To the Graduate Council:

I am submitting herewith a dissertation written by Henry M. Frechette, Jr. entitled "An Exploration of the Utility of Normative-Ipsative Scores for Predicting Absenteeism." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Industrial and Organizational Psychology.

John M. Larsen, Jr., Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

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Graduate Studies and Research

AN EXPLORATION OF THE UTILITY OF NORMATIVE-IPSATIVE SCORES FOR PREDICTING ABSENTEEISM

A Dissertation

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Degree

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ABSTRACT

The utility of normative-ipsative scores and the relationship between absenteeism and attitudinal and biodata type variables were investigated. Eighty-two workers at all levels of the organization completed the questionnaire. For each subject, attendance information was collected for a period of six months before and six months after the questionnaire had been completed. This information included not only the frequency and the duration of absence, but also whether the absence was voluntary or involuntary. These absence measures were used as the dependent variables.

The background and attitudinal variables were combined to correspond to Steers and Rhodes' (1978) conceptual model of absenteeism. The major factors were: (1) a personal characteristic or background factor, (2) a job situation or extrinsic factor, and (3) a job expectation or intrinsic factor. These factors were entered into a multiple regression equation twice to predict various types of absences. On one occasion the factors were entered as normative scores, while on the second occasion they were entered as normative-ipsative scores. The results were compared. There were not significant differences between the two types of scores. There were, however, differences in the intercorrelation matrices between the two type of scores. Previous research had suggested that the existence of negative correlations in the normative-ipsative matrice could be interpreted meaningfully. This was the case here. Using normative-ipsative scores the intercorrelations coefficient of

the MSQ indicated that the extrinsic variables were antagonistically related to the intrinsic variables. This is opposite to the conclusions reached from the normative matrix. Interestingly, it is consistent with the findings of Deci's (1975) work on intrinsic motivation.

The second purpose in the study was to explore Steers and Rhodes (1978) conceptual process model of absenteeism. The model states that a distinction should be made between voluntary and involuntary absence. This was confirmed. Voluntary absence could be adequately predicted by the model while involuntary absence could not. This distinction has been overlooked in previous research and may account for some of the conflicting results in the literature. The results emphasize the importance of motivation theory in understanding attendance behavior.

We ask how we can find the men whose mental qualities make them the best fitted for the work which they have to do; secondly, under what psychological conditions we can secure the greatest and most satisfactory output from every man; and finally how we can produce most completely the influences on human minds which are desired in the interests of business. In other words, we ask how to find the best possible work, and how to secure the best possible effects.

Hugo Munsterberg, 1913

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CHAPTER I

INTRODUCTION

Several years ago, Dr. Milton Blood (1973) resurrected the issue of ipsative scores as an appropriate means of measuring human motivation in work settings. His basic tenet was that "persons respond to their work situation according to their personal hierarchy of work rewards rather than responding to the absolute level of one dimension without regard to other rewards" (p. 2). Therefore, he concluded that it is more meaningful to measure differences among dimensions within the individual than to measure differences between individuals. Ipsative techniques provide the means to measure these intraindividual dimensions.

Blood (1973) provides an example which clarifies the above distinction. Suppose that by using normative measure we find that Fred Familyman is a very motivated person. He has scored high on all of our motivation dimensions. Mike Moneyman, on the other hand, has scored towards the middle on most of the scales. We decide to implement an incentive program which rewards overtime with large financial bonuses. We expect Fred to put in more extra time than Mike since Fred's score on the pay motivation scale was higher than Mike's. Surprisingly, the opposite occurs. It is Mike who puts in the extra time. The important information to make an accurate prediction was not provided by the normative measure. Fred was high on the money motivation scale relative to the group but money was low when compared to his other scores. We

had no idea that money was not Fred's top priority. Ipsative scores may have been able to provide us with that information.

Another example again illustrates the difference in information provided by the two types of measures.

> Knowing that your work force is more motivated by challenging work than are workers in another plant may be less useful for predicting reactions to a job enrichment program than in knowing that they are motivated more by challenging work than they are by increased job security. (Blood, 1973, p. 2-3)

The normative measure is providing information concerning the relative degree an individual has on some particular trait in comparison to the sample, while the ipsative score is expressing the relative priorities among traits within the individual.

In essence, Blood is suggesting that normative measures may actually be masking useful information about the individual because the normative scores are based on the population groups' performance, not the individual's. This idea is not new (Freeman, 1934; Stern, 1935) but its importance and usefulness has been essentially ignored. Here we investigated the utility of using ipsative scoring transformations in conjunction with traditional normative measures.

General Statement of the Problem

The appropriateness and utility of using a specific type of partially-ipsative score in an organizational setting were investigated in this study. The term ipsative was suggested by Cattell (1944) for situations where each score of an individual is dependent on his own scores on other variables but is independent and, in fact, not comparable

with scores of other individuals. Cattell (1944) distinguishes between the properties of ipsative measures and absolute measures. Absolute measures are scores which are statistically independent of other scores of the individual being measured.

There are two types of absolute measures. For the first, the interactive measure, raw scores are utilized. These units are independent of other scores of the individual and are independent of other individuals' scores. It is apparent that this type of score is relatively meaningless in conveying information about the individual. However, when the interactive scores are scaled within the population so that the raw units may be interpreted as being relatively high or low, a second type of absolute measure is realized; this is the normative score. Normative measurement yields units such that the individuals' scores are statistically dependent on other individuals' scores in the population or sample, and independent of other scores of the individual. Examples of normative measurements are percentile scores and standardized scores. To summarize, absolute measures (1) yield estimates of the absolute levels of the variables assessed, (2) yield interindividual score differences on each variable measured, (3) provide a separate scale for each variable and (4) distribute the scores on each scale about a population mean.

In comparison, ipsative measures yield (1) estimates which are relative to the level of the other variables being assessed, (2) intra-individual score differences among the several variables being assessed and (3) individuals' scores on scales of these variables are distributed about the individuals' mean. Interestingly, Dahlkes and Dana (1963)

discussed the possibility of making both interindividual and intraindividual comparisons using interactive measures. This can be done if identical raw score units are used in all comparisons. Also normative measures, while being preferred for interindividual comparisons, can be utilized for intraindividual assessment. An alternative procedure for intraindividual comparison using absolute scores "involves rescaling each individual's normative or interactive score so as to make them relative to his own mean over all variables investigated" (Hicks, 1970, p. 168). The result of rescaling a normative measure in this manner, that is ipsatively, is called a normative-ipsative measure (Cattell, 1944).

Purpose

It is the purpose of this investigation to acquaint the reader with the fundamental properties of ipsative and partially-ipsative scores, and to see how well the partially-ipsative score works in a predictive situation. Arguments are presented for the rationale of using these scores in lieu of the traditional normative measures. Particular emphasis is placed on the normative-ipsative transformation, a type of partially-ipsative score developed by Broverman (1961).

Specifically the goals in the study were twofold: (1) to test the properties of normative-ipsative scores, and (2) to investigate a conceptual model of absenteeism proposed by Steers and Rhodes (1978). The study was designed (1) to compare the predictive efficiency of a measure when scored normatively and when scored normative-ipsatively, and (2) to compare the process information which the measure yields when

scored normatively and normative-ipsatively. The vehicle for making these comparisons was the Minnesota Satisfaction Questionnaire (MSQ).

The second purpose of the study was to explore Steers and Rhodes (1978) conceptual model of absenteeism. Data were collected to correspond with each factor in the model. Stepwise regression analysis was used to investigate the relationship among these variables, and to see how well the model predicted absenteeism.

CHAPTER II

ASSUMPTIONS OF IPSATIVE AND NORMATIVE MEASUREMENT

To understand why partially-ipsative (normative-ipsative) scores are being considered as a means of predicting human performance and measuring individual differences, one must first undersatnd the underlying assumptions of normative and partially-ipsative measures.

The normative orientation assumes that "behaviors of individuals are ordered on dimensions which transcend the individual, i.e., the behavior of a given individual is only a point or mark on the normative scale" (Broverman, 1962, p. 295). Individual differences in behavior are due solely to traits which all members of the population possess, but possess in varying degrees. Spearman (1927), for example, hypothesized that individual differences in intelligence simply reflect the different amounts of "mental energy" possessed by each individual. Intraindividual variation, as part of a normative trait, is not considered in a normative orientation measurement. Imperfect correlations between many manifestations of the same normative trait are explained by assuming (a) that the observed behaviors of the trait are phenotypically complex manifestations of two or more underlying genotypical normative traits and/or (b) that part of the imperfection is due to measurement error (Broverman, 1962). In other words, normative dimensions are treated as internally undifferentiated variables whose variation occurs across individuals.

The ipsative orientation maintains that each individual is a universe within which variations of behavior occur. Accordingly, the different behaviors of the individual may be ordered on comparable scales within the individual. These scales may be thought of as habit strengths (Broverman, 1962) or motives (Cattell, 1944) of the individual. Observed behavior is a function of the interaction between these ipsative scales, i.e., the highest ranking scale will determine the behavior. It follows that ipsative measurements are concerned with quantifying relationships between psychic functions within the individual.

In addition to quantifying intraindividual variations, the ipsative orientation assumes that rules which govern psychic events may be generalized to all people. Examples of this are found in Spearman's theory of intelligence, Hull's and Thorndike's learning models, and Lewin's theory of personality cited in Broverman (1962). These theories are based on normative measures but they assume that behavior is a function of the relationships between psychological events occurring within the individual. For instance, as alluded to previously, Spearman (1927) maintained that differences in intelligence were due to varying amounts of a single factor, mental energy, but his theory also contains formulations about intraindividual relationships between subfunctions of intelligence. In other words, this theory and many other psychological theories are comprised of both normative and ipsative characteristics. The appropriate metric to measure differences should account for both elements. It is suggested that the normative-ipsative transformation, a partially-ipsative deviation score, can account for both elements.

It is interesting to note that the vernacular of individual difference measurement does not make a distinction between interindividual and intraindividual differences when, in fact, the difference is a useful one. Commonly, individual difference studies are expressed in normative terms, i.e., differences are thought of only in terms of degree (Anastasi and Foley, 1949). This obscures any possibility that some interindividual differences are based on varying intraindividual or ipsative relationships. To illustrate the distinction, Broverman (1962) provided the example cited below. In ipsative terms, a psychoanalyst

> might argue that the differences between psychotics and normals are due to intra psychic relationships between ego and id. On the other hand, individual differences stemming from differing ipsative relationships can be placed on normative scales, e.g., the above analyst might also say that one patient is more or less psychotic than the other. (p. 298)

The example illustrates how normative measures can ignore individual differences in subdomains of normative traits. If one appreciates the contribution of the normative-ipsative approach, i.e., that scores may reflect both normative and ipsative sources of variation, then not only does the normative orientation become inadequate but so does the pure ipsative methodology, which overlooks interindividual differences. Each orientation omits some element of the available data. This argument is reminiscent of Meehl's (1954) nomothetic-idiographic synthesis. The omission by either model ultimately leads to increased error terms and possibly to inappropriate conclusions concerning the data.

