Relaxed-Affiliation condition.

This prediction, too, is unsupported by the data. Of the six correlations between total attempted performance scores under the Relaxed-Affiliation condition and affiliation motive scores based on all six pictures (Table 12), only one is significant; three of the six are negative. Once again, moreover, no more than this number are to be obtained for any other combination of affiliation motive index with correct or total performance scores. And while this percentage of significant correlations is not exceeded under any other condition, it certainly is far short of what would be required to confirm the prediction. It also should be noted that a rather higher set of correlations between affiliation motive indices and arithmetic performance scores (up to .62) are to be observed under the achievement-oriented, group administration condition (Table 10). Again, according to the theoretical model, the Achievement-Orientation condition is the one in which such a relationship between *n* Affiliation and performance should be expected least.

The fourth prediction states that for all experimental conditions under which *n* Achievement or *n* Affiliation is significantly related to performance, the motive index derived from the first three pictures of the present six-picture form will yield larger positive

correlations than that based on the last three pictures, without regard for content of the pictures involved.

The data from the present investigation hardly provide an adequate opportunity to test this prediction, since neither motive index is systematically related to performance under any condition. Consider, however, the set of all significant correlations between correct or total attempted performance scores and motive indices derived from either subset of pictures in either position. There are twelve such significant correlations. In each case, the significant correlation is greater than the corresponding one based on the complementary subset of pictures. Four of these twelve pairs are in accord with the prediction, i.e., the larger correlation is based on the subset of pictures presented first; the other eight cases contradict the prediction.

No motive indices were systematically related to performance under any condition, either positively or negatively. These data do not confirm the first prediction.

CHAPTER IV

DISCUSSION AND SUPPLEMENTARY ANALYSES

When predictions are confirmed, relatively little additional discussion may be necessary; unconfirmed expectations, however, demand further investigation. The first phase of the analytic sequence yielded the anticipated results. The present motivational induction instructions demonstrably affected performance in the predicted direction. No further systematic analysis seems indicated. The second phase of the sequence, on the other hand, produced results which accord with none of the predictions. The analysis which follows is an attempt to isolate the reasons for this unexpected outcome.

There are three general possibilities. First, the mechanics of the present investigation may differ critically from those of the two antecedent studies (12, 53). Second, the relations predicted may be present in the data even though the analysis fails to bring them out. Third, the antecedent findings themselves may have been due to chance.

Variations from Previous Studies

Is there some crucial difference between this study and the two previous investigations? Several changes have been made, certainly. The motivational instructions were printed; previously they were administered orally. True, the printed instructions produced a significant performance difference, but absolute levels of performance under Achievement-Oriented in the two cases still may be different. This must re-

main uncertain; since the response measures used were not identical, there is no way to make a direct comparison.

Despite the obtained performance increment, moreover, the lack of extensive spoken communication between E and Ss in the present study also cannot be ruled out as a critical factor. The achievement-orienting cues of printed instructions may yield an increment by engaging a limited degree of extra motivation from all Ss with some achievement motive. Most men in college may be presumed to be at least minimally motivated to achieve, and previous research indicates that Ss low in motive strength also show some increment as a function of Achievement-Orientation (44). The Ss with strong achievement motives may differ from others precisely in being more susceptible to oral instructions, which therefore elicit an additional performance increment from them. Again, no direct test of this suggestion is possible. The relation of this hypothesized oral communication factor to what Birney (16) has termed "the experimenter effect" is obvious, however. Should further research provide additional evidence of its existence, the result might well be a real addition to our knowledge of the cues which engage, and in a sense define, the "achievement expectancy."

An eight-picture form was used to assess motive strength in the previous experiments; a six-picture form is used here. Furthermore, because of requirements imposed by other investigations involving many of these same Ss (e.g., 23), the six pictures used here were not all selected from among the original eight (cf. Appendix A).

It is unlikely that these differences had any systematic influence upon the outcome of this experiment, however. Although somewhat shorter than the original form, the full six-picture measure used

here is still fifty per cent longer than the standard four-picture measure used in many studies of n Achievement (e.g., 44). Circumstantial evidence is available which also suggests that the minor picture changes probably had little or no detrimental effect upon the validity of the motive indices. Davage (23) worked with a considerable number of these same Ss shortly after the administration of the performance measures used here. His positive results, obtained with these very six-picture motive indices, are a cogent argument for their validity.

How important is the difference between the performance criteria used in the previous studies and those utilized in this investigation? The antecedent experiments employed an "Xs-in-circles" task and the present arithmetic measure. The number of circles which Ss filled in proved quite unrelated to n Achievement and the task probably need not be considered further. The previous studies, however, used a fourteen-minute version of the arithmetic measure, whereas nine-minute protocols were obtained here. Perhaps the difference in length lowered the reliability of the measure. To check this, part scores for the first and second three-minute portions of the present nine-minute protocols were computed for all ninety-nine Ss who worked under achievement-oriented conditions. These part scores were then correlated to obtain an estimate of reliability. The resulting coefficient is .73. Application of the Spearman-Brown correction formula (29, p. 493) indicates that the reliability of the nine-minute measure as a whole is .89. Atkinson and Reitman do not report reliabilities for their measures. In view of the high coefficient obtained here, however, the possible decrease in reliability due to the shorter length of the present arithmetic measure

is hardly a serious problem.

Nor can the three performance measures be considered too short or too insensitive to reflect motivational differences; on all three, including the three-minute number matching measure, there is a significant performance increment as a function of the motivational difference induced by the achievement-orienting instructions. Finally, it is worth noting that the correlations between the three measures, while positive, are relatively low. If correlations between correct scores are computed separately for each of the five performance conditions, the median correlation between the arithmetic and number matching measures is .32, between the spacial and number matching measures, .20, and between the arithmetic and spacial measures, .14. Taken together, then, the three measures would seem to sample a broad performance domain, and yet all of them also are demonstrably sensitive to the motivational differences they were intended to measure.

There are also, of course, many seemingly minor differences between the present experiment and the antecedent ones. The Ss here were asked to mark an "X" during work on the arithmetic measure; in the antecedent experiment, under the Achievement-Orientation condition, they worked without interruption. The E here directed individually administered Ss from immediately outside their closed laboratory room doors; in the antecedent studies E left the immediate experimental situation entirely. The Es were different. Any of these or similar variations may in fact have led to critical psychological differences in the Ss' perceptions of the two situations, and thus have resulted in observed disparities between the two sets of results.

A solution in this direction brings problems of its own, however.

McClelland has remarked the intrinsic sensitivity of thematic apperceptive measures (39). Specifically, he notes that

. . . fantasy also has its weaknesses as a method of measurement, weaknesses directly related to our other two criteria of a good measure--uniqueness and reliability. To anticipate a little, the sensitivity of fantasy is both its greatest strength and its greatest weakness: strength because it picks up slight motivational variations, weakness because it picks up variations in other factors as well, making it difficult to get stable and replicable results.

His comments apply to the total experimental network used to assess and establish relations between motives and performance as well. As McClelland points out, sensitivity is a vital characteristic of a measuring instrument. Sensitivity raises difficulties, however, when the range of stimuli to which an instrument is sensitive is neither fully specified nor adequately controlled. Any cue which affects the perception of an experiment is clearly a potential determinant of response variation. But the measurement situation must be accounted a part of the measure, variations in the measurement situation--variations in the measure; and a collection of related measures similar enough to be indistinguishable in advance yet different enough to produce discrepancies from previous results comparable to those reported here obviously would be of little use to psychology. It is important to note every factor which may have had some effect upon the results, and the potential effects of minor variations cannot be ignored. However, rather than stress a contingency implying a serious question as to the practical utility of thematic apperceptive measures given the limitations of current experimental technique, it seems desirable from a heuristic standpoint to first seek elsewhere for alternative explanations.

There is a further possibility which merits consideration.

Atkinson and Reitman tentatively suggest that performance on their first task may have been "confounded by continued attempts to practice the memory material that had been introduced at the beginning of the test period" (12, p. 363). To replicate the conditions of the original studies, the same memory measure was introduced in the present study immediately prior to the first task, which in this case was the arithmetic measure. Perhaps Ss with high *n* Achievement tried to recall the story they had read, and so worked less intensively on the subsequent performance measures. To provide a measure of control over such a possibility, in the questionnaire which followed the several performance measures Ss were asked, "Did you try to recall the memory story during the other tasks?"

The answers to this question are presented in Table 13, with respect to Ss' position above or below the median six-picture *n* Achievement score and the conditions under which the performance measures were administered. As is evident from the Table, there is no overall association between *n* Achievement and reported attempts to recall the story during the performance measures. Almost exactly half ($N=58$) of the 118 Ss who indicate some attempted recall are below the *n* Achievement median. Almost exactly half ($N=66$) of the 137 Ss who report no recall attempts are above the *n* Achievement median.