An excellent example of this type of confounding is provided by correlational analysis. Suppose that you wish to investigate the correlations among several tasks. To do this, you administer each task to each subject in the sample and correlate the scores. The results would resemble the hypothetical data presented by Broverman (1962) in Tables 1 and 2. In Table 2, the correlations range from .69 to .93. By traditional correlation standards, these scores represent the relationship between task performance. However, from the previous discussion, you know that these correlations are a function of two sources of variation: (a) normative differences between individuals in general ability levels and (b) within individual ipsative variations in abilities on different tasks. The coefficients depicted in Table 2 are confounded resultants of these two variation sources. The problem is to separate these two confounds, i.e., to determine what the relationships are between abilities and task when differences in general ability between subjects are held constant. Partial-ipsatization of performance scores appears to do that. If the scores are expressed partially-ipsatively; as deviations from the subject's mean level of performance, all subjects will have the same status with respect to the new reference norms (the subjects' average performance). In other words, normative effects between subjects will have geen removed; Broverman, 1962, p. 301 (see Table 3) depicts the deviation scores calculated from Table 1, and depicts the intercorrelations of those scores (see Table 4). Interestingly, some of the coefficients are now negative. This table is considerably different from Table 2 and would obviously alter any conclusions to be made about the data.

TABLE 1

BROVERMAN'S HYPOTHETICAL PERFORMANCE DATA
STANDARDIZED SCORES

Subject	Test 1	Test 2	Test 3	Test 4	Mean Standard Score
1	67	62	58	55	60.5
2	62	67	55	58	60.5
3	58	55	62	67	60.5
4	55	58	67	62	60.5
5	53	51	49	47	50.0
6	51	53	47	49	50.0
7	49	47	51	53	50.0
8	47	49	53	51	50.0
9	45	42	38	33	39.5
10	42	45	33	38	39.5
11	38	33	42	45	39.5
12	33	38	45	42	39.5

Source: Broverman, "Normative and Ipsative Measurement in Psychology," Psychological Review, 1962, 69, p. 300.

TABLE 2

INTERCORRELATION OF BROVERMAN'S HYPOTHETICAL TESTS

Test	Test 2	Test 3	Test 4
Test 1	.93	.69	.69
Test 2		.69	.69
Test 3			.93
Test 4			

Source: Broverman, "Normative and Ipsative Measurement in Psychology," Psychological Review, 1962, 69, p. 300.

TABLE 3

BROVERMAN'S HYPOTHETICAL PERFORMANCE DATA TRANSFORMED INTO IPSATIVE SCORES
$(X_i - \bar{X}_i)$

Subject	Test 1	Test 2	Test 3	Test 4
1	6.5	1.5	-2.5	-5.5
2	1.5	6.5	-5.5	-2.5
3	-2.5	-5.5	1.5	6.5
4	-5.5	-2.5	6.5	1.5
5	3.0	1.0	-1.0	-3.0
6	1.0	3.0	-3.0	-1.0
7	-1.0	-3.0	1.0	3.0
8	-3.0	-1.0	3.0	1.0
9	5.5	2.5	-1.5	-6.5
10	2.5	5.5	-6.5	-1.5
11	-1.5	-6.5	2.5	5.5
12	-6.5	-1.5	5.5	2.5

Source: Broverman, "Normative and Ipsative Measurement in Psychology," Psychological Review, 1962, 69, p. 301.

TABLE 4

INTERCORRELATIONS OF IPSATIVE SCORES BASED ON BROVERMAN'S HYPOTHETICAL DATA

Test	Test 2	Test 3	Test 4
Test 1	58	-79	79
Test 2		-79	79
Test 3			58

Source: Broverman, "Normative and Ipsative Measurement in Psychology," Psychological Review, 1962, 69, p. 301.

Broverman's (1962) examples dramatically illustrate the lack of sensitivity correlational analysis has toward the distinction of between and within behavior of individuals. But there is another point to be drawn from the example. Table 4 contains several large negative coefficients while Table 2 has only positive correlations. Broverman reports a similar finding in his investigation of intraindividual variation of cognitive styles (1960). These negative correlations may have important implications for theories of individual differences. Usually theorists have

> interpreted the occurrence of normative group factors defined exclusively by positively loading tests as an indication that intrapsychic organization consists of a number of independent dimensions on which subjects differ only by being more or less proficient. (Broverman, 1961, p. 78)

However, the occurrence of both positive and negative factor loadings with the normative-ipsative scores suggests that particular abilities or traits may be antagonistically related within the individual. An increase in one segment of abilities apparently inhibits the level of another class of abilities. Cattell and Baggaley (1956) and Seveney (1959) have interpreted this directional aspect of ipsative scores as an indicator of motive strength. Broverman (1961) refers to this doubly defined factor as a "choice point" (p. 78) in the development of the individual. During his development, the person must make decisions on the various bi-polar factors. These factors then become either dominant or subordinate influences of the individual's behaviors. These choices may be visualized as a series of forks in the road of individual development, each fork creating a choice of abandonment for one class of behaviors

in preference for the specialization of another class of behaviors. Presently there is not enough evidence to say emphatically that the negative and positive loadings can be interpreted as representing antagonistic relationships. Intuitively it is an interesting point and, assuming that the subtests are known to be construct valid, the interpretation may be true. However, if the subtests were combined mindlessly, this type interpretation would be meaningless. It should be noted that negative correlations must occur in ipsative data matrices as a function of the (1) number of variables being investigated and (2) the intercorrelations of those variables (Clemans, 1956).

The cited examples have underscored three issues concerning comparisons between normative and partially-ipsative scores. The most obvious is the differences in obtained results. Secondly, extreme differences exist in the type of inferences possible from the two techniques. Thirdly, there are certain theoretical implications stemming from the disparate data recorded using the different techniques. The research which exists indicates that generalizations made at one level do not necessarily hold at the other level (Broverman, 1960, 1961; Mandler, 1959).

Partially-Ipsative Scores and Individual Differences

In the preceding pages the assumptions underlying partially-ipsative scores were presented. The central issue regarding their utility centers on the hypothesis is that individual differences should be and can be measured in a manner which considers not only the normative or intergroup

differences, but also accounts for intraindividual or ipsative variations. Unfortunately, much of the current thought in the personality literature has polarized into two distinct and distant schools. One school hypothesizes that human behavior results only from nomothetic (general or group) laws, while the other maintains that it is idiographic (specific or individual) laws which control behavior. Each position is mutually exclusive from the other (Wiggins, 1973). However, Meehl (1954) and others have taken the position that "the general laws do not preclude uniqueness, but instead general laws describe how uniqueness comes about" (Wiggins, p. 148). This was exactly the position taken by Broverman (1962) when he suggested the use of a normative-ipsative transformation.

Specifically, Meehl (1954) states that behavioral laws are "(a) nomothetic in their form for a given group, (b) idiographic in their parameters and (c) strongly idiographic in their end terms, whic refer to response properties of the organism" (p. 64). Learning theory provides an excellent example of the above relationships. Suppose we are interested in training rats to press a bar using operant conditioning in a Skinner box. First, for any group of rats, the form of the learning curve is a smooth function. However, within that group, different acquisition rates are likely to occur for individual rats. Therefore, the group curve represents the nomothetic law while the individual acquisition rates are idiographic. The individual behaviors have established the limits of the group's learning curve (principles (a) and (b) above).

Secondly, while the experimenter has controlled the reinforcement history and other experimental conditions, the individual rat controls

the end term, that is, the bar press. It does not matter how the experimenter defined the response, there will be individual differences among the rats as to how they actually press the bar. Some rats may press harder than others, some may use their paws, while others may use their heads to press the bar. The point being that the end term is idiographic. Since the nomothetic law holds despite the idiographic laws, the individual differences are ignored.

A more germaine example is provided by the frustration aggression hypothesis (Dollard et al., 1939). While generally it may be true that aggression is a consequence of frustration, the conditions which are perceived as frustrating and the forms of the aggression will vary across individuals. Again, the nomothetic law is convenient for group predictions but it ignores the idiographic status of the individual. The diversity of situations in which the frustration aggression relationship may occur is ignored, as well as those situations where the relationship does not hold. The idiographic law must be considered either a component of nomothetic laws or an exception to them (Wiggins, p. 150).

Meehl (1954) incorporates idiographic laws into a model of clinical prediction. He stresses intraindividual comparisons as well as interindividual comparisons. In essence, the group pattern establishes a context beyond which the idiographic law or uniqueness of the individual carries him. This process parallels the reasoning behind Broverman's (1962) method of calculating normative-ipsative scores. The score utilizes a normative or group baseline but, beyond that, are found

intraindividual response patterns; patterns which may be masked by normative measures, but which may be able to provide insights into individual behavior.

Tyler (1974) also urges the use of intraindividual differences in her pluralistic model of individual differences. Tyler insists that a measure will have little predictive potential unless the context of the trait in question is known. For example, a measure of anxiety will have little predictive validity unless the examiner is familiar with the subject's changes in mood over time and is aware of the situations which do and do not arouse anxiety in the subject. Awareness of context results from realizing that each individual is ultimately a collection of many different selves or roles. One might visualize this as the individual playing the father role with his children, the husband role with his wife, the businessman role at the office. Each role has different behaviors. From a different perspective, each of those roles is determined by a combination of many abilities, many motivational directions, and many different styles. It is the interactions of these three characteristics that form the pluralistic model of individual differences (Tyler, 1974).

It is also the interaction of these characteristics that restricts the limit of correlations of testing scores across time. Each situation calls for a reordering of these characteristics resulting in varying behavior. Obviously, outside of the testing situation, the variability increases with the variance of the environment.

The pluralistic approach to individuality emphasizes the idea of the measurements of states instead of traits. Each individual has a range of scores or behaviors which characterize one, not a single point. Also, for situations which are perceived as trivial, fluctuations in behavior may be due to chance, but in important situations behavior probably results from a priority order system. These priorities may be shaped from experience and heredity. As the individual develops, some actions become incompatible with others. Only a relatively few actions can exist at one time. For traits to be useful in predicting behavior, the priorities must be measured. It is crucial to know "what he does first and if that doesn't work, what he does second" (Tyler, p. 16). There is evidence that while behavior changes over time, personality characteristics remain stable.

> There is a kind of consistency besides the simple persistence of the same characteristics from one age level to another. A personality characteristic clearly identified at one level may be related to something quite different at the next level. (Escalona, 1968 as cited by Tyler, p. 197).

Iscoe and Garden (cited by Tyler, 1974) provided evidence which suggests that while the characteristics remain the same, their relationships to one another change across time. Tyler (1974) refers to these persistent personality characteristics as "experience patterns" (p. 197). It is these intraindividual patterns, these priority systems, which need to be measured.

In summary, Tyler (1974) views the individual as having a great number of possibilities for development. Diverse as these possibilities are, the choices are limited by time. Within the limits set by the

heredity/environment interaction of previous development and within the constraints of the current situation, an individual has some choice about his future behavior. Individuality stems from the unique repertoire of psychological patterns gained through development rather than a single unified pattern. The repertoires are organized into priority systems. Any given individual usually displays a great deal of consistency within his priority system (Schwebel, 1970). In other words, behavior can probably be more accurately understood and predicted by knowing the individual's priority system. Tyler (1974) concludes by stating that these priority systems should be susceptible to measurement: "what seems to be needed . . . are some new concepts, some new ways of analyzing development" (p. 197). Instruments such as the Kuder and SVIB provide some of the information, but do not go far enough (Tyler, 1974). It is interesting to note that the two instruments singled out by Tyler are partially-ipsative measures since mathematically they meet some but not all of the requirements of ipsative measures (Kuder, 1956; Strong et al., 1966). Again, we see a need for both interindividual and intra-individual measures. Additionally, Tyler's priority concept closely parallels Broverman's (1962) interpretation of antagonistic traits or choice points.

To conclude, there are numerous psychologists who believe that group data are not sufficient for the study of individual differences and human performance. The trend is toward an amalgamation of inter-individual and intraindividual comparisons and away from the mutually exclusive idea of behavior resulting from either nomothetic laws or

idiographic laws. Also there is some evidence that a relatively stable system of priorities may exist in each individual which, to a great extent, determines behavior (Mischel, 1968; Endler and Magnusson, 1975). This priority system parallels the antagonist point discussed by Broverman (1961, 1962).

It should be noted that the previous discussion assumes that the study of traits itself is a valid approach to studying human behavior. The reader may be aware of the criticism that trait theorists have undergone from the interactionists who insist that a taxonomy of situations is the appropriate path to take for increased performance predictions (Mischel, 1969). While the situation does play an important role, the key to interactionism is the individual's perception of the situation (Bem and Allen, unpublished manuscript). This would indicate a need for accurate measurement of the traits, priority systems, or whatever, which may influence the individual's perception. In short, a taxonomy of situations is probably useful in gaining an understanding of behavior but traits still play an important role. Dunnette (1976) summarized the current situation nicely. He stated that for him, measurement of human attributes is the keystone to programs relating to personnel administration and utilization. Despite the contribution of trait theory, it must be expanded to account for some situational variance (Stagme, 1973; Bowers, 1973). Yet, in the final analysis, it is the personal dispositions, or the traits

> which increase the relative probabilities of particular situations being chosen or avoided by particular persons who, in turn, determine the nature of the reinforcing or aversive qualities of those situations. (p. 469)

The question still to be answered is whether or not partially-ipsative scores are the appropriate metric to handle this fusion of nomothetic and idiographic laws. The following pages report the few empirical endeavors which address the question.

Empirical Evidence

There is a void in the psychological literature concerning the use of partially-ipsative scores. Broverman (1960) used partially-ipsative measures to demonstrate that significant differences in performances of subjects using different cognitive styles may be demonstrated in neutral as well as in stressful conditions using intraindividual comparisons. Previous research, relying on inter-individual differences had indicated performance differences only in the stressful conditions. Broverman (1960) explained his finding by stating that "significant ipsative score differences between criterion groups do not necessarily imply or require similar differences in raw scores" (p. 242). As an example, two groups of subjects may have identical distributions of general ability levels but performances on a specific task on one group may consistently deviate positively from each subject's general level of ability, while performances in the other group may have consistently negative deviations on that specific task. In this situation, two observations can be made: (1) the mean levels of group performance will be identical for the two groups and (2) the raw scores on the task may not show significant group differences since there may still be considerable overlap in the distributions of the task scores

in each group. Only the direction of the ipsative deviations themselves would be able to distinguish the two groups. The "relationship between group differences expressed in raw versus partially-ipsative scores is a function of the amount of overlap in the general levels of ability of the subjects composing each group, and the extend and directions of the ipsative deviations" (Broverman, 1960).

The Broverman study (1960) raised some interesting points concerning the use of partially-ipsative scores. First, it is alarming to realize that the usual normative methodology used to investigate cognitive styles does not reveal apparently important patterns of intraindividual consistency. In fact, interindividual differences in ability appear to mask these consistencies. Broverman's (1960) results emphasize Stern's (1935) earlier conviction that the appropriate technique for personality oriented research is to use the individual himself as a frame of reference rather than others. Secondly, studies which have assumed equality among groups based on raw scores may be in error. Broverman's (1960) study illustrated that groups with equal raw scores reflected a significant ipsative score difference. Therefore, the groups were not really equated on performance. Confounds of this type may be reducing the accuracy of measurement in hundreds of studies. One can only wonder at the difference partially-ipsative scoring methodology might make on existing theories of abilities.

There have been two studies reported which suggest the applied utility of ipsative techniques (Hughes, 1960; Hughes and Dodd, 1961). In the first study, Hughes (1960) found that the highest personality

traits in the Gordon Personality Profile (GPP) based on partially-ipsative scores were related significantly to the performance of sales trainees in a sales training class, while the normative trait scores showed no relationship. In a second related study, the effectiveness of the same partially-ipsative and normative measures in predicting actual sales performance was studied (Hughes and Dodd, 1961). As expected, using the ipsative measures, one of the GPP scales successfully differentiated between the high and low performers. The normative measure was not at all useful in making distinctions. Additionally, the ipsative scores yielded a useful personality profile for the extremely successful performers.

In Hughes and Dodd's (1961) discussion, the authors conclude that

> an ipsative scoring method for scoring the GPP has some promise as a predictor of the criterion of sales performance used in this study. This was contrary to the negative results obtained for the normative method by which the GPP is usually scored. (p. 353).

The authors contend that the superior performance by the ipsative method was probably a result of controlling response bias due to social favorability. A response bias would influence the height of the individual trait scores profile on the GPP, but ipsatization would minimize the effect by accounting for the magnitude of all scores in the profile. The authors believe that ipsative scores may provide new insights into selection, training and on-the-job performance predictions.

The studies cited do not make an overwhelming case for the use of partially-ipsative scores. One study dealt with cognitive differences, while the other two studies could be more accurately described as one

study with two measurements since they used the same subjects on both trials. Despite the lack of studies, the results do suggest further investigation into the utility of the methodology.

CHAPTER III

PROPERTIES OF IPSATIVE MEASURES

The more important properties of ipsative scores are presented below. To facilitate the understanding of the ipsative transformation, comparisons between raw score, standard score, and ipsative score matrices are provided.

Appendix A contains an exhaustive list of ipsative score properties compiled by Clemans (1956) and Radcliffe (1963). The mathematical derivations of these properties are beyond the scope of this paper. The interested reader is referred to Clemans (1956), Radcliffe (1963), or Hicks (1970). Appendix B provides a listing of various techniques which can be used to make a test purely or partially-ipsative.

Ipsative Scores

> Any score matrix is said to be ipsative when the sums of the scores obtained over the attributes measured for each respondent is constant. (Clemans, 1956, 1966; Tucker, 1956; Humphreys, 1957; Radcliffe, 1963 as cited by Hicks, 1970, p. 169).

In other words, purely ipsative measures yield a mean assessed across all attributes, this mean being the same for each individual. The Edwards Personality Profile (Edwards, 1954) is one example of a measure constructed to be purely ipsative.

A more restricted definition is provided by Cattell (1957) who suggested that the term "ipsative" be used only for ipsative standard scores. He believed that ipsative raw scores should never be used.

If interindividual comparisons of attribute rank orders are to be made from the score, this would be true. However, standardizing the raw ipsative score may alter the intraindividual rank orders. Also, as discussed below, there are some different mathematical properties for the raw and standardized ipsative score (Radcliffe, 1963). In this paper the less restricted defition of ipsative measures was used.

Tables 5, 6, 7, 8, and 9 (Clemans, 1956, pp. 5-9) illustrated the effects of ipsatization on a data matrix which facilitates the understanding of the effects and interpretation of the ipsative transformations. In Table 5 can be seen the raw score data matrix of ten subjects measured on three attributes. Any set of scores can be made ipsative by simply adding an appropriate constant to the measure of each attribute for each subject so that the sum of the scores for each individual is a constant. However, barring that the units have been standardized, the resulting scores will be meaningless.

Table 6 depicts the primary data matrix transformed into T-scores with a mean of 50 and a standard deviation of 10. The formula for this transformation is:

where,

$$T = tr + u$$

$$t = {}^{x-\bar{x}}/_{s}$$

and,

x = raw score

s = the standard duration

σ = 10, and

u = 50 .

TABLE 5

CLEMANS' HYPOTHETICAL DATA; PRIMARY MATRIX OF RAW SCORES

Entity	Attribute I	II	III
1	700	3.8	34
2	600	4.0	33
3	650	3.6	31
4	550	3.1	22
5	400	2.8	12
6	500	2.2	33
7	450	2.8	15
8	350	2.7	11
9	300	2.5	6
10	500	2.5	14
M	500	3.1	20
σ	129.10	.54	9.98

Source: Clemans, "An Analytical and Empirical Examination of Some Properties of Ipsative Measures," Psychometric Monographs, 1966, 14, p. 5.

TABLE 6

STANDARD SCORES OF CLEMANS' HYPOTHETICAL DATA

Entity	Attribute I	II	III	Σ
1	65	63	64	192
2	58	67	63	188
3	62	59	61	182
4	54	50	52	154
5	42	44	42	128
6	50	52	52	154
7	46	44	45	135
8	38	43	41	122
9	35	39	36	110
10	50	39	44	133
M	50	50	50	
σ	10.0	10.0	10.0	

Source: Clemans, "An Analytical and Empirical Examination of Some Properties of Ipsative Measures," Psychometric Monographs, 1966, 14, p. 6.

TABLE 7

IPSATIVE SCORES OBTAINED BY TRANSFORMING THE THREE ATTRIBUTE MEASURES IN TABLE 5

	Ipsative Scores			
	Attribute			
	I	II	III	Σ
1	34.3	32.3	33.3	99.9
2	28.7	37.7	33.7	100.1
3	34.7	31.7	33.7	100.1
4	35.3	31.3	33.3	99.9
5	32.7	34.7	32.7	100.1
6	32.0	34.0	34.0	100.0
7	34.3	32.3	33.3	99.9
8	30.7	35.7	33.7	100.1
9	31.7	35.7	32.7	100.1
10	39.0	28.0	33.0	100.0
M	33.34	33.34	33.34	
σ	2.85	2.79	.44	

Source: Clemans, "An Analytical and Empirical Examination of Some Properties of Ipsative Measures," Psychometric Monographs, 1966, 14, p. 5.

TABLE 8

IPSATIVE STANDARD SCORES OBTAINED BY TRANSFORMING THE THREE ATTRIBUTE MEASURES IN TABLE 5

	Ipsative-Standard Scores		
	Attribute		
	I	II	III
	53	46	49
	34	66	58
	55	44	58
	57	43	49
	48	55	35
	45	52	65
	53	46	49
	41	58	58
	44	58	35
	70	31	42
M	50.0	49.9	49.8
σ	10.0	9.9	10.2

Source: Clemans, "An Analytical and Empirical Examination of Some Properties of Ipsative Measures," Psychometric Monographs, 1966, 14, p. 8.

TABLE 9

FIVE TYPES OF ATTRIBUTE SCORES FOR TWO SUBJECTS CALCULATED FROM CLEMANS' HYPOTHETICAL DATA

Scores	S	Attribute I	II	III
Raw	2	600	4.0	33
	10	500	2.5	14
Standard		58	67	63
		50	39	44
Ipsative	2	28.7	37.7	33.7
	10	39.0	28.0	33.0
Ipsative Standard		34	66	58
		70	31	42
Normative-Ipsative	2	-4.67	4.33	.33
	10	5.67	-5.33	-.33

Source: Clemans, "An Analytical and Empirical Examination of Some Properties of Ipsative Measures," Psychometric Monographs, 1966, 14, p. 9.