Further inspection, however, reveals evident association between attempted recall and *n* Achievement under the achievement-oriented, group condition ($\chi^2 = 5.21$, $P < .05$, with 1 df). Of the twenty-six Ss above the *n* Achievement median, fourteen report recall attempts; of the nineteen out of twenty Ss below the median who responded to the item, all but three report none.

TABLE 13

REPORTED RECALL OF MEMORY STORY DURING PERFORMANCE MEASURES AS A
FUNCTION OF PERFORMANCE CONDITION AND POSITION ABOVE (H) OR
BELOW (L) SIX-PICTURE MEDIAN ACHIEVEMENT MOTIVE SCORE

Performance Conditions	N Achieve- ment	Amount of Reported Recall						To- tal
		None	Yes*	One Min- ute†	Two Min- utes	More Than Two	No An- swer	
Achievement instruc- tions, group ad- ministration	H	12	0	12	1	1	0	26
	L	16	0	3	0	0	1	20
Achievement instruc- tions, individual administration	H	18	0	7	1	0	0	26
	L	15	0	11	1	0	0	27
Neutral instructions, group administra- tion	H	13	0	10	0	1	0	24
	L	11	0	9	1	1	0	22
Neutral instructions, individual admin- istration	H	9	0	11	4	1	0	25
	L	9	2	12	0	0	2	25
Relaxed-Affiliation instructions, group administration	H	14	0	11	0	0	0	25
	L	20	2	16	0	0	0	38
Total		137	4	102	8	4	3	258

*Amount of time not indicated.

†Or less.

On the other hand, under the achievement-oriented, individual condition, which is closer to the Achievement-Orientation condition described by Atkinson and Reitman (12, p. 362), whatever slight associa-

tion exists is in the opposite direction. Furthermore, this is true not only of Ss from sections A and F, whose performance scores were positively correlated with *n* Achievement, but also for Ss from sections C, S, and T, for whom all correlations between performance and *n* Achievement were slightly negative (cf. above, Table 7). Eight of twelve Ss high in *n* Achievement from sections C, S, and T who worked under the achievement-oriented, individual condition report no recall attempts, while only ten of the corresponding eighteen Ss below the *n* Achievement median report none. Unless it is assumed that Ss high and low in *n* Achievement somehow differed systematically in reporting attempted recall of the memory story, differential recall clearly is not an adequate explanation for the lack of positive correlations between the *n* Achievement and performance scores of Ss from these three sections who worked under the achievement-oriented, individual condition.

Finally, if all Ss working under achievement-oriented instructions are considered together, twenty-two Ss high in *n* Achievement are found to report recall, while thirty do not. The comparable figures for Ss low in *n* Achievement, fifteen and thirty-one, are not very much different, and all four figures taken together hardly constitute reason to reject the hypothesis of no association between *n* Achievement and reported recall under achievement-oriented conditions in general.

The major differences between the present study and the antecedent investigations have now been considered. The available evidence does not suggest that any one of them is responsible for the failure to confirm the predictions made.

The Adequacy of the Analytic Techniques

What possibility is there that the predicted relations actually

obtain in these data, but remain undetected because the techniques used to analyze the results fail to bring them out? In other words, is there a chance that the negative outcome of the analysis of results is to some extent a statistical artefact?

All predictions are tested with the correlation coefficient, which imposes several stringent requirements upon the data to which it is applied. For instance, the correlation coefficient presupposes the equality of all unit score intervals. The difference between *n* Achievement scores of six and seven, for example, is assumed to be equal in size to the difference between *n* Achievement scores of twenty-two and twenty-three. If this requirement is not met, the correlation coefficient may give a distorted picture of the degree of association present when the relations between such a measure and others are analyzed.

Perhaps the *n* Achievement index does not satisfy all of the assumptions implied by the use of the correlation coefficient. If this is the case, the correlation coefficient is not the best statistic to use in describing relations between *n* Achievement and other variables. To investigate this possibility, a further analysis was made of these data to supplement the correlational findings.

All Ss were classified both as to the form of the thematic apperceptive measure they had taken and the conditions under which they had worked at the performance measures. Two forms of the thematic apperceptive measure and five different performance conditions were used in the present experiment (cf. above, p. 19), so that joint classification by thematic apperceptive measure and performance condition results in ten separate groups of Ss.

The Ss in each of these ten groups were then classified as high

or low in *n* Achievement according to whether their scores fell above or below the median six-picture *n* Achievement score for all 258 *Ss* who took part in the experiment. The mean correct performance scores on each of the three performance measures used were then computed separately for *Ss* high and low in *n* Achievement in each of the ten groups. These means are presented in Table 14. The sign of the difference between means for high and low *Ss* on all three performance measures in each of these ten groups (thirty pairs of means altogether) then was noted and compared with the sign of the corresponding correlation coefficient in Tables 7-9. To facilitate comparison, it may be pointed out that the ten groups just described correspond to the total of ten separate columns in these three Tables; each of the thirty differences between mean correct scores on one of the performance measures for *Ss* high and low in *n* Achievement corresponds to the correlation between achievement motive scores based on all six pictures and the correct scores on the given performance measure in the appropriate column.

Among these thirty sets of a mean difference and a correlation coefficient computed from the very same data, there are seven in which the mean difference and the correlation coefficient differ as to sign. In four of these seven cases the absolute magnitude of the correlation coefficient is .05 or less; in the remaining three cases, the correlations are .09, -.15, and .23.

Two conclusions may be drawn from these comparisons. First, considering the reasonably clear equal unit interval character of the response measures, these reversals indicate that the *n* Achievement index does not fully satisfy the assumptions required for the use of the correlation coefficient, although the specific assumptions cannot be

TABLE 14

MEAN CORRECT SCORES ON THE ARITHMETIC, SPACIAL PERCEPTION, AND NUMBER MATCHING RESPONSE MEASURES AS FUNCTIONS OF PERFORMANCE CONDITIONS, FORM OF THEMATIC APPERCEPTIVE MEASURE, AND POSITION ABOVE (H) OR BELOW (L) SIX-PICTURE MEDIAN ACHIEVEMENT MOTIVE (N ACH) SCORE

Performance Condi- tions	T.A. Form (By Sec- tions)	N Ach	N	Response Measure					
				Arithmetic		Spacial		Matching	
				Mean	<u>SD</u>	Mean	<u>SD</u>	Mean	<u>SD</u>
Achieve- ment, group	A,F	H	10	44.70	13.80	60.10	22.20	46.20	9.30
		L	11	45.00	12.00	53.36	21.55	48.00	7.91
	C,S,T	H	16	41.44	11.62	45.81	23.06	45.75	12.75
		L	9	40.67	11.67	46.33	20.33	50.67	7.67
Achieve- ment, indi- vidual	A,F	H	14	49.50	15.21	58.43	27.64	52.29	10.93
		L	9	41.33	11.33	43.67	28.00	49.33	15.33
	C,S,T	H	12	38.00	14.25	56.50	28.50	43.75	9.25
		L	18	44.67	14.17	62.17	23.83	47.83	9.17
Neutral, group	A,F,	H	12	37.50	11.50	46.25	15.25	40.25	7.00
		L	12	39.50	11.50	43.75	13.25	44.25	9.00
	C,S,T	H	12	37.75	15.25	55.00	25.00	48.25	9.25
		L	10	32.10	12.30	38.50	18.90	41.70	10.80
Neutral, indi- vidual	A,F	H	12	44.75	17.50	38.75	17.25	44.50	12.50
		L	8	40.12	10.12	41.12	14.62	49.50	6.38
	C,S,T	H	13	40.39	11.77	48.08	21.46	47.54	11.77
		L	17	40.59	12.35	50.94	24.53	43.41	7.94
Relaxed- Affil- iation, group	A,F,	H	13	40.39	9.46	46.00	13.84	41.54	7.61
		L	18	35.50	13.50	52.17	22.33	43.50	8.50
	C,S,T	H	12	43.75	17.50	42.50	18.50	48.50	10.00
		L	20	31.50	12.00	47.35	18.75	48.15	7.65

identified, and the exact degree to which distortions have occurred cannot be estimated.

Second, it also is reasonably obvious that distortions of this magnitude cannot account for the lack of confirmation of the predictions made. Even in the case of the one reversal where the original correlation was .23, the $P = .05$ significance level for the appropriate number of cases ($N = 20$) is .44, and the corresponding mean difference is very close to zero. For all correlations above .30, not only the signs of the corresponding mean differences but also their magnitudes quite clearly confirm the conclusions drawn from the correlation coefficients themselves.

To determine whether there was any evidence of systematic curvilinearity in the present data, a further supplementary analysis was made. Within each of the ten groups described above, S_s were divided into six classes on the basis of their six-picture n Achievement scores. With the exception of the first and last classes, which extended far enough to include the lowest and highest motive scores respectively, these classes were all three n Achievement score units in size. This coding arrangement was chosen, after considering the range and density of the motive score distributions, because it afforded an efficient and satisfactory means of observing any gross curvilinear relations.