This simple transformation actually results in loss of some information from the raw score matrix because in probability, real differences between standard deviation of tests do exist (Thomson, 1951). However, the information in Table 6 is more immediate. The relationships among column scores remain unchanged from Table 5, page 28, but the row relationships have changed so that differences between row scores now have some meaning with respect to how the individual ranks in the group. For example, from looking at only row 10, we can determine what entity 10 is at the mean on attribute I, and about a standard deviation below the group mean on attribute II. It is meaningful to say that with respect to the group, his score on attribute I is higher than it is on attribute II. We could not determine this by looking only at row 10 in Table 5, page 28.

When interest is only in the information contained in the rows and the information lost from the columns is inconsequential, the data can be transformed into ipsative scores (Table 7). The ipsative score matrix stresses intraindividual differences and changes the interindividual differences from the standard score matrix. The scores in Table 7 were obrained by adding a constant to the entries in each row such that the scores for each individual sum to 100. The constant is determined by first summing the row of standard scores, then subtracting from these totals 100 and dividing that difference by the number of variables being studied—in this example, three, i.e., T-C where $C = {}^{(\varepsilon T-100)}/_{3}$. Note that the attribute means are identical. This must be true if the scores prior to ipsatizing had identical means. Interestingly, the standard deviations are not equal nor do they appear related to those listed in

in Table 6, page 29. This is true because the transformation has made every score in a particular column dependent on all of the other scores in the row. Ordinarily a score has no dependency on the other raw scores. Since the pattern of row scores is different for each individual, each score in a column must be affected differently. The relationship between column scores has actually been altered. This accounts for the change in the standard deviation.

The relative strengths of the individual attribute when compared with others can be obtained by ranking the ipsative scores, if the means and variances of the attributes are equated prior to ipsatizing. That is, the ipsative scores for a given attribute can be transofrmed into standard scores by column providing a ranking of the attribute scores across individuals. To calculate the ipsative standard scores shown in Table 8, the following formula was used:

a. $t^* = {}^{x^* - \bar{x}}/_{s^*}$; $x^* = T - {}^{(T-100)}/_{3}$

b. $T = t^* r + u$; $r = 10$ and $u = 5$

$= (x^* - \bar{x})\ ({}^{10}/_{s^*}) + u$

It should be noted that if the means and variances of the attributes were not equated prior to ipsatization, the rank ordering would have no meaning. But if the variances were equated prior to ipsatizing and the means are still different, it is possible to determine the rank ordering of the relative strength of an individual's score.

> However, under these circumstances, it is absolutely essential to transform the ipsative scores into deviation units for each attribute before the relative values or strengths of an

> individual's score, in relation to each other, can be determined. The results obtained under these conditions will be identical to those that would have been obtained had the means been equated prior to ipsatizing. (Clemans, 1956, p. 7)

The reader will see later that this is the technique Broverman (1961, 1962) used. Also, if the standardization group for a given scale that gives ipsative scores directly yields unequal means, then the above deviation transformation, not standard scores, must be made before the individual scores can be ranked. Finally, if the row score variances underlying the ipsative scores are unequal, then the resulting scores are impossible to interpret and no transformation will restore the lost information (Clemans, 1956).

Effects on Interpretation Due to Ipsatizing

In Table 9 are comparative scores of two subjects across the four types of scores presented. Each transformation yields a somewhat different interpretation. The interpretations for subjects 2 and 10 for each matrix are presented below.

There is no difficulty in determining which individual scores higher on a given attribute in the raw score matrix. It is not so obvious as to whether their scores are located above or below the mean, or whether the distance between scores is the same on each attribute. Since scale locations are unknown, there is no way of comparing scores of an individual on different attributes. Does individual 10 rank higher on attribute II or III?

The standard score makes it possible to determine which individual scores higher on an attribute, and where on the scale the score is

located with respect to some group. Also, the individual's scores on different attributes can be compared with respect to the groups. For example, individual 10 has scored higher on attribute I than he has on attribute III.

Transforming the scores into ipsative units obliterates the comparisons between individuals on a single attribute because each attribute score has become dependent on the other scores. Comparisons are limited to ranks. The raw and standard score indicate that for subjects 2 and 10, subject 2 possesses more of attribute I than subject 10. The order is reversed when the scores are ipsatized. This occurs because individual 2's scores on attributes II and III are higher than his score on attribute I, while the opposite is true for individual 10. This occurs because the row totals must equal a constant which implies that an increase on one scale must result in an equivalent decrease on one or more of the remaining scales. The result is that the ranking of subject 2's score on attribute I, relative to his other scores, is lower than the relative ranking of attribute scores for individual 10. The intraindividual comparisons remain unchanged in this transformation.

The ipsative standardized transformation permits the comparison of an individual's ranking on an attribute with the ranking of others but can make intraindividual comparisons difficult. This type of comparison is especially problematic when the variances of the ipsative scores are unequal.

To summarize the various effects of the transformations, Clemans (1956) says to consider column comparisons as interindividual comparisons and row comparisons as intraindividual comparisons.

When raw units are used, column comparisons are meaningful, but row comparisons are not. With standard scores, both column and row comparisons are appropriate and score locations are obvious. In ipsative units, row comparisons are straight forward, but column comparisons can only be made in terms of rank, not absolute strength. Finally when scores are transformed into ipsative standardized units, both row and column comparisons are meaningless in terms of absolute strengths of the attributes. However, comparisons of rankings, both inter and intra-individually, can be made.

Clemans (1956) and Radcliffe (1963) provided a very detailed empirical investigation of ipsative scores. Their major conclusions concerning the properties of ipsative scores are presented in Appendix A. Mathematical proofs can be found in Clemans (1956) or in a somewhat simpler form in Radcliffe (1963).

Partially-Ipsative Scores

There are many examples of measures which do not meet the rigid criteria of pure ipsatization but which, nevertheless, share some communality with measures that do. The Kuder Preference Record-Vocational (Kuder, 1956) and Strong Vocational Interest Blank (Strong, 1959) are examples of measures developed in conjunction with ipsative properties (Appendix B) but which are not purely ipsative. For example, their summed attributes may vary over a certain range instead of being equivalent, and the item format may only approximate the criterion for ipsativity. These measures often meet a more lenient criterion expressed by Guilford (1952) and Cattell (1944) which states that:

> Any test is ipsative which produces intraindividual assessment of variables of a type such that a score elevation on one attribute necessarily produces a score depression on other variables. (Cited by Hicks, 1970, p. 170)

Instruments which meet this less stringent criterion for ipsativity have been labeled partially-ipsative measures. Presumably, partially-ipsative measures possess ipsative properties as some inverse function of their total score variability (Hicks, 1970).

There have been only a few studies completed in which partially-ipsative measured were investigated. These studies were aimed at determining the empirical validity of such measures. The earliest reported studies were done by Strong (1943, 1959). In his studies of vocational interests, he found that the procedure of forcing choices on partially-ipsative measures occasionally produced high predictive validities. A stronger test of this conclusion was provided by Gordon (1951). Gordon compared partially-ipsative items to interactive items of the same general type and reported superior validities for the partially-ipsative items on personality test items. Unfortunately, he failed to assess the effects of variation in item content between the two types of formats. A later study did control for effects in variation between the two types of items (Perry, 1955). The results confirmed Gordon's (1951) findings. The partially-ipsative format was able to differentiate different interest groups and satisfaction groups somewhat better than the interactive format. Perry used the Navy Vocational Interest Inventory. More recently, Hughes (1960) and Hughes and Dodd (1961) have reported greater predictive validities with the

Gordon Personal Profile (GPP) and salesmen when the GPP is scored ipsatively as opposed to interactively. The format of the GPP makes the scores partially-ipsative, not ipsative as reported. The evidence suggests that under certain conditions, an optimal level of partial-ipsatization may produce a fairly high degree of predictive validity. There is evidence that beyond a particular point, partial-ipsatization may diminish this effect (Maier, 1975, cited by Hicks). Maier used a 30 variable prediction battery containing SVIB scores and a second 30 variable battery containing KPR-V scores for purposes of differential academic prediction. He found that the SVIB battery contributed more to the prediction efficiency than did the KPR-V battery. While there are several alternative interpretations for this result, one possibility could be that the SVIB is less ipsative than the KPR-V.

To summarize, there are some studies which indicate higher validities for partially-ipsative measures than for interactive or absolute measures. Also, there is some evidence that validity increases as an inverse function of the degree of ipsativity present in the score matrix. At this point, there has not been enough research done with partially-ipsative scores to say emphatically that this occurs.

Table 10 used the same data which has been used in the other tables. The table illustrates one example of a partial-ipsative score matrix. While there are many techniques for obtaining partially-ipsative scores, none appear to have the potential for psychological measurement as the method developed by Broverman (Hicks, 1970). His technique provides both inter and intraindividual information. Hicks (1970) in his review says:

TABLE 10

NORMATIVE IPSATIVE SCORES CALCULATED FROM CLEMANS' HYPOTHETICAL DATA

Subject	Attributes I	II	III	Row Σ/N	T/n
1	1	-1	.0	.0	64
2	-4.67	4.33	.33	-.01	62.67
3	1.33	-1.67	.33	-.01	60.67
4	2.0	-2.0	.0	.0	52
5	-0.67	1.33	-.67	-.01	42.67
6	-1.33	.67	.67	.02	51.33
7	1.0	-1.0	.0	.0	45
8	-2.67	2.33	.33	-.01	40.67
9	-1.67	2.33	-.67	-.02	36.67
10	5.67	-5.33	-.33	.01	44.33
MEAN	.00	-.00	-.00	.03*	50.01
Std.	2.86	2.77	.45		9.73

*Difference from zero due to rounding error.

> It is quite likely that normative-ipsative measurement procedures will prove extremely useful. However, many measures that are widely utilized lack this normative baseline and, therefore, could not convey the kind of information which Broverman's method demands. (p. 169)

To calculate the normative-ipsative matrix, scores from Cleman's (1956) primary data matrix (X) were transformed into standard scores (See Table 7, page 30).

$$T = t\,\sigma + u\ ; = {}^{x-\bar{x}}/_{s}$$

The next step required summing the attributes for each individual (see Table 10, ${}^{T}/_{n}$) and dividing that total by the number of attributes. studies; three.

$$\Sigma T/3$$

This score is the individual normative rank standing on all attributes. In other words, it represents the individual's mean level of performance or ipsative norm. Finally, the ipsative norm was subtracted from each of the standard scores.

$$T - {}^{\Sigma T}/_{3}$$

The remainders represent ipsative scores. They are normative (Broverman, 1962). It can be seen that Table 10 maintains the identical relationships illustrated by the ipsative score matrix (Table 6, page 29). This is not accidental. Studies investigating the mathematical properties of ipsative and partially-ipsative scores indicate that they are the same[1] (Clemans, 1955, 1966; Radcliffe, 1963).

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[1]The properties are the same only when the partial-ipsative score is deviational. The relation does not hold for ordinal partial-ipsative scores because column variances and covariances are not linear transformations of their known normative equivalents. However, many generalizations hold for both types of scores. (Hicks, 1970)

Clemans (1956, 1966) and Radcliffe (1963), using both empirical data and illustrative data, reported the following properties to be true:

1. The sums of the columns or rows of an ipsative covariance matrix must equal zero (for deviation scores by columns).

2. In the case where ipsative variances are equal, the sums of the columns or rows of the ipsative intercorrelation matrices are equal to zero (for deviation scores by columns).

3. When ipsative variances are equal, the average intercorrelation will take its limiting value, $-1/(N-1)$, where N is the number of variables in the test.

4. The sum of the covariance terms obtained between a specified criterion and a set of ipsative scores is zero.

5. When ipsative variances are equal, the sum of the ipsative validity coefficients is zero.
(Cited in Hicks, 1970, p. 172)

Without going into detail, it should be noted that calculations based on these properties make it possible to quantify ipsativity by measuring the deviations from the stated properties (Hicks, 1970). Ace and Weiss (1967) have developed a complex formulation for reducing and quantifying the amount of ipsatization in a measure. This is useful since empirical investigations suggest that prediction validity is an inverse function of the degree of ipsatization.

Clemans (1966) and Tucker (1956) have noted that because of the first three properties, there is a large proportion of negative values in the ipsative intercorrelation matrix. Clemans demonstrated that the proportion of negative values fluctuates as a joint function of the number of variables examined and the variability of the original intercorrelations. Specifically, when the nonipsative variables are

orthogonal, or are correlated to some constant degree, the ipsative intercorrelations will all be a negative constant value determined only by the number of variables in the measure. Additionally, when the column sums of the preipsative intercorrelation matrix are equal and the off-diagonal correlations are distributed normally, the proportion of negative values in the ipsative intercorrelation matrix can be determined from tabled values of the normal curve. This makes it relatively simple to estimate the number of negative values appearing in the ipsative intercorrelation matrix. Again, this knowledge provides a means of quantifying the degree of ipsatization existing in a measure. Perhaps of greater importance are the effects these restrictions have on the amount of predictive information.

Clemans (1966) and Radcliffe (1963) have demonstrated that ipsatization of normative scores produces a removal either partially or completely of first centroid variance. Only when the interaction validity coefficients sum to zero will no information be lost through ipsatization. If the sum of the normative column variance is negative, however, there is a gain in the validity coefficient because the first centroid acts as suppressor variance, and its removal purifies the predictor (Radcliffe, 1963). To summarize, pure ipsatization generally results in a decrease in predictive efficiency (Hicks, 1970; Clemans, 1969). However, empirical research suggests that some optimal degree of ipsatization may increase predictive efficiency of a measure beyond that obtained from absolute scores.

At this point, it may be beneficial to further explore and review the nature of the normative-ipsative score (Broverman, 1961, 1962). The

score may be categorized as a partially-ipsative deviation score. It is calculated using absolute scores. Because the scores are deviation scores, meaningful interpretations can be made from the matrices without having equal variances or means in the raw scores matrix (Clemans, 1956). The appeal of the particular transformation is its ability to discriminate between the normative and ipsative aspects of the data; that is, variance due to normative differences between individuals in general ability levels and variance due to within individual ipsative differences in abilities between tasks. Normative variance occurs when some subjects tend to generally be above the mean, while others are generally below the mean. If task performances are expressed as ipsative scores or deviations from each subject's own mean level of performance, then all subjects will have the same status with respect to their new reference norm. In other words, the sum of deviations above the mean will equal the sum of deviations below the individual mean. Therefore, the normative differences existing between subjects has been removed. Correlations performed on the ipsative scores will now indicate differences due solely to within individual variation on the tasks. These correlations are free from the influence of general ability levels between subjects. As Table 11 illustrates, the correlations between the standard scores and the normative-ipsative scores are quite different. While the negative values are to be expected and, in fact, can be predicted, Clemans (1956) and Broverman (1961, 1962) suspect that they should be interpreted as representing incompatible traits within the individual. There is too little research to assume that this hypothesis is correct.

TABLE 11

INTERCORRELATION MATRICES OF THE STANDARD AND NORMATIVE-IPSATIVE SCORES BASED ON CLEMANS' HYPOTHETICAL DATA

	Standard Scores				Normative-Ipsative Scores		
	Attributes				Attributes		
	I	II	III		I	II	III
I	1.00	.84	.95	I	1.00	-.96	-.27
II	-	1.00	.96	II	-	1.00	.13
III	-	-	1.00	III	-	-	1.00

Interpreting the normative-ipsative score matrix (Table 10, page 40) is relatively straight forward and informative. Except in the special case where attribute variances of the ipsative scores are equal, only row comparisons are valid, just as is the case for ipsative scores (Table 6, page 29). At a glance it is immediately obvious on which attributes the individual scores high and on which he scores low, relative to his own general ability level (T/n), or ipsative normative score. In other words, these scores reflect the individual differences on the attributes, based on the individual's general performance ability. Also, the individual's ipsative norm is directly comparable to other individual's ipsative norms to obtain rankings. The table can be thought of as reflecting the idiographic laws (deviation scores) which determine the parameters of the nomothetic laws (differences between ipsative norm comparisons) suggested by Meehl (1954).

It is interesting to directly compare the differences in available information between the normative-ipsative matrix and the standard score matrix. As mentioned earlier, it is possible to make both row and column comparisons using standard scores. The location of the score with respect to the group is readily apparent. The normative-ipsative matrix does not have that ability. Absolute differences cannot be made; only relative distances are available. However, comparisons of the individual's overall rank standing in the group is immediately obvious and is absolute. Additionally, relative row comparisons are available, ranking the attribute with respect to the individual's performance, not the group's performance. It is believed that by using the deviation scores available

through the normative-ipsative transformation, predictive validity may be increased. Also, there may be some practical implications from this data. These are discussed in the next chapter.

CHAPTER IV

RESEARCH QUESTIONS AND PROCEDURES

The preceding chapters have emphasized the paucity of empirical research directed towards ipsative scores. The overriding purpose of this investigation is to determine the utility of these scores. Specifically these questions require answers:

1. Can normative-ipsative scores increase the predictive efficiency of a measure significantly above the coefficient derived from the use of normative scores?; and

2. Can normative-ipsative measures improve our understanding of the processes involved in a particular relationship beyond that obtainable from normative scores?

Focusing on the first question, it is argued that normative-ipsative scores can significantly increase the predictive validity of a measure when used appropriately. It has been suggested that normative measures do not effectively deal with intraindividual variations (Broverman, 1962). Rather, normative measures assume that behavior is caused by traits or variables possessed by everyone, but in varying amounts. Only interindividual variation is considered. This omission must lead to an increase in error variance. Ipsative measures have a similar flaw. The individual is seen as a universe within which variations of behavior occur. Behavior is a result of different traits or variables interacting with each other. The ipsative orientation maintains that the rules governing the interaction of these traits are generalizable to all people. Unfortunately, the ipsative scores of one person are not directly comparable to another since the scales for the traits vary

across individuals. Only intraindividual variations are dealt with. Again the omission of part of the available data must lead to increased error variance. The normative-ipsative transformation apparently incorporates both elements of behavior reducing the error variance normally found.

The strength of this particular transformation rests on the fact that it begins with normative considerations. A given subject would have a distribution of normative ranks across a test battery. The mean of these normative ranks represents the subject's ipsative mean, i.e., his average level of performance across the scale. Deviations of the individual's normative ranking from the ipsative norm represent ipsative scores. These scores are in units of deviations of group standings on the various scales or tasks from the individuals average group standing. In other words the ipsative score has first been centered around the group norm and then centered around the individual's mean. The net effect of the transformation is a score which accounts for both inter and intraindividual variation, and theoretically, a reduction in unexplained variation.

To date, only one study (Hughes and Dodd, 1961) has been published which explores the first question. Hughes and Dodd (1961) using a transformation similar to that described here were able to increase predictive efficiency of a personality measure predicting salesmen's performance. In addition, indirect evidence that this transformation may improve predictive coefficients is provided by the research of Strong (1943, 1959), Gordon (1951), and Perry (1955). They reported

that partial ipsatization of a measure seems to increase the measurer's validity. Hicks (1970) corrobated this in his review of the literature. He concluded that there was an apparent optimal level of ipsatization which would increase the validity of a measure, but at this time the evidence was too scanty to be positive. It should be emphasized that this evidence is indirect, since it deals with ipsatization based on actual test form. The research has not dealt with ipsatization based on a statistical transformation. However, both formats converge in terms of the final product; the partially-ipsative score. Both techniques have the same mathematical principles in the final score matrix.

While the idea of explaining behavior in terms of normative and ipsative properties has existed for a long time, little research has actually been directed to investigating how the two properties interface. Can the use of this transformation give us insights into behavior which previously have been masked by the parameters of normative measurement? Broverman (1960, 1961, 1962) and Mandler (1959) think so. They maintain that negative correlations found in a correlation matrix should be interpreted as representing conflicting attributes within the individual. This interpretation leads to a greater understanding of the process underlying the observed behavior. The argument fits well with the evidence presented in Chapter II insofar as there probably are conflicting attributes which interact to form patterns which determine overt behavior.

Practically speaking there are some problems inherent with Broverman's and Mandler's interpretations of the matrix. First, the

interpretation necessarily requires that the test be content and construct valid. This is a problem inherent any time scores are being combined. The calculation of the scores makes no claims about the scales being transformed. One could just as easily combine scales dealing with intelligence, verbal and mathematical ability as they could intelligence, shoe size, and eye color. Obviously it would be meaningless to interpret a negative correlation between eye color and foot size as being antagonistic traits. Secondly, the number of negative correlations in the matrix is a mathematical function predicted by knowing the number of variables investigated and the intercorrelations of those variables (Clemans, 1956; Hicks, 1970). Apparently at least 50% of the correlations will be negative. These restrictions do not make Broverman's interpretation technique wrong. Rather they make clear the importance of effective test construction. For example, it is not uncommon for items or scales in an instrument to have low intercorrelations, yet when combined correlate highly with the criterion. In fact to increase reliability the scales are often constructed to measure as many of the facets of the criterion as possible. This is the process used in multiple correlation to increase the multiple R (McNemar, 1969). In other words it is assumed that the criterion is multidimensional. Each scale of the measure under the conditions described is said to measure one dimension of the criterion. The result is a profile of the individual suitable for use in classification. While normative scores provide these profiles, there end results, little information is given about the relationship between the scales. One can only say that they do not correlate very highly and that a person's

score on scale A is greater than on scale B and C. While this is useful information, the interpretation can be taken one step further.

Normative-ipsative scores provide a profile of the individual's performance, but with a difference. Conclusions can apparently be made concerning the relationships between the scales. Comparisons shown in Table 11 dramatically illustrated the differences between the two sets of intercorrelations. Conclusions from the standard score matrix would indicate that the three scales are highly correlated. This is far different from the conclusions drawn from the normative-ipsative matrix. This matrix indicates that scales I and II are inversely related while scale I and III oppose each other to a lesser degree. Scales II and III do not interact with each other very much at all. There is no doubt that conclusions made from one table would be different from conclusions made from the other table. That is not the issue here, however. Instead the focus is on the questions "Can those negative values be interpreted as indicating an actual direction of relationship between scales?" and if so, "Is it beneficial knowing this information?"