Correct performance scores on each of the three performance measures were plotted against these six n Achievement classes within each of the ten groups described above. In addition, a further thirty plots were made of the performance scores against analogous n Affiliation score classes. Careful examination of the individual plots and systematic comparisons of plots related by common motivational induction in-

structions, individual or group response measure administration, and thematic apperceptive measure forms yielded no evidence of any such curvilinear relations.

In analyzing the results of the present investigation, performance scores are combined for Ss from sections A and F, and for Ss from sections C, S, and T. This combination of performance results for all Ss who were given the same form of the thematic apperceptive measure seemed reasonable since the administration conditions were generally constant over all sections. In view of the failure of the analysis of results to confirm the predictions, however, it is appropriate to examine the n Achievement scores for Ss from each of the five sections separately to ascertain whether combined treatment of performance scores is entirely justified.

Separate means and SDs for n Achievement scores of Ss from each of the five sections are presented in Table 15. The results for section S clearly are different from those for the other sections. An analysis of variance of n Achievement scores from the achievement-related pictures in sections C, S, and T confirms the significance of this difference ($F = 3.35$, $P < .05$ with 2 df). It is impossible to determine whether this result is a consequence of unsuspected alterations in the administration of the thematic apperceptive measure in this section or of real differences between Ss from this section and those from the others.

Only nineteen of the 139 Ss from these three sections who participated in this experiment are from section S, but these nineteen are equally distributed over the five performance conditions. To determine conclusively whether these Ss systematically affected the combined results, it is necessary that all correlations involving these Ss be re-

TABLE 15

MEAN ACHIEVEMENT MOTIVE SCORES AS FUNCTIONS OF PICTURE CUES,
PICTURE ORDER, AND SECTION IN WHICH ADMINISTERED

Order of Picture Presentation		Source of Motive Scores						
		Three Aff Pictures		Three Ach Pictures		All Six Pictures		
		<u>N</u>	Mean	<u>SD</u>	Mean	<u>SD</u>	Mean	<u>SD</u>
Aff-Related First								
Section A	40		-1.08	2.40	6.55	3.80	5.48	4.70
Section F	79		.30	3.44	6.39	4.11	6.70	5.76
Ach-Related First								
Section C	73		-.33	2.53	6.08	4.27	5.75	5.70
Section S	19		-.63	2.63	3.68	3.21	3.05	3.42
Section T	47		-.70	2.81	6.45	3.85	5.74	4.96
<u>F</u>						3.35		
<u>df</u>						2		
<u>P</u>						.05		

computed without them. The results of these recomputations are presented in Tables 16-18. Preliminary comparison of these results with the corresponding correlations presented in Tables 7-12 does not suggest that this difference in mean achievement motive scores between Ss from section

TABLE 16

EFFECTS OF PICTURE CUES AND INDIVIDUAL VS. GROUP RESPONSE MEASURE
ADMINISTRATION ON CORRELATIONS OF ACHIEVEMENT AND AFFILIATION
MOTIVES WITH PERFORMANCE UNDER ACHIEVEMENT ORIENTATION
FOR SUBJECTS FROM SECTIONS C AND T ONLY

Source of Motive Scores	Performance Index		<u>Achievement</u>		<u>Affiliation</u>	
	Score	Measure	Group (N = 21)	Individual (N = 26)	Group (N = 21)	Individual (N = 26)
Three Aff Pictures	Number correct	Arithmetic	-.11	-.21	-.15	.21
		Spacial	.16	-.22	-.13	.15
		Matching	-.22	-.25	.11	-.05
	Number attempted	Arithmetic	-.10	-.19	-.11	.21
		Spacial	.12	-.22	-.21	.09
		Matching	-.20	-.25	.09	-.07
Three Ach Pictures	Number correct	Arithmetic	.17	-.09	.06	-.15
		Spacial	-.08	-.06	-.12	-.28
		Matching	.31	-.20	-.26	.00
	Number attempted	Arithmetic	.07	-.13	.14	-.18
		Spacial	-.10	-.02	-.34	-.22
		Matching	.25	-.20	-.26	.04
All Six Pictures	Number correct	Arithmetic	.06	-.16	-.13	.14
		Spacial	.04	-.15	-.14	.03
		Matching	.09	-.26	.07	-.04
	Number attempted	Arithmetic	.00	-.19	-.09	.13
		Spacial	.00	-.11	-.26	.00
		Matching	.07	-.27	.05	-.05

One-tailed Significance Levels for Correlation Coefficients

*	P = .05	.37	.33	.37	.33
**	<u>P</u> = .01	.50	.45	.50	.45

TABLE 17

EFFECTS OF PICTURE CUES AND INDIVIDUAL VS. GROUP RESPONSE MEASURE
ADMINISTRATION ON CORRELATIONS OF ACHIEVEMENT AND AFFILIATION
MOTIVES WITH PERFORMANCE UNDER NEUTRAL ORIENTATION
FOR SUBJECTS FROM SECTIONS C AND T ONLY

Source of Motive Scores	Performance Index		<u>Achievement</u>		<u>Affiliation</u>	
	Score	Measure	Group (N = 18)	Individual (N = 27)	Group (N = 18)	Individual (N = 27)
Three Aff Pictures	Number correct	Arithmetic	.12	-.12	.42*	.03
		Spacial	.18	-.11	-.03	.32*
		Matching	.08	.07	.08	-.10
	Number attempted	Arithmetic	.14	-.14	.35	.06
		Spacial	.15	-.19	.11	.29
		Matching	.10	.07	.10	-.08
Three Ach Pictures	Number correct	Arithmetic	-.09	-.01	-.14	.09
		Spacial	-.13	-.16	.36	.21
		Matching	.19	-.06	.17	.06
	Number attempted	Arithmetic	.05	.03	-.19	.19
		Spacial	-.10	-.09	.28	.18
		Matching	.18	-.03	.16	.06
All six Pictures	Number correct	Arithmetic	-.02	-.09	.31	.05
		Spacial	-.02	-.19	.17	.37*
		Matching	.18	-.01	.17	-.07
	Number attempted	Arithmetic	.10	-.06	.21	.11
		Spacial	-.02	-.19	.26	.32*
		Matching	.19	.02	.18	-.06

One-Tailed Significance Levels for Correlation Coefficients

*	P = .05	.40	.32	.40	.32
**	P = .025	.47	.38	.47	.38

TABLE 18

EFFECTS OF PICTURE CUES ON CORRELATIONS OF ACHIEVEMENT AND AFFILIATION
MOTIVES WITH PERFORMANCE UNDER RELAXED-AFFILIATION ORIENTATION
AND GROUP RESPONSE MEASURE ADMINISTRATION FOR
SUBJECTS FROM SECTIONS C AND T ONLY (N = 28)

Source of Motive Scores	Performance Index		Achievement	Affiliation
	Score	Measure		
Three Aff Pictures	Number correct	Arithmetic	.61****	.21
		Spacial	-.07	-.12
		Matching	.38**	-.10
	Number attempted	Arithmetic	.63****	.18
		Spacial	-.15	-.02
		Matching	.38**	-.12
Three Ach Pictures	Number correct	Arithmetic	.14	.08
		Spacial	-.14	-.20
		Matching	.02	.16
	Number attempted	Arithmetic	.17	.15
		Spacial	-.22	-.06
		Matching	.01	.15
All Six Pictures	Number correct	Arithmetic	.34*	.23
		Spacial	-.13	-.16
		Matching	.16	-.06
	Number attempted	Arithmetic	.37**	.21
		Spacial	-.22	-.03
		Matching	.15	-.10

One-tailed Significance Levels for Correlation Coefficients

*	P = .05	.32
**	P = .025	.37
***	P = .01	.44
****	P = .0005	.59

S and those from sections C and T had any systematic effect upon the correlations for the combined groups.

Under the critical achievement-oriented, individual condition, for example, the original correlations between the six-picture n Achievement scores and correct scores on the three performance measures are $-.18$, $-.11$, and $-.21$ (Table 7, column 4). The corresponding correlations for Ss from sections C and T only are $-.16$, $-.15$, and $-.26$ (Table 16, column 2). Or consider the similarly critical correlations between six-picture n Affiliation scores and correct performance scores under the Relaxed-Affiliation condition. The three original correlations are $.30$, $-.13$, and $.15$ (Table 9, column 2); the corresponding correlations for Ss from sections C and T only are $.33$, $-.16$, and $-.06$. The correlation with the number matching scores changes somewhat, but in the wrong direction! Certainly these six critical comparisons provide no evidence at all that the nineteen Ss from section S systematically affected the analysis of results, and this conclusion tends to be confirmed by further systematic comparison of all the other correlations computed with and without these Ss.

The parametric analyses indicated that performance level in the present experiment was a function of quantitative aptitude (cf. above, pp. 34-35). It is important to determine whether quantitative aptitude also had any systematic effect upon motive-performance relations. Such an effect might arise were quantitative aptitude correlated with motive scores. To investigate this possibility, correlations between quantitative aptitude and six-picture achievement and affiliation motive indices were computed for each of the eight groups formed by classifying Ss both as to form of thematic apperceptive measure and performance condition (cf. above, p. 19; it will be recalled that Q and L ACE scores

were not available for Ss assigned to the Relaxed-Affiliation condition). The eight correlations between Q scores and n Achievement scores are: -.11, -.04, .02, .03, .12, .12, .19, and .27. The correlations between Q scores and n Affiliation scores are: -.08, -.02, .01, .10, .11, .12, .13, and .34.