In preceding chapters arguments have been made that various factors may interact with each other in negative or positive fashions. An example from the Minnesota Satisfaction Questionnaire (MSQ) may help to focus this argument. The intercorrelations of the MSQ scales provided in the manual (Weiss et al., 1967) indicate that all of the scales are overlapping to some extent. For nondisabled workers the interrelation is a low of .20 between compensation and social service to a high of .77 between achievement and ability utilization. This would lead one to assume that the elements measuring satisfaction with ability

utilization are similar to those measuring satisfaction with achievement. Similarly those elements measuring satisfaction with compensation have little to do with those measuring satisfaction with social services. Little else can be said about the relationship. If these scores were converted into a normative-ipsative matrix quite possibly a directional relationship could be revealed. It seems that ability utilization and achievement would still exhibit a positive relationship since, intuitively, one leads to the other. If you can use your competencies you will probably feel that you are achieving something. At the other extreme, satisfaction with pay and the amount of work done could inhibit satisfaction with the opportunity to help others. For example, if money is important to a person he may have little time to devote to social services and visa versa. An increase on one scale would result in a decrese in another. Be that as it may, does knowing the directional relationships, the process, of the behavior have any practical significance?

The answer is yes, the most obvious application being in classification. The goal in classification is to make as precise a differentiation as possible among the different categories for each individual. This is done by measuring profiles. By understanding how the different variables interact we should be able to differentiate between the individuals better than is now possible. In a sense, the transformation results in weighting the individual's scores, giving insight into the effects of increasing the scores on one scale at the expense of the other scale. This would permit an easier analysis of a cost to benefit ratio in classifying individuals for a particular opening. For example, if one knows that scale I and II are positively related to each other,

and scale III is moderately negatively related to both of them, one can predict what will happen if one chooses to raise the requirement scores for scale I. It would be predicted that scale II would also become higher while scale III would become smaller. Knowing this type of relationship allows the practitioner to fine tune the requirement for the position. He can make decisions concerning the optimal scale scores used, knowing that an increase on one scale will effect the entire profile in a predictable manner.

Therefore, the use of this transformation could benefit the testing professions. First, because the error term could be reduced, and second, because a greater understanding of the process underlying the behavior will be available. This in turn should make it easier to classify people for placement or any other application where the individual is the focus. Intuitively the transformation is neat. As in many theories of behavior, the user of this transformation must accept the idea that these relationships between variables are relatively stable across time. The biggest issue, common to most all testing situations, is whether or not a given test battery is constructed carefully enough to justify an interpretation of antagonistic variables.

What remains to be discussed is a vehicle for exploring these two questions. Steers and Rhodes' (1978) conceptual model of absenteeism seemed an appropriate choice--first because it was predictive in nature instead of correlational. This would allow a comparison to be made between a regression equation using normative scores, and an equation using normative-ipsative scores. Second, the majority of variables in the

model could be measured by the Minnesota Satisfaction Questionnaire. This was important because it enabled comparisons to be made on an instrument whose psychometric properties were well known. It should also be added that the model has not been tested. There were no empirical reasons to state which variables would account for the most variance in the model. This situation raises a third research question:

> How do the variables in the model influence (a) frequency and (b) duration of absence?

To summarize, the study is directed towards exploring the similarities and differences between normative and normative-ipsative scores using an untested predictive model of absenteeism as the vehicle. At the same time, the usefulness of the absentee model will be explored.

Instruments and Method

Instruments. The long form of the Minnesota Satisfaction Questionnaire (MSQ 1967) was the instrument selected to compare the normative and normative-ipsative score. Because of its frequency of use, it has well established psychometric properties. In addition, the scales parallel the job situation and job expectation factors described in Steers and Rhodes' (1978) conceptual model. This would make the examination of the model easier.

The second part of the questionnaire was comprised of background or biodata variables. The goal here was twofold. First, the data would provide correlations with the criterion to be made. By doing this, the results would indicate if this sample was consistent with earlier

research. The second objective was to collect data for the personal characteristics factor and the pressure to attend factor included in the model (see page 59).

The remaining factor, ability to attend, was developed from company records, not the questionnaire. The records contain information which describes the reason for the absence. This allowed a judgement to be made as to whether the employee did or did not have the ability to attend. According to the model, illness and accidents, family responsibilities, and transportation problems constituted involuntary reasons for missing work. All other reasons were voluntary.

Procedure. Questionnaires were distributed to the employees by their supervisors. These forms were to be completed at home. Attached to the questionnaire was a cover letter explaining that participation was voluntary and that all responses would remain confidential. Also, a ready to mail envelope was provided to return the completed form.

Absentee information was collected from company records over a one year period. The first period was for the six months prior to the distribution of the questionnaire, and the second was for six months after the distribution. Specifically, frequency of absence, duration of absence, and reason for absence was recorded for each participant.

Stepwise regression analysis was used to determine how well absenteeism could be predicted by the two types of scores. This technique was selected since the independent variables were correlated and because there really was no a priori reason for ordering the variables (Cohen

and Cohen, 1978). The absentee model is based on correlational data only. The relative importance of each variable is unknown. The differences between multiple regression coefficients was indirectly tested by a simultaneous test (Aitkin, 1974). These procedures addressed the first and third research questions.

The second question, dealing with an increased understanding of the processes under observation, was analyzed by observing the Pearson correlation matrices for the two types of scores.

CHAPTER V

MODEL SELECTED TO TEST THE RESEARCH QUESTIONS

Rhodes (1978) conceptual model of absenteeism (see Figure 1) was selected to test the research questions. The model was based on an exhaustive review of the absentee literature. However, most absentee studies have been only correlational in nature. They generally have examined only a few variables and often used different measures of absenteeism. This model is predictive in nature and makes a distinction between different types of absenteeism. It is argued by Steers and Rhodes (1978) that this model could reduce much of the confusion existing in the literature. To date the model has not been tested.

According to the model depicted in Figure 1, absenteeism is primarily a function of the employee's motivation to attend and the employee's ability to attend. In other words, a distinction is made between voluntary and involuntary absences. Assuming that the employee has the ability to attend work, the employee's motivation to attend is the primary influence on actual attendance. Motivation, in turn, is determined by a combination of the employee's affective responses to the job situation (2) and particular internal and external pressures to attend (5). Therefore, other things being equal, if the employee likes the work environment and the task itself, the expectation would be that the employee would have a desire to come to work. Work is a rewarding or reinforcing event. According to behaviorists, people have

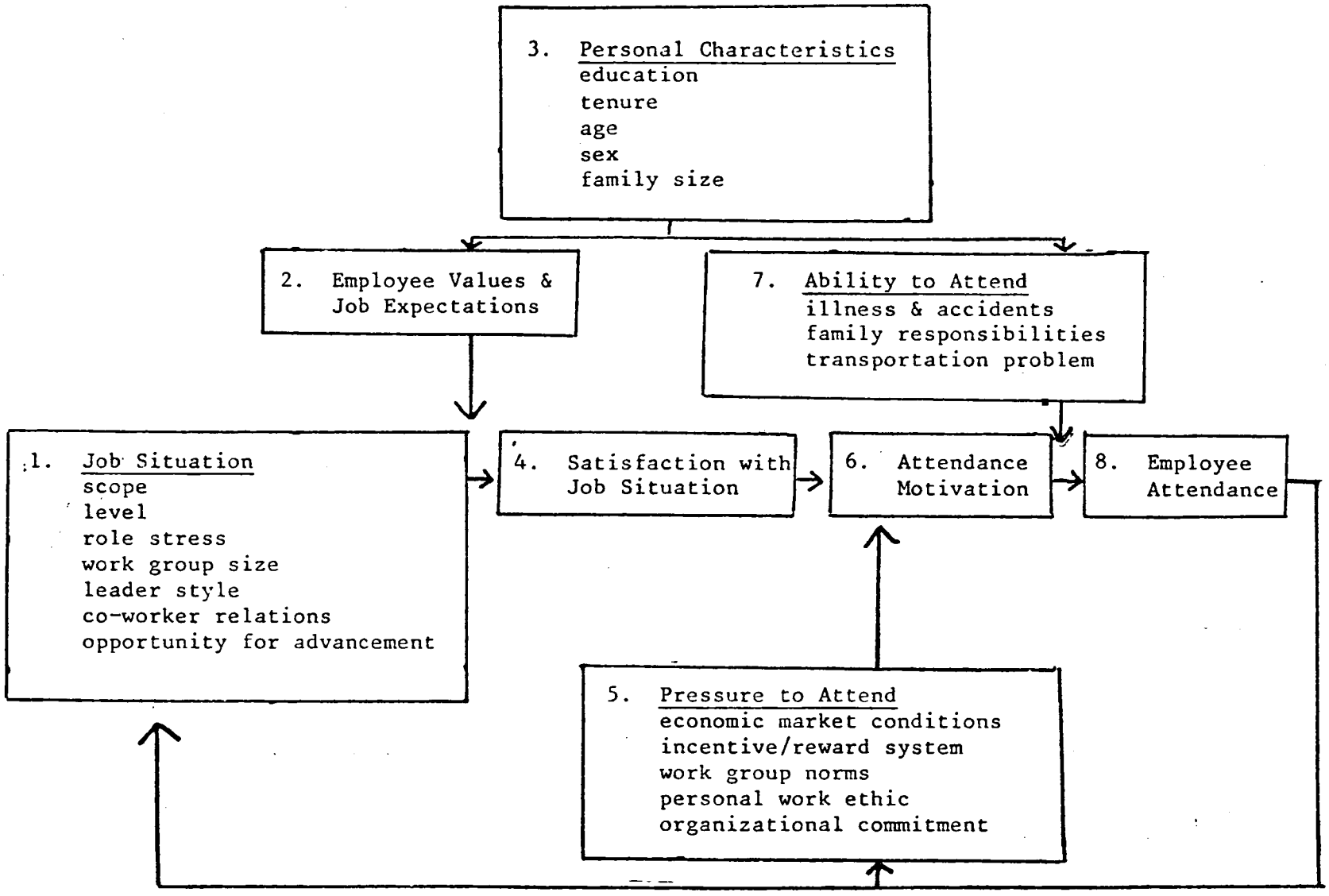


Figure 1: Major Influence on Employee Attendance (Steers and Rhodes, p. 393, 1978).

a tendency to repeat behaviors which result in rewarding outcomes; in this case the behavior is attending work.

Based on this proposition, we would expect to find consistent relationships on the variables listed under Job Situation (3) since they are directly linked to the work. Those elements which enhance satisfaction should be negatively related to absenteeism while those which reduce satisfaction should be positively related. Previous research supports this proposition and suggests that the relationship is stronger for variables related to the job content as opposed to the job context. Context variables while exhibiting a relationship to job satisfaction, have little correlation to actual absentee behavior (Steers and Rhodes, 1978).

The second group of moderators influencing attendance motivation are those variables listed under Pressure to Attend (5) (Steers and Rhodes, 1978). These variables apparently act in an additive fashion (Nicholson, 1976; Garrison and Muchinsky, 1977). The research has indicated a strong inverse relationship between attendance and economic conditions. The influence of the other four variables is inconsistent and generally weak (Steers and Rhodes, 1978).

The third set of moderators does not deal directly with attendance motivation, rather it is the individual's actual ability to attend (7). Steers and Rhodes (1978) argue that the factors listed here are all examples of involuntary reasons for not attending work. To remain consistent with this model, they are treated as such in this study. Yet it seems obvious that these categories could be heavily influenced

by the personal characteristics (3) or other factors in the model. The implication being that a two day illness might stretch to a five day illness if the attendance motivation is low. It appears to be almost an arbitrary distinction between what should be considered voluntary absence and what should be considered involuntary absences.

In summary, Steers and Rhodes (1978) have described their model as a process one, whereby a change in one factor can effect relationships elsewhere in the model. The decision to attend work is a function of influences stemming from the individual and the work environment. Some of the factors are within the control of the individual while others are not. The model suggests

> that the nature of the job situation interacts with employee values and expectations to determine satisfaction with the job situation. This satisfaction combines in an additive fashion with various pressures to attend to determine an employee's level of attendance motivation. (p. 401)

These relationships are modified by one's actual ability to attend.

It may be helpful to review the results of the absentee literature in terms of the variables utilized in the model. The studies cited are by no means exhaustive. A more complete list of absentee studies can be found in Steers and Rhodes' Technical Report (1978), in which are cited 104 studies in tabulative form.

Job Situation

Job Scope. The literature suggests a modest, but consistent relationship between absenteeism and variations in job scope. Specifically absenteeism is inversely related to perceived measures of task identity,

autonomy (Hackman and Lawler, 1971), variety (Hackman and Oldham, 1976) and responsibility (Baumgartel and Sabol, 1959).

Job Level. Apparently increased job level decreases absenteeism (Baumgartel and Sabol, 1959). This may only be due to increases in job satisfaction not simply an increase in job level (Herbiniak and Roteman, 1973).

Role Stress. Absentee rates have been found to be higher in jobs perceived as being inherently stressful (Hedges, 1973). This finding has been corroborated by others (Bernardin, 1977). Apparently increased stress and anxiety lowers an individual's satisfaction (Gadoureck, 1965).

Work Groups Size. In general increased group size increases absenteeism (Baumgartel and Sabol, 1959). However this relationship has not always been found especially when dealing with white collar workers.

Leader Style. While the work of Stogdill (1974) confirms the idea that people oriented leaders have a positive influence on job satisfaction, there apparently is no direct link between leader style and absenteeism (Steers and Rhodes, 1978).

Co-worker Relations. The pattern here is similar to that of leader styles. Vroom (1964) reports a significant relationship between co-workers and job satisfaction, but few studies exhibit a significant relationship between co-workers and attendance (Metzner and Mann, 1953; Waters and Roach, 1971, 1973).

Opportunities for Advancement. Here also the relationship is tenuous. Patchen (1960) and Smith (1977) have reported small inverse relationships, but the majority of studies suggest that promotion has no discernible effect on absenteeism (Waters and Roach, 1971; 1973; Hackman and Lawler, 1971). However, the Hackman and Lawler (1971) study does indicate that the rate of promotion does influence an employee's general job satisfaction.

In summary:

> Job content variables have a stronger influence on actual absenteeism than those that relate to job context. That is, job content variables were generally found to be related to both satisfaction and absenteeism. In contrast, job context variables, while they were consistently related to satisfaction, were seldom related to absenteeism. Hence, they would be expected to influence absenteeism only to the extent that they altered one's satisfaction with the job situation. (Steers and Rhodes, 1978, p. 396)

Employee Values and Job Expectations

Evidence concerning the impact of the employee's values and expectations is limited. Studies by Locke (1976) and Porter and Steers (1973) suggest that the link between job situation and attendance is not direct, but rather it is moderated by the values and expectations of the individual. To this end, Smith (1972) reported that realistic job previews increased satisfaction among new employees, presumably because they were able to more accurately match their values and expectations to the job situation.

Pressures to Attend

Economic and Market Conditions. The relationship here is direct. Unfavorable economic conditions make job changes difficult. Also it increases the fear of losing one's current job. Because of this, the pressure to attend is increased, and absenteeism declines. In conjunction, there is an inverse relationship between the threat of layoffs and absenteeism (Behrend, 1953).

Incentive/Reward Systems. The effect of incentive systems vary with the type of measurement employed. When measures are perceptual the results are mixed; some studies report an inverse relationship between equity of pay and absenteeism (Patchen, 1960), while others found no relationship at all (Hackman and Lawler, 1971). When actual pay rates are examined an inverse relationship is reported (Bernardin, 1977). Steers and Rhodes (1978) and Yolles et al. (1975) conclude that more evidence should be given to the actual pay rate studies than the perceived pay rate studies because of their increased rigor and consistencies.

Personal Work Ethic/Organizational Commitment. Little work has been done in the area. There is evidence that there is a wide variation between workers in their attitudes about feeling obligated to come to work. In addition these studies indicate a direct relationship between a strong work ethic and attendance (Ilgen and Hollenback, 1977). Similarly a commitment to the organization's goals increases attendance

(Steers, 1977) while competing or conflicting goals reduces attendance (Morgan and Herman, 1975).

Ability to Attend

According to this model, the ability to attend work; the difference between voluntary and involuntary absence, accounts for much of the conflicting results found in the literature. The argument for this distinction is that there are times when a person has a high motivation to attend work, but attendance behavior is not possible.

Illness and Accidents. The primary cause of absence is illness or injury (Hedges, 1973). As indicated by the model this is influenced by the personal characteristics, especially age which increases the likelihood of an accident (Baumgartel and Sabol, 1959).

Family Responsibilities. This cause of absence is also influenced by personal characteristics (age, sex, and family size). "In general, women as a group are absent more frequently than men" (Steers and Rhodes, 1978, p. 400). Interestingly, this absence rate declines over the course of their careers, while men miss increasingly more work as time goes by (Yolles et al., 1975).

Transportation. Intuitively it would make sense to assume that the further one lived from work, either in actual miles or elapsed time, the greater the rate of absence. Some studies do support this conclusion (Martin, 1971; Knox, 1961), but it is not definitive. Nicholson and Goodge (1976) found no relationship in a study of female employees.

Steers and Rhodes (1978), however, conclude that in general as difficulty in getting to work increases, attendance decreases.

The above studies are some of the ones cited by Steers and Rhodes (1978) which when combined formed their process model of absenteeism. They state that while these correlational studies are consistent with the model, they are not adequate to validate it. They suggest a need to measure the relationship of satisfaction to the various pressures to attend and the ability to attend. Tangential to studying the differences between normative and normative-ipsative scores, the relationships between the independent variables and the criterion variable, absenteeism, were examined.

CHAPTER VI

RESULTS

Dependent Variables

Because of the limited sample size only two dependent variables were used in the regression equations. These were the total frequency of absence and the total duration of absence measures. These measures are routinely used in absentee research. Total frequency of absence refers to the number of times an individual missed work regardless of how long the absence period was and regardless of the reason for the missed work (mean frequency = 2.2 days). The total duration measure indicated the length of each absence (mean duration = 5.3 days). Other dependent measures were also recorded to investigate Steers' and Rhodes' (1978) contention that a distinction between voluntary and involuntary reasons for absence is important to the understanding of attendance behavior. The distinction has been ignored in previous research. In the process model (Figure 1) this cause of absence is included in the "ability to attend" variable.

The hypothesis that absences due to involuntary reasons are different from those due to voluntary reasons can be observed in this study. In Table 12 are shown the correlations between voluntary and involuntary absences. The process model suggests that this relationship should be quite low, and it is. The correlation between voluntary and involuntary frequency of absence is $\underline{r} = .30$ ($p \leq .01$) and that between involuntary and voluntary duration is even smaller $\underline{r} = .05$ (n.s.). Also

TABLE 12

INTERCORRELATIONS BETWEEN SIX MEASURES OF ABSENTEEISM

	Total Frequency	Total Duration	Voluntary Frequency	Voluntary Duration	Involuntary Frequency	Involuntary Duration
Total Frequency	-	.24*	.45****	.26***	.51****	.17
Total Duration		-	.18	.31**	.38***	.95****
Voluntary Frequency			-	.65****	.30**	.12
Voluntary Duration				-	.59****	.05
Involuntary Frequency					-	.19*
Involuntary Duration						-

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$
**** $p \leq .000$

of interest is the comparison between voluntary frequency and voluntary duration $\underline{r} = .65$ ($p \leq .00$) and involuntary frequency and involuntary duration $\underline{r} = .19$ ($p \leq .05$). This again underscores the significant differences between voluntary and involuntary absence. Finally, the comparison between total frequency and total duration $\underline{r} = .24$ ($p \leq .05$) replicates the earlier findings of Nicholson and Goodge (1976) that different measures of absence do not correlate well.

Independent Variables

The list of independent variables is long. There were six background or personal characteristic factors: age, sex, marital status, race, family size, and educational level. There were also twenty attitudinal scales from the MSQ. It was decided on an a priori basis to group the scales into two factors; a job situation factor and a job expectation factor. This decision also seemed appropriate because the MSQ manual (Weiss et. al., 1967) explains that a factor analysis of the scales generally yields two factors: an intrinsic factor and an extrinsic one. Therefore it was decided that each scale would be clustered on the basis of two criteria: (1) each group of variables should fit some aspect of the process model, and (2) each cluster of variables should be taken from the same MSQ factor, i.e., intrinsic or extrinsic. This criterion proved to work well since the major predictor factors in the model, the job situation and job expectation factors, are essentially comprised of extrinsic and intrinsic variables respectively.

The arguments presented above call for two factors when in fact three were used. Since there were a priori reasons for combining the

scales, a factor analysis was run to confirm that the scales were actually clustering into the usual two factors. They did not. Rather they loaded onto the three factors used here. The manual (1967) reports that this does occasionally happen. In fact, the loadings are similar to those found for office clerks and warehouse workers. The a priori extrinsic factor was accurate, but two, not one, intrinsic factors resulted. The first intrinsic factor was labeled the job expectation factor and the second was called the leader factor. The job expectation factor need no explanation since it is comprised of the traditional intrinsic variables. The leader factor however was unexpected. It is comprised of three variables that are all intrinsic, but the relationship between the three is not immediately apparent. Satisfaction with authority and satisfaction with social status are easily linked. In general, increases in authority or formal influence increase the opportunities to "be somebody" in the organization and probably in the community. Conversely, someone who holds a position of high social status in the organization or community usually will have a large amount of informal influence. This in turn would increase the employee's net level of authority. The data did not indicate a causal relationship. Both interpretations may be operating at the same time, and both relate similarly to the third variable, social service. Apparently those people possessing authority or social status also participate in community activities. This is not surprising, since the company is the largest industrial employer in a rural community. As such it takes pride in its participation in community events. Also the majority of people employed

here feel that their job is as good as or better than any others available in the community. This probably contributes somewhat to their social status. Too, people are awarded public recognition both in the company and the community for participating in community events. This in turn may increase individuals' social status within the company and therefore increase their informal influence. There is no causal relationship being implied by the arguments presented above. Rather they are meant only to illustrate the appropriateness of treating these three variables as a separate factor instead of incorporating them into the job expectation factor. For these reasons it was thought valid to abandon the a priori composite factors in favor of the three actual factors derived from the factor analysis.