None of the sixteen correlations are significant. All but the two coefficients, .27 and .34, for the thirty Ss who wrote stories to the "Ach-related pictures first" form of the thematic apperceptive measure and who worked individually under neutral instructions, are negligible. Even these two fall short of the .36 required for significance at the .05 level. The overall absence of sizable associations between motive indices and quantitative aptitude in all other groups makes it unlikely that quantitative aptitude enters into the motive-performance correlations presented in Tables 7, 8, 10 and 11.

There is one further potential source of analytic error which must be considered. This is the possibility that errors crept in somewhere in going from the raw data to the statistics arrived at with the electronic computation equipment. The safeguards against such errors have been described (cf. above, pp. 27-28). One final verification of the entire analytic procedure may help, however, to establish beyond reasonable doubt the fact that the procedures used were correct and free of major error throughout.

For this final verification, the correlation between six picture n Achievement scores and correct arithmetic scores for the thirty Ss from sections C, S, and T who worked under the achievement-oriented, individual conditions was recomputed entirely from the raw data. The choice of this particular correlation for the purpose was determined by

the fact that, as it stands ($r = -.18$), it constitutes a critical non-confirmation of the second prediction.

The thematic apperceptive stories were rescored and the six picture n Achievement scores recomputed. A correlation of .88 between these scores and the original ones (cf. above, pp. 21-22) indicates that no inadvertent reversals or systematic errors entered into the original scores. The arithmetic performance measure also was rescored. The correlation between the original n Achievement scores and the recomputed performance scores was computed by hand, and turned out to be $-.17$. Since the difference between the hand-computed figure and the machine result, $-.18$, is easily attributable to coding or rounding error, it seems certain that the original analytic procedures were entirely sound.

All of the obvious possibilities of inadequate analysis have now been considered. None of the supplementary analyses suggested by these considerations yield any evidence which would require modification of the original findings reported in the discussion of results.

The Adequacy of Generalizations from Previous Research

Procedural details to a certain extent vitiate the significance of the evidence which forms the basis of conclusions reached in the two antecedent studies. This problem has already been discussed (cf. above, pp. 10-11). To what extent can the discrepancy between the results of the present study and those of the preceding ones be attributed to the operation of chance in the original experiments.

There is no way to answer this question directly. In view of the basic similarity of the relationship between n Achievement and performance reported there, however, to the results from numerous other

studies (16, 35, 61), such a conclusion would seem highly unlikely and would be unsupported by evidence of any kind.

On the other hand, the persistent reports of failure to replicate the simple motive-performance relationship under achievement-oriented conditions^{1,2} (16) also bear emphasizing, as do reports of the "right" relationship obtained under the "wrong" conditions. Birney's recent finding (18) of a significant positive relation between n Achievement scores and performance on an "Additions task" is a good instance. The experiment was administered by a student who "without saying anything about its being related to intelligence or leadership ability or anything else, simply read the instructions with the Ss and started them on the tasks" (18, p. 6). This would seem a good description of a condition at least as "neutral" as the present neutral condition. Birney's own comment, in reference to the performance measure, would seem to confirm this conclusion. He writes, "We have found in the past that it seems to work best with this population when it is administered by a student under low cued conditions" (18, p. 7).

Such disagreements about the conditions necessary for the motive-performance relationship, partly terminological but partly also over apparently conflicting facts, are a stubborn, endemic characteristic of the literature on n Achievement. They have proven immeasurably expensive, for they are the prime cause of the lack of transitivity and additivity which plagues attempts to integrate the results of research on n Achievement. They are the strongest possible argument for standardized techniques.

¹Personal communication from R. N. Haber, April, 1955.

²Personal communication from R. N. Haber, April, 1956.

CHAPTER V

SUMMARY

Progress in psychology depends upon methodological advance.

The promising results obtained by D. C. McClelland, J. W. Atkinson, R. A. Clark, and their colleagues (e.g., 8, 38, 44) are in part a function of the methodological superiority of their thematic apperceptive measures of the achievement and affiliation motives to other assessment techniques. Some inconsistent findings, however, suggest that much is to be gained from a more precise theoretical formulation of the conditions under which such measures should relate to performance, and from further methodological improvement of the measurement technique itself.

Atkinson (7) has proposed a theoretical model relating motive scores to performance which specifies in detail the conditions under which motive-performance relations are to be expected. Previous research has tended to confirm this model (12).

Three predictions deriving from this model are tested in the present investigation.

1. Significant correlations between motive indices and performance will be positive under all experimental conditions.
2. The n Achievement index will be maximally correlated with performance under Achievement-Oriented conditions.
3. The n Affiliation index will be maximally correlated with

performance under the Relaxed-Affiliation condition.

A fourth prediction stems from the findings of a related study (53).

4. For all experimental conditions under which n Achievement or n Affiliation is significantly related to performance, the motive index derived from the first three pictures of the present six-picture form will yield larger positive correlations than that based on the last three pictures, without regard for content of the pictures involved.

A major additional purpose of the present study is the further methodological improvement of controls over the factors affecting the motive-performance relation.

One of two forms of a thematic apperceptive measure was administered to each of five groups of Ss under neutral classroom conditions. All Ss subsequently participated in a second experimental session about eleven weeks later. At that time, Ss worked at three performance tasks under one of five different performance conditions: Achievement-Orientation, group; Achievement-Orientation, individual; Neutral, group; Neutral, individual; Relaxed-Affiliation, group. Printed instructions were used to induce motivational differences.

The Achievement-Orientation conditions yielded a significant performance increment over the Neutral conditions, providing clear evidence of the efficacy of the printed instructions. Furthermore, this relationship was found to be independent of the individual vs. group administration of the response measures, and of differences among Ss in quantitative and linguistic aptitude.

None of the four predictions were confirmed, however.

Supplementary analyses were undertaken to determine possible

reasons for this non-confirmation. Several potentially critical factors are discussed, although no one is shown definitely to have been decisive. The uncertain comparability of antecedent conditions and resultant response levels among experiments relevant to the predictions is pointed out as an important possibility, and the urgent need for standardized response measures and more precisely controlled induction techniques is stressed.

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APPENDIX A

STIMULUS MATERIAL FOR THEMATIC APPERCEPTIVE MEASURE

1. Instructions

PICTURE INTERPRETATIONS

You are going to see a series of pictures, and your task is to tell a story that is suggested to you by each picture. Try to imagine what is going on in each picture. Then tell what the situation is, what led up to the situation, what the people are thinking and feeling, and what they will do.

In other words, write as complete a story as you can - a story with plot and characters.

You will have twenty seconds to look at a picture and then four minutes to write your story about it. Write your first impressions and work rapidly. I will keep time and tell you when it is time to finish your story and get ready for the next picture.

There are no right or wrong answers or kinds of stories, so you may feel free to write whatever story is suggested to you when you look at the picture. Spelling, punctuation, and grammar are not important. What is important is to write out as quickly as possible the story that comes into your mind as you imagine what is going on in each picture.

Notice that there is one page for writing each story, and four questions to guide your thinking about the plot. You will have about a minute to write about each question. We will keep time and keep you posted. If you need more space for writing a story, use the reverse side of the paper.

2. Pictures

a) Achievement-Related Subset



1B



1H

1D¹

b) Affiliation-Related Subset

3E¹

3A



3B

¹These pictures were not used in the two antecedent studies (12, 53).

APPENDIX B

MOTIVATIONAL INDUCTION INSTRUCTIONS

1. Achievement-Orientation Induction Instructions

a) Introductory Instructions

This first hour you will be taking a series of short tests which measure a series of abilities. In particular, all of them are sensitive to the amount of care and effort you put in to them. Superior performance on these tests has been shown to relate to the Stanford Binet Intelligence Test, The Scholastic Aptitude Test, and to a lesser extent to the verbal and arithmetic parts of the College Board Examinations. As these tests are to be evaluated in terms of how well you can really do, other measures of your past achievement are necessary. Will you therefore fill in any of the information requested below which you know. In order to control for inadequacies in such measures, we would appreciate it if you would comment in the blank space if you think these measures do not do you justice--in other words, if you think you can do better if you really try:

1. Score on draft examination: _____ (men only)
2. IQ _____
3. Rank in high school graduating class: _____ out of
_____ in my graduating class.
4. Your grade point average so far in your college
career: _____.

COMMENT:

Now reread these instructions

Time:

Date:

Name (in full)

b) Arithmetic Task Induction Instructions

This test was designed by psychologists working on Officer Candidate selection for the Office of Naval Research. It is an excellent measure of how quickly and efficiently you can work.

(Instructions for working arithmetic problems inserted here)

DO YOUR BEST!

c) Spacial Perception Task Induction Instructions

This test reveals how careful you are, and how accurately you perceive the world. It too requires that you work as fast as you can and as well as you can.

(Instructions for working spacial perception problems inserted here)

Work quickly and accurately.

d) Number Matching Task Induction Instructions

The next test has been demonstrated many times to be one of the best means of selecting men **who can work with speed and efficiency** at a demanding task.

(Instructions for working number matching problems inserted here)

Both speed and accuracy are vital for this test.

2. Neutral-Orientation Induction Instructions

a) Introductory Instructions

As you know, one of the requirements for Psychology 31 is that you become familiar with the types of instruments psychologists use in studying behavior. The series of tasks contained in this booklet will provide some examples of such psychological instruments, most of them being parts of actual measures currently in use.

You need not put down your name, as these tasks will not be scored. They are intended as a demonstration, and will probably be discussed in class at the beginning of January.

The instructor will tell you when to start and stop. Please listen to him carefully so that you spend enough time on all of the tasks. Do not turn to any task until the instructor says to do so, and continue working at a task until the instructor tells you to stop.

Please do not turn over this page until the instructor says to do so.

b) Arithmetic Task Induction Instructions

This task is a typical example of moderately complex tasks involving arithmetic operations on numbers.

(Instructions for working arithmetic problems inserted here)

c) Spatial Perception Task Induction Instructions

This spatial perception task is related to people's perceptions of the world.

(Instructions for working spatial perception problems inserted here)

d) Number Matching Task Induction Instructions

The next task is one widely utilized among some psychologists.

(Instructions for working number matching problems inserted here)

3. Relaxed-Affiliation-Orientation Induction Instructions

a) Introductory Instructions

You have been in Psychology 31 now long enough to know that much of a Psychologist's time is spent measuring things. Unfortunately, it takes a lot of preliminary work to help develop a good test or measure of something. What we are going to do now is show you some of the tasks that some European Psychologists have been developing. None of these have been standardized yet, and to be truthful, we have only a vague idea about what they might possibly measure.

In a sense, then, we're going to try to kill two birds with one stone, by asking you to help us work the kinks out of this set of experimental tasks. We hope that this will also give you some idea of the type of thing psychologists do, and we will be grateful for your help in providing us with these data.

Because we would like to know roughly how long these tasks take, we would appreciate it if you would follow the timing instructions which will be given to you. Please do not turn over to a new task until we ask you to.

After you have worked at some of these tasks, there will be a page for recording briefly your comments about different problems which might arise if ever these tasks were to actually be developed and used. We would appreciate it if you would note down any observations you might have when we get to that part.

Thanks again for your help. Please wait until the instructor says to begin.

ATTENDANCE FORM

Please write down name _____, Psych 31 section _____ and Instructor's name, so that he can be notified that you participated in an experimental demonstration. Time _____; Date _____.

b) Arithmetic Task Induction Instructions

Here's one developed in Germany quite recently. Unfortunately the experimenter who made it up never bothered to see whether it would work or not. We haven't gotten to that stage yet ourselves, and right now we would like to know roughly how long these tasks take, on the average.

(Instructions for working arithmetic problems inserted here)

c) Spacial Perception Task Induction Instructions

This is another of the recently developed European tests we would like to try out, and again, we would appreciate your helping us out on this. It is not clear just what "spacial perception" is as far as this test goes, and so what we've done is copy out on the next two pages several of the items from the original.

(Instructions for working spacial perception problems inserted here)

d) Number Matching Task Induction Instructions

The next task is one widely utilized among some psychologists.

(Instructions for working number matching problems inserted here)

APPENDIX C

PERFORMANCE MEASURES

1. Arithmetic

a) Instructions for Working Problems

Here's a sample and the instructions for working it:

SAMPLE: $6+8-2$
 $3-1+4$

INSTRUCTIONS:

(1) add the first line across: $6+8-2 = 12$. REMEMBER THE RESULT, BUT

DON'T WRITE IT DOWN

(2) add the second line across: $3-1+4 = 6$. REMEMBER THE RESULT, BUT

DON'T WRITE IT DOWN

(3) if the top line sum (12 in this example) is larger than the bottom line sum (6 in this example) you subtract the bottom sum from the top. If the top line sum is smaller, then add the two sums together. This gives you your answer. In this sample, the top line sum is 12, which is larger than the bottom line sum, 6, so you subtract 6 from twelve and write down the answer, 6. The rule is: SUBTRACT WHEN YOU CAN SUBTRACT WITHOUT GETTING A NEGATIVE NUMBER; OTHERWISE ADD.

Here are two practice problems:

$5-3+1$
 $6+2-3$

$6+7+1$
 $8-7+9$

The answer is 8, since the top line sum, 3, is smaller than the bottom line sum, 5, and you therefore add. The answer is 4, since the top line, 14, is larger than the bottom line sum, 10, and you therefore subtract.

Do not turn over this page until the instructor tells you to.