The coefficient alpha's were improved by using three factors instead of two. This would indicate that the internal consistency of each scale has been increased. What also shows in the analysis is a drop in the magnitude of the coefficients when comparisons are made between the normative scores and the normative-ipsative scores (see Table 13). This drop in the alpha is consistent with a general lowering of the Pearson correlation coefficients and an increase in the multiple correlation using normative-ipsative scores. These effects suggest that the normative-ipsative factors are not as consistent as their normative counterparts. Apparently the ipsatization process has reduced the amount of redundant information contained in the attitudinal variables. But how has this happened?

TABLE 13

COEFFICIENT ALPHAS FOR THE THREE CREATED FACTORS OF THE MINNESOTA SATISFACTION QUESTIONNAIRE

	Normative	Normative-Ipsative
Job Expectation	.94	.68
Job Situation	.92	.58
Leader	.83	.51

The use of normative-ipsative scores assumes that correlations between performances are a function of both normative differences between individuals in general ability levels and within individual ipsative variations in abilities on different tasks (Broverman, 1962). Therefore the correlation coefficient is confounded by these two sources of variation. It does not partition the variance into "between" and "within" effects as is done in analysis of variance. The reduction in the correlation coefficients here is a result of eliminating this confound, i.e., the normative differences in general attitude level between individuals. The correlations are now reflecting the relationship between attitudes on the different scales when differences in general attitude levels between subjects are kept constant. As a result of this partitioning, further analysis is using information due only to intra individual differences between attitudes.

Results of the Multiple Regression Equations

Stepwise multiple regression equations were used to determine the overall predictive ability of Steers and Rhodes' (1978) absentee model and to explore the relative importance of each of the independent variables. There was no a priori basis for ordering the placement of these variables into the equations. The results are presented below in a manner consistent with the intent of the research. First, the overall efficiency of the variables is presented for the dependent variables. This is followed by an examination of the contributions of the individual independent variables both in normative and normative-ipsative scores.

Table 14 contains a summary of the regression results for the two major dependent variables. There are six equations for each one. This illustrates the effects of each major group of variables alone and combined with each other. For example, background factors (1) taken alone account for more variance then either the normative (2) or normative-ipsative factors (3) taken alone. Also total frequency is predicted more effectively than total duration under any circumstances.

Of particular interest here are equations two and five and equations three and four. These equations can indirectly test whether the normative-ipsative scores add anything to the prediction of absenteeism. According to Aitkin (1974) the adequacy of the multiple regression coefficient can be tested using the following general equation:

$$F_t = \frac{(Rx^2 - Rx_1^2)/P}{-(1 - Rx^2)/n-p-1} \quad > \quad F(p,n-p-1)$$

where n equals the sample size, Rx^2 equals R^2 for the entire set of predictors and $Rx_1^2 = R^2$ for the subset of predictors. The test is to see if Rx^2 is an R^2 adequate subset of X. In other words, does $Rx_1^2 = Rx^2$ or alternatively is $Rx_1^2 < Rx^2$. If it is the latter case than Rx_1^2 does add significantly to the equation. Here using equations two and five, the test is not significant ($F_t = .20$). The normative scores added nothing significant to the equation. Similarly, using equations three and four the test was again not significant ($F_t = .13$). The normative-ipsative scores did not add anything significant to the overall equation. These tests indicate that the normative-ipsative scores do not predict any better than the normative scores.

TABLE 14

SUMMARY TABLE OF THE REGRESSION EQUATIONS FOR THE TWO DEPENDENT VARIABLES

Dependent Variables	Independent Variables	R	R^2	F	dF	Sig
Total Frequency	1. Background Factors	.4325	.187	2.43	7,74	.027
	2. Normative Attitude Factors	.2309	.0533	1.46	3,78	.231
	3. Normative/Ipsative Attitude Factors	.3045	.093	2.66	3,78	.054
	4. 1&2	.4966	.2466	2.324	10,71	.020
	5. 1&3	.5450	.2970	3.00	10,71	.003
	6. 1&2&3	.5630	.3169	2.668	12,69	.005
Total Duration	1. Background	.2262	.0512	.570	7,74	.778
	2. Normative Attitude	.1655	.027	.732	3,78	.536
	3. Normative/Ipsative Attitude	.2019	.041	1.104	3,78	.353
	4. 1&2	.2536	.0643	.55	9,72	.833
	5. 1&3	.2806	.0788	.684	9,72	.721
	6. 1&2&3	.3256	.106	.682	12,69	.763

Table 15 is another summary table which illustrates where the model is working well and where it is working poorly. Because of the restricted sample size many of the equations may be significant by chance alone and must be interpreted as such. However, there are some trends worth noting despite this caveat. For example, notice the equations pertaining to the involuntary duration variable. This set of equations is not significant. Apparently it is this facet of the data that is hindering prediction efforts on the primary dependent variable of interest, total duration of absence. This aberration in the data emphasizes the importance of distinguishing frequency measures from duration measures. Also when compared to the voluntary absence data, it suggests the importance of distinguishing between voluntary and involuntary reasons for absence. Unfortunately, concrete conclusions can not be postulated owing to the limited sample size.

In summary, the overall results suggest the following:

1. Normative-ipsative scores predict absence behavior better than normative scores although the difference is slight.

2. Total frequency of absence is predicted better by this set of variables than total duration of absence.

3. The difference in the predictive efficiency of the two dependent variables may be due to differences between involuntary and voluntary absence behavior.

4. Background factors in combination are better predictors of absence frequency than the attitude variables.

The Partial Correlation Coefficients

As indicated above, there was no rationale for putting the independent variables into the regression equation on the basis of some

TABLE 15

SUMMARY TABLE OF REGRESSION EQUATIONS SHOWING 6 DIFFERENT MEASURES OF ABSENTEEISM

Measures of Absenteeism		R	R^2	F	Sig
Total Frequency	1. Background	.4325	.187	2.43	.027
	2. Background and Normative	.4936	.2466	2.324	.020
	3. Background and Normative/Ipsative	.5450	.2970	3.00	.003
Total Duration	1. Background	.2262	.0512	.570	.778
	2. Background and Normative	.2536	.0643	.55	.823
	3. Background and Normative/Ipsative	.2806	.0788	.684	.721
Involuntary Frequency	1. Background	.4793	.2297	3.153	.006
	2. Background and Normative	.5242	.2748	3.031	.004
	3. Background and Normative/Ipsative	.5439	.2958	2.982	.003
Involuntary Duration	1. Background	.2484	.0617	.822	.557
	2. Background and Normative	.2652	.0703	.605	.789
	3. Background and Normative/Ipsative	.2803	.0785	.605	.804
Voluntary Frequency	1. Background	.4619	.2133	2.867	.01
	2. Background and Normative	.4733	.2241	2.310	.02
	3. Background and Normative/Ipsative	.4730	.2237	2.046	.041
Voluntary Duration	1. Background	.4536	.2057	2.738	.014
	2. Background and Normative	.4860	.2362	2.821	.009
	3. Background and Normative/Ipsative	.4899	.2400	2.526	.014

a priori ordering. Rather the goal was to investigate the utility of the model. Stepwise regression analysis would do this and at the same time enter the variables in order of descending predictive importance. The summary tables for these equations are reproduced below (Table 16).

The two summary tables in Table 16 illustrate not only that the model predicts the frequency of absence (R^2 = .317) better than the duration of absence (R^2 = .106), but also that the key independent variables differ for each measure. In predicting frequency, salary is the only variable which contributes significantly. Leader, sex, and education contribute to the overall significance, but alone do not make significant increments in the variance accounted for. No variables contribute significantly to the prediction of total duration. There are two possible explanations for the lack of significant contributions by the individual variables. The first is the existence of redundant information contained in the variables. This results in the problem of multicollinearity. To combat this problem Cohen and Cohen (1978) suggest the use of an hierarchial stepwise analysis of the data, or the elimination of those items, on an a priori basis which have the lowest causal relationship to the dependent variable. As indicated, the hierarchial analysis is not appropriate here, however, some variables were eliminated from the analysis. The second reason for this lack of significance is a result of the small sample size. The formula for testing the significance, $F = \frac{r^2(n-k-1)}{1-R^2}$ (Cohen and Cohen, p. 107) of the partial coefficient is directly affected by the sample size.

TABLE 16

SUMMARY TABLE OF THE STEPWISE MULTIPLE REGRESSION EQUATION FOR THE TWO DEPENDENT VARIABLES

Step	Variable	Mult-R	R-SQ	R	Overall F	Significance
Total Frequency						
1	Salary	.291	.085	.291	7.385	.008
2	Leader (I)	.355	.126	-.173	5.700	.005
3	Sex	.393	.154	.221	4.742	.004
4	Education	.426	.181	.011	4.261	.004
5	Child	.447	.200	.091	3.802	.004
6	Marital Status	.475	.226	-.210	3.649	.003
7	Job Expectations (I)	.489	.239	.168	3.318	.004
8	Job Situation (I)	.522	.272	.024	3.416	.002
9	Race	.544	.295	-.022	3.356	.002
10	Age	.545	.297	-.085	3.000	.003
11	Job Situation (N)	.545	.297	.077	2.691	.006
12	Job Expectations (N)	.563	.317	-.023	2.668	.005
Total Duration						
1	Sex	.166	.027	.166	2.261	.137
2	Job Situation (I)	.220	.048	.154	2.005	.141
3	Race	.227	.051	-.031	1.407	.247
4	Leader (I)	.233	.054	.040	1.108	.359
5	Job Expectations (I)	.255	.065	-.104	1.054	.392
6	Marital Status	.262	.069	-.046	.922	.484
7	Education	.269	.072	-.031	.822	.572
8	Age	.275	.076	.023	.745	.651
9	Family Size	.281	.079	.083	.684	.721
10	Job Expectations (N)	.286	.082	-.133	.631	.782
11	Job Situation (N)	.324	.105	-.019	.745	.692
12	Salary	.326	.106	.063	.682	.763

(I) = Normative-Ipsative
(N) = Normative

The Correlational Matrices

Considering the mathematical properties of the normative-ipsative scores, the correlation matrix must contain some negative values (Table 17). The matrix based on the normative scores does not (Table 18). It has been suggested that the negative coefficients represent antagonistic variables and can increase our understanding of the processes being observed. The difference between the two sets of correlations are readily observable. If the normative data matrix is examined one would conclude that each dimension of the satisfaction scale is highly correlated to the others. This is not a particularly surprising conclusion since the scales are all attitudinal and purport to measure different facets of the same construct; job satisfaction.

A different conclusion is reached if the normative-ipsative matrix is considered. An examination of this matrix leads to the conclusion that the scales are correlated, but not all in a positive direction. Apparently some of the variables are antagonistically related to others. That is, an increase in one variable results in a decrese in another variable. While these negative values are a mathematical property of ipsatization, it is argued that the negative coefficients can be interpreted in a meaningful and useful manner.

A large number of variables with which to test the antagonistic hypothesis is shown in Table 17. In general the job situation (extrinsic) variables are negatively correlated to the job expectation variable (intrinsic). This is contrary to the data in the normative matrix (Table 18). Based on Table 17, as the intrinsic factors increase the

TABLE 17

PEARSON CORRELATION COEFFICIENT BETWEEN THE JOB SITUATION AND