b) Problems

$$\begin{array}{l} 8-4+2 \\ 9+5-6 \end{array}$$

$$\begin{array}{l} 7-3+9 \\ 5+8-6 \end{array}$$

$$\begin{array}{l} 8+4-3 \\ 9-2+8 \end{array}$$

$$\begin{array}{l} 7+5-9 \\ 6-2+4 \end{array}$$

$$\begin{array}{l} 9-5+2 \\ 7+6-4 \end{array}$$

$$\begin{array}{l} 8-3+6 \\ 9+4-6 \end{array}$$

$$\begin{array}{l} 5+8-6 \\ 8-2+9 \end{array}$$

$$\begin{array}{l} 9-3+7 \\ 8+5-7 \end{array}$$

$$\begin{array}{l} 9-3+5 \\ 8+4-7 \end{array}$$

$$\begin{array}{l} 9+2-8 \\ 7+5+6 \end{array}$$

$$\begin{array}{l} 8+3-7 \\ 7+6-5 \end{array}$$

$$\begin{array}{l} 8-2+7 \\ 9+3-5 \end{array}$$

$$\begin{array}{l} 5+8-2 \\ 9+3-4 \end{array}$$

$$\begin{array}{l} 7+8-6 \\ 9+8-2 \end{array}$$

$$\begin{array}{l} 7-3+9 \\ 5+8-7 \end{array}$$

$$\begin{array}{l} 7-4+6 \\ 9-3+8 \end{array}$$

$$\begin{array}{l} 6-3+2 \\ 7+4-3 \end{array}$$

$$\begin{array}{l} 9+7-2 \\ 5+9+4 \end{array}$$

$$\begin{array}{l} 9-5+7 \\ 3+8-9 \end{array}$$

$$\begin{array}{l} 7+4-6 \\ 8-3+4 \end{array}$$

$$\begin{array}{l} 9+5-8 \\ 8+7+4 \end{array}$$

$$\begin{array}{l} 6-2+7 \\ 9-7+3 \end{array}$$

$$\begin{array}{l} 8-6+2 \\ 4+8-5 \end{array}$$

$$\begin{array}{l} 9-3+7 \\ 5-2+6 \end{array}$$

$$\begin{array}{l} 5-3+4 \\ 3+8+6 \end{array}$$

$$\begin{array}{l} 7+8-2 \\ 9-5+3 \end{array}$$

$$\begin{array}{l} 9-6+4 \\ 4+8+5 \end{array}$$

$$\begin{array}{l} 9-3+8 \\ 7-2+4 \end{array}$$

$$\begin{array}{l} 8+6-7 \\ 7-4+5 \end{array}$$

$$\begin{array}{l} 9-5+3 \\ 8+3+5 \end{array}$$

$$\begin{array}{l} 7-4+8 \\ 8+4-9 \end{array}$$

$$\begin{array}{l} 3+6-5 \\ 4-2+6 \end{array}$$

$$\begin{array}{l} 8+4-7 \\ 6+7+5 \end{array}$$

$$\begin{array}{l} 9-3+8 \\ 2+9-5 \end{array}$$

$$\begin{array}{l} 5+2-3 \\ 8+3+6 \end{array}$$

$$\begin{array}{l} 9-5+3 \\ 6+7-5 \end{array}$$

$$\begin{array}{l} 4+8-9 \\ 7-4+6 \end{array}$$

$$\begin{array}{l} 5-3+4 \\ 7+6+5 \end{array}$$

$$\begin{array}{l} 8-5+9 \\ 6-3+5 \end{array}$$

$$\begin{array}{l} 9+2-5 \\ 8-3+2 \end{array}$$

$$\begin{array}{l} 4-2+5 \\ 3+9+6 \end{array}$$

$$\begin{array}{l} 9-4+6 \\ 7+5-9 \end{array}$$

$$\begin{array}{l} 8+3-6 \\ 7+4+5 \end{array}$$

$$\begin{array}{l} 8-6+5 \\ 9+5-6 \end{array}$$

$$\begin{array}{l} 7-2+8 \\ 5+3-2 \end{array}$$

$$\begin{array}{l} 4+9-6 \\ 7+8+3 \end{array}$$

$$\begin{array}{l} 6-4+3 \\ 7-3+4 \end{array}$$

$$\begin{array}{l} 8-4+7 \\ 3+8-9 \end{array}$$

-2-

7+2-4	9-3+3	8-2+7
9+3-5	9+3-4	9+5-8
9-3+7	7-3+5	3+8-4
8+3-6	9+6-3	9-2+8
9+5-6	9-3+9	8+3-6
9+3-5	6+5-3	6+9-8
7+4-8	5+8-2	9-2+8
5+9-6	9+4-6	8+7-9
5+7-4	7-2+8	7+5+3
4+8+5	9+3-7	9+3-4
9-2+8	3+9-4	7+6-5
7+4-5	8+6+3	4+9+3
6-2+9	9+4-8	9+2-4
9+5-6	3+8-5	6+7-5
8+5-6	7+4-8	9-2+9
3+6+5	6+5-2	7+5-3
5+7-4	9+3-8	8+6-2
8-2+9	7+5-4	7+6-8
7+9-2	7+4-5	3+9-5
8+3-4	8+3+6	7+4-3
5+9-6	4+9+3	8-6+2
8-3+9	7+5-3	9+5+3
9-4+8	8+4-9	8-2+7
6+8-5	5+6+8	5+6-2
9-3+9	4+9+3	2+7+6
7+5-4	7+5-3	5+7-3
5-2+6	8+4-9	9-4+2
9+4+3	7+8-6	7+5+4
8+3+5	7+4-6	7-2+8
7+6-4	5+6+8	9+2-7
8+3-6	5+9-3	3+9-5
4+9-6	9+4-7	7+8-6

2. Spacial Perception

a) Instructions for Working Problems

A sample of the items is given below. You will see that all of those figures which are like the original figures on the left, except that they have been turned, are underlined. Those which are different, e.g. reversed or backward, are not underlined. None of the reversed figures would look like the original if they were turned right side up.



Would you please see how many of the figures on the following pages are actually like the first figure on the left (you underline those) and how many are different (leave those blank).

Please do not turn over this page until the instructor asks you to.

b) Problems

In each row put a mark under every figure which is like the first figure in the row.

						
						
						
						
						
						
						
						
						
						

In each row put a mark under every figure which is like the first figure in the row.

-2-

						
						
						
						
						
						
						
						
						
						

3. Number Matching

a) Instructions for Working Problems

On the following page you will find a series of pairs of numbers, each separated by a line: for example,

79542 _____ 79524

50794367 _____ 50794367

(✓) If the two numbers are exactly the same, make a check mark on the line between them; if they are different, make no check mark on that line.

In the example above, the two numbers are different in the first pair, so you would make no check; the second pair of numbers are identical, so you would check that line.

Do not turn over this page until the instructor tells you to.

b) Problems

If both numbers of the pair are exactly alike, check the line between the numbers. If the numbers are different, leave the line blank.

5614	5613	9061	9461
422	420	56701023980	5670123890
9625481	9625481	585	585
30417766	30412766	1134766	1134766
4830236	4830236	764854346036	764845346056
3174928046	3174926246	671008	671008
5013791	5015791	2398933508	2398933508
832108	832108	86992	86992
94113726833	94113726833	976298133349	976298133349
6514	65114	1589	1589
2198640384	2198640384	3072859074	3072839074
70335	70335	88964	88894
148911345531	148911345531	58897583856	5889758385
401	401	22789301	22789301
862351248	862351248	478	478
339876246012	339876246012	5627101	5527201
523344	523444	583876079	583876079
210538766	210357866	243	243
194302115453	194302115453	16656214824	16656214884
32840	32840	6939198	6938198
67217109	6727109	9405494419	9405945519
425213	425213	6897	6897
174964928240	174964928240	65037352	65037332
76281	76182	1656005355	1656053455
2542201119	254220119	9027334	9027334
4257196	4357186	229388753	229388753
161688686436	161688686436	8129	8219
20433	20343	133935	133395
167723024	167230724	12071346233	12071346233
29408633832	29408633832	748214537	748124357
3666026	3666026	3190	3190
9363	9633	903518632689	903518632689
89632226	8963226	62215	62215
862663744	852663744	14719	14719
19958423	19958423	45835941	45835941

APPENDIX D

DATA

1. List of Variables

1. Quantitative ACE score.
2. Linguistic ACE score.
3. Achievement motive score from three affiliation-related pictures. A constant of three has been added to each score to eliminate negative numbers.
4. Achievement motive score from three achievement-related pictures. A constant of three has been added.
5. Achievement motive score from six pictures. A constant of six has been added.
6. Affiliation motive score from three affiliation-related pictures.
7. Affiliation motive score from three achievement-related pictures.
8. Affiliation motive score from six pictures.
9. Number correct on arithmetic measure.
10. Total attempted on arithmetic measure.
11. Number correct on spacial perception measure. A constant of ten has been subtracted.
12. Total attempted on spacial perception measure. A constant of twenty has been subtracted.
13. Number correct on number matching measure.
14. Total attempted on number matching measure.
15. Reported recall of memory story:
 - a) "0"; no answer made to the question.
 - b) "1"; recall reported, but without indication of amount.
 - c) "2"; no recall reported.
 - d) "3"; recall for one minute or less reported.
 - e) "4"; recall for about two minutes reported.
 - f) "5"; recall for more than two minutes reported.

2. Data

a) Achievement-Orientation Condition, Group Administration

S	Sec- tion	<u>Variable</u>														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
529	A	46	76	01	17	18	01	02	03	32	32	48	40	42	42	3
530	A	64	92	00	13	13	02	00	02	67	69	91	82	65	65	3
535	A	39	60	00	07	07	04	00	04	42	45	40	40	56	56	3
545	A	57	93	06	08	14	04	02	06	56	61	27	36	42	42	3
546	A	45	61	00	16	16	05	00	05	34	34	50	43	59	59	2
550	A	43	71	04	08	12	00	00	00	33	40	33	40	46	48	2
551	A	40	56	01	06	07	00	00	00	46	52	51	46	47	48	2
570	A	53	85	04	03	07	01	00	01	41	44	45	41	48	48	2
574	A	43	69	00	08	08	03	00	03	33	37	31	29	33	35	2
518	F	46	57	04	15	19	03	00	03	45	47	77	72	46	48	2
526	F	49	91	08	11	19	00	00	00	31	32	50	40	48	48	4
528	F	57	65	04	13	17	00	04	04	63	65	58	53	38	40	3
531	F	51	60	08	08	16	00	00	00	30	32	56	46	43	43	3
537	F	58	72	00	09	09	08	03	11	72	74	90	82	56	56	2
547	F	50	99	04	12	16	00	01	01	56	65	09	13	34	34	2
548	F	37	80	03	06	09	02	00	02	49	55	31	58	56	56	2
552	F	39	82	03	06	09	03	00	03	29	34	29	40	39	39	2
579	F	56	92	01	04	05	00	00	00	54	59	55	52	56	56	2
594	F	40	79	05	06	11	01	05	06	61	63	28	18	49	49	2
595	F	44	67	00	09	09	02	00	02	33	33	08	10	46	48	2
596	F	48	99	08	03	11	00	00	00	35	41	71	70	40	43	2
517	C	40	60	02	12	14	02	00	02	22	29	06	16	33	35	3
519	C	37	54	05	15	20	00	00	00	25	33	31	27	40	41	2
522	C	61	82	03	14	17	04	00	04	34	39	41	41	69	70	3
536	C	65	71	00	11	11	01	00	01	64	68	57	48	52	52	2
540	C	40	55	07	14	21	00	00	00	33	33	32	24	48	48	2
543	C	50	95	07	18	25	00	00	00	55	61	38	42	55	56	3
544	C	43	72	03	09	12	01	00	01	33	35	10	28	34	34	2
549	C	49	80	03	06	09	01	00	01	25	27	69	64	43	48	2
598	C	58	67	00	07	07	02	00	02	44	50	48	40	55	56	2
527	S	50	79	01	11	12	04	00	04	55	61	77	72	47	48	2
533	S	50	64	01	12	13	03	00	03	43	44	65	58	48	48	3
597	S	57	84	01	04	05	01	02	03	46	52	05	10	51	51	3
599	S	35	88	00	07	07	00	00	00	30	36	50	63	42	43	2
513	T	46	56	00	11	11	00	00	00	48	54	10	16	63	65	2
514	T	52	88	09	11	20	00	02	02	51	59	24	16	37	40	2
515	T	56	73	06	08	14	00	00	00	45	49	29	28	25	26	3
525	T	49	83	00	12	12	01	00	01	41	42	44	40	29	29	3
534	T	44	61	00	13	13	07	00	07	48	49	22	18	47	48	3
538	T	45	59	01	03	04	06	00	06	37	47	31	40	48	51	2
539	T	37	58	06	06	12	00	00	00	31	40	41	38	46	48	2
566	T	54	58	06	14	20	00	00	00	35	36	83	73	66	66	2
567	T	55	77	01	14	15	00	00	00	62	67	03	22	66	66	2
568	T	41	70	05	07	12	02	00	02	54	61	20	28	46	48	5
572	T	51	94	00	10	10	09	01	10	27	33	29	22	43	43	0
573	T	46	69	00	11	11	06	00	06	47	54	20	22	64	65	3

b) Achievement-Orientation Condition, Individual Administration

S	Sec- tion	Variable														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
507	A	59	86	04	14	18	05	00	05	71	75	82	72	69	70	2
512	A	45	67	04	11	15	05	00	05	30	34	25	18	39	40	2
524	A	53	78	07	12	19	03	00	03	62	68	06	18	60	63	2
553	A	53	70	00	03	03	03	00	03	52	53	23	34	69	70	2
561	A	52	69	00	06	06	05	01	06	36	39	29	22	47	48	2
565	A	33	60	00	11	11	04	01	05	43	46	32	40	69	69	3
577	A	59	86	00	05	05	02	00	02	54	56	99	99	34	34	4
587	A	55	77	00	11	11	08	00	08	27	67	43	34	51	51	2
590	A	43	61	00	06	06	03	01	04	29	31	11	16	42	42	2
503	F	56	77	01	17	18	02	00	02	33	36	99	94	60	60	2
506	F	58	75	00	17	17	03	01	04	50	56	36	35	48	48	3
509	F	51	48	09	15	24	01	00	01	81	83	43	36	50	51	2
510	F	46	93	00	12	12	02	00	02	45	46	35	27	29	30	2
511	F	51	71	00	12	12	00	00	00	56	57	32	46	47	48	2
542	F	35	70	01	14	15	00	02	02	57	58	12	20	48	48	4
555	F	35	62	09	06	15	00	00	00	36	38	82	76	39	40	2
556	F	50	69	09	06	15	06	03	09	56	61	59	52	66	66	3
562	F	38	61	02	11	13	01	00	01	34	37	33	28	51	51	2
563	F	49	43	15	15	30	00	00	00	45	48	87	82	57	57	2
564	F	46	81	06	06	12	00	00	00	34	36	47	40	65	66	3
569	F	40	71	00	07	07	08	00	08	30	32	10	23	29	30	3
576	F	43	69	00	09	09	08	02	10	40	41	55	46	33	35	2
582	F	47	75	01	10	11	02	00	02	63	68	01	04	68	69	3

S	Sec- tion	Variable														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
504	C	43	64	07	13	20	04	00	04	22	28	05	00	23	25	3
508	C	46	94	03	10	13	00	00	00	34	36	06	09	43	43	2
516	C	52	75	03	09	12	00	03	03	35	39	43	35	40	40	2
520	C	56	74	01	17	18	00	00	00	61	64	53	46	40	40	3
521	C	42	84	02	10	12	01	00	01	58	62	24	32	46	48	2
523	C	43	49	02	12	14	03	00	03	45	46	91	88	48	48	3
532	C	42	40	09	15	24	00	00	00	33	38	49	40	38	38	2
541	C	39	64	00	14	14	00	00	00	05	06	44	40	34	34	2
554	C	23	62	04	09	13	00	05	05	36	40	22	34	55	56	2
559	C	66	84	00	09	09	06	00	06	88	94	78	68	56	56	2
560	C	56	66	04	07	11	01	02	03	30	32	30	22	38	38	3
581	C	58	76	01	09	10	00	00	00	45	51	12	04	60	60	3
584	C	49	79	00	11	11	12	00	12	37	41	50	40	38	38	2
586	C	65	79	00	11	11	00	00	00	40	45	61	52	52	52	3
588	C	56	99	01	08	09	00	00	00	55	56	25	16	43	44	3
589	C	51	76	01	10	11	00	00	00	36	41	99	99	59	59	3
592	C	47	81	00	03	03	00	00	00	32	38	75	65	34	34	2
593	C	43	60	00	07	07	00	00	00	29	32	67	63	35	35	2
505	S	60	80	03	10	13	00	01	01	34	35	56	46	57	59	2
557	S	35	63	05	04	09	04	04	08	41	46	23	16	43	43	2
580	S	45	67	08	03	11	00	00	00	48	48	45	35	44	44	2
585	S	41	63	01	07	08	01	00	01	52	52	35	64	39	40	3
501	T	41	55	02	18	20	04	00	04	45	46	70	79	48	48	3
502	T	52	79	07	12	19	01	00	01	50	57	99	94	56	56	2
558	T	46	69	01	08	09	00	00	00	26	29	20	28	47	48	2
571	T	58	67	04	05	09	04	01	05	43	47	50	40	44	44	3
575	T	62	71	00	06	06	03	00	03	66	74	86	82	65	65	3
578	T	48	59	00	06	06	01	00	01	35	38	65	59	56	56	2
583	T	35	62	01	01	02	00	00	00	49	53	69	63	49	49	2
591	T	47	94	01	08	09	00	00	00	55	63	45	46	54	56	2

c) Neutral Condition, Group Administration

S	Sec- tion	Variable														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
356	A	61	79	00	14	14	03	00	03	56	58	24	16	42	42	2
372	A	42	82	01	12	13	05	00	05	47	48	24	16	35	35	3
392	A	46	77	00	05	05	00	00	00	39	42	37	40	47	48	3
397	A	54	76	03	12	15	04	00	04	47	48	49	40	35	35	2
399	A	56	78	07	13	20	05	00	05	37	40	55	46	48	48	2
441	A	48	63	00	03	03	04	01	05	54	54	39	34	49	49	2
357	F	56	86	01	13	14	01	03	04	24	27	44	34	25	25	2
358	F	41	72	10	14	24	02	00	02	53	56	15	19	38	38	5
365	F	31	69	01	17	18	01	00	01	30	33	64	58	47	48	2
367	F	47	73	06	09	15	04	00	04	38	44	34	24	48	48	3
368	F	47	68	01	14	15	03	00	03	23	29	34	24	41	43	2
373	F	50	71	07	06	13	00	00	00	39	41	52	46	48	49	2
375	F	43	81	09	15	24	00	01	01	24	26	12	20	39	41	2
376	F	46	91	03	11	14	00	00	00	28	29	34	24	34	35	2
393	F	39	85	01	05	06	01	00	01	28	31	50	40	49	50	2
401	F	45	65	01	02	03	00	00	00	26	26	47	40	22	22	3
403	F	67	92	00	11	11	00	00	00	49	51	30	22	47	48	2
404	F	48	80	02	02	04	00	00	00	37	46	49	40	48	48	2
425	F	41	67	00	10	10	04	00	04	58	64	33	32	55	56	5
427	F	58	74	00	05	05	05	00	05	55	59	48	40	57	59	3
431	F	47	80	01	06	06	09	01	10	35	36	08	13	35	35	4
433	F	45	79	00	08	08	04	00	04	39	41	30	24	41	41	3
436	F	34	83	05	01	06	03	00	03	18	25	16	24	41	41	2
440	F	36	80	00	10	10	01	03	04	38	48	17	34	40	45	3
366	C	51	82	04	15	19	00	00	00	23	30	33	24	38	38	3
371	C	46	90	05	07	12	01	00	01	33	36	51	41	35	35	3
381	C	44	75	02	10	12	00	00	00	23	33	54	52	56	56	3
382	C	55	87	05	17	22	00	00	00	41	45	43	34	43	43	3
395	C	37	94	00	03	03	07	00	07	54	57	32	27	56	56	3
398	C	52	90	05	17	22	01	00	01	48	60	16	24	62	63	2
400	C	67	79	03	10	13	05	00	05	61	70	00	00	47	48	2
430	C	59	71	03	02	05	02	00	02	50	52	30	22	34	34	2
432	C	43	69	00	11	11	03	00	03	30	33	28	34	33	34	2
437	C	51	99	01	01	02	03	01	04	45	47	30	53	48	48	3
379	S	49	86	00	13	13	02	00	02	16	20	86	76	42	42	2
394	S	32	54	00	07	07	00	00	00	26	29	17	34	55	56	3
434	S	34	78	00	03	03	04	00	04	19	24	00	00	34	34	2
435	T	44	64	04	06	10	01	00	01	22	27	43	34	21	21	2
369	T	39	74	00	14	14	01	00	01	45	50	14	24	51	52	3
370	T	41	86	09	13	22	02	00	02	64	66	46	75	62	63	2
374	T	54	94	04	12	16	02	01	03	50	50	26	24	56	56	3
380	T	53	59	09	07	16	02	00	02	21	25	25	16	37	38	3
402	T	44	87	00	11	11	03	00	03	22	25	31	24	42	43	3
411	T	31	63	05	18	23	00	00	00	26	39	49	41	45	45	3
438	T	48	74	03	04	07	00	05	05	26	31	73	64	51	51	2
439	T	45	88	00	11	11	04	00	04	27	29	03	24	46	48	2

d) Neutral Condition, Individual Administration

S	Sec- tion	Variable														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
352	A	49	91	00	08	08	01	01	02	43	48	28	22	50	51	2
362	A	56	79	01	13	14	07	03	10	35	36	32	27	34	34	3
363	A	62	89	00	13	13	06	00	06	69	71	33	28	40	40	3
384	A	48	62	01	16	17	00	00	00	41	44	64	58	59	60	2
386	A	48	77	00	12	12	05	00	05	21	22	09	18	34	35	2
410	A	45	76	01	06	07	00	00	00	31	32	08	18	59	60	2
353	F	58	76	02	16	18	00	00	00	72	79	55	46	42	42	4
355	F	31	69	01	13	14	07	00	07	18	19	10	15	35	35	3
364	F	55	74	01	17	18	00	00	00	76	76	41	32	48	48	3
377	F	43	68	07	11	18	01	01	02	43	46	30	32	59	66	2
378	F	48	72	05	11	16	02	06	08	40	48	--	--	35	35	4
389	F	59	73	00	05	05	02	02	04	35	39	47	40	47	48	2
396	F	59	60	10	15	25	00	00	00	43	49	22	34	60	60	3
407	F	61	88	01	10	11	05	00	05	65	69	50	40	47	48	3
409	F	44	62	05	05	10	00	00	00	36	37	44	34	38	38	3
412	F	44	71	01	09	10	01	00	01	36	48	14	28	56	56	1
413	F	55	91	00	10	10	01	00	01	37	39	22	17	42	42	2
416	F	40	60	06	16	22	00	00	00	37	39	14	19	64	66	2
442	F	45	67	00	07	07	05	00	05	39	40	33	58	50	51	2
458	F	27	51	03	09	12	05	00	05	45	48	06	07	25	26	2
354	C	38	61	04	14	18	00	00	00	36	42	24	22	53	56	4
359	C	36	49	11	08	19	00	00	00	40	43	16	20	38	38	3
360	C	37	54	05	11	16	02	00	02	25	28	10	15	27	29	2
361	C	54	76	10	02	12	00	01	01	36	38	74	64	56	56	2
383	C	51	57	06	11	17	00	00	00	55	56	10	22	56	56	2
387	C	47	67	02	09	11	04	01	05	54	56	85	20	38	38	1
390	C	50	98	03	06	09	00	03	03	28	37	09	16	33	34	3
408	C	57	69	01	07	08	06	00	06	39	42	34	25	43	44	3
414	C	41	59	03	06	09	02	00	02	51	54	09	17	43	43	2
415	C	49	72	01	11	12	03	02	05	64	72	52	46	56	56	2
417	C	44	65	01	06	07	02	00	02	25	28	41	34	56	56	0
418	C	44	82	04	10	14	02	00	02	46	46	27	48	60	63	3
420	C	45	52	01	04	05	00	00	00	51	54	53	52	38	41	3
422	C	54	83	00	06	06	05	00	05	45	46	59	52	36	37	3
424	C	66	67	04	06	10	08	03	11	49	51	98	89	54	56	2
443	C	34	74	01	05	06	02	00	02	29	30	--	--	48	48	2
459	C	42	45	01	12	13	01	00	01	25	28	33	58	32	34	3
460	C	68	97	05	19	24	02	00	02	39	43	58	48	40	41	3
391	S	35	34	01	07	08	00	00	00	35	38	52	82	47	48	3
421	S	29	73	02	04	06	00	01	01	16	18	17	13	28	29	3
444	S	43	56	01	08	09	02	04	06	38	40	38	34	49	51	3
351	T	62	79	08	09	17	02	00	02	32	35	50	40	44	44	3
385	T	42	57	00	15	15	01	00	01	58	60	20	35	41	41	4
388	T	56	68	01	06	07	00	00	00	48	49	48	40	43	43	3
405	T	49	87	00	12	12	09	00	09	27	35	67	63	40	40	3
406	T	58	73	01	11	12	00	00	00	47	48	58	52	69	70	5
419	T	53	82	02	06	08	03	00	03	67	69	36	28	42	42	3
423	T	30	57	00	08	08	00	00	00	27	33	32	52	35	35	2
426	T	51	69	00	07	07	01	00	01	48	52	90	82	58	59	9
429	T	33	66	01	04	05	04	00	04	43	46	20	34	47	48	3

e) Relaxed-Affiliation, Group Administration

S	Sec- tion	Variable														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
252	C			04	14	18	01	00	01	36	38	35	28	54	56	2
255	C			01	05	06	00	00	00	25	30	45	36	39	41	2
260	C			00	02	02	02	00	02	15	22	42	34	43	43	2
272	C			01	03	04	01	00	01	43	47	58	52	42	43	1
273	C			04	06	10	01	02	03	44	55	13	27	59	59	3
274	C			00	10	10	02	00	02	23	29	42	40	48	48	2
277	C			01	05	06	01	00	01	16	18	44	40	43	44	2
281	C			04	12	16	02	00	02	54	61	58	52	69	70	3
291	C			04	12	16	01	00	01	58	64	15	10	47	49	3
295	C			01	03	04	02	00	02	22	31	22	16	55	56	2
297	C			00	06	06	01	00	01	35	43	18	24	51	51	3
299	C			00	04	04	03	00	03	45	47	47	40	41	41	3
302	C			05	08	13	05	00	05	65	69	49	40	41	43	2
304	C			07	12	19	06	00	06	65	68	43	34	58	58	3
306	C			01	09	10	04	00	04	21	29	06	22	38	38	2
309	C			02	10	12	00	01	01	51	57	08	16	56	56	2
310	C			00	02	02	05	00	05	58	60	50	46	59	59	3
311	C			01	04	05	01	00	01	26	27	54	55	43	43	2
265	S			00	03	03	01	00	01	42	45	36	32	44	44	3
270	S			03	10	13	00	00	00	12	13	16	10	47	48	2
271	S			09	06	15	02	01	03	48	53	49	40	48	52	2
279	S			05	02	07	00	00	00	18	24	40	34	56	56	3
251	T			00	04	04	07	00	07	35	41	22	52	47	48	2
258	T			05	11	16	01	00	01	56	67	26	24	48	49	3
259	T			00	13	13	07	00	07	35	37	26	16	29	29	2
266	T			01	07	08	00	00	00	49	55	08	16	35	35	3
267	T			00	11	11	00	00	00	16	21	82	76	47	48	3
292	T			03	15	18	05	00	05	21	30	03	13	48	48	2
296	T			01	12	13	02	01	03	22	31	62	53	33	34	3
300	T			01	06	07	00	00	00	36	39	23	16	48	48	3
307	T			00	07	07	02	00	02	30	30	37	27	59	59	2
313	T			04	06	10	01	00	01	34	35	60	52	59	59	2

S	Sec- tion	<u>Variable</u>														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
254	A			00	10	10	02	00	02	35	39	71	63	55	56	2
257	A			00	10	10	00	00	00	23	26	13	16	32	34	2
275	A			05	08	13	07	00	07	43	47	56	48	48	50	2
280	A			05	07	12	02	00	02	60	64	34	24	48	51	2
286	A			04	10	14	00	00	00	34	37	23	40	30	30	2
290	A			06	08	14	04	01	05	48	49	43	34	38	40	3
293	A			00	11	11	00	00	00	31	44	81	82	54	54	2
298	A			04	11	15	01	00	01	49	50	38	28	58	60	2
305	A			01	02	03	00	03	03	29	34	17	22	38	38	2
312	A			07	13	20	01	00	01	35	36	10	10	47	48	3
253	F			01	09	10	04	05	09	17	19	35	28	37	38	3
256	F			07	11	18	06	00	06	40	43	18	22	43	43	3
261	F			04	06	10	03	00	03	17	18	06	13	29	29	2
262	F			00	03	03	03	00	03	29	32	67	58	51	53	1
263	F			06	02	08	01	02	03	40	46	52	53	48	48	3
264	F			03	10	13	00	00	00	25	30	54	46	30	30	3
268	F			08	07	15	02	01	03	26	31	48	46	35	35	3
269	F			05	06	11	00	00	00	35	39	61	52	44	46	2
276	F			00	04	04	00	00	00	18	25	23	43	35	35	2
278	F			00	08	08	04	00	04	59	59	50	40	34	34	3
282	F			01	06	07	04	00	04	37	38	49	40	40	40	3
283	F			07	15	22	00	00	00	34	42	44	52	48	48	2
284	F			04	10	14	04	00	04	41	41	48	40	33	34	2
285	F			00	10	10	01	00	01	46	47	38	29	48	48	2
288	F			09	16	25	00	01	01	50	53	34	24	40	41	3
289	F			04	07	11	03	00	03	38	48	40	40	62	63	2
294	F			09	10	19	06	04	10	42	46	22	16	42	42	2
301	F			02	07	09	02	00	02	34	40	47	40	49	51	3
303	F			00	04	04	06	00	06	51	53	68	58	41	41	2
308	F			00	11	11	02	00	02	69	69	04	04	38	38	3
314	F			00	08	08	02	04	06	28	30	37	34	45	48	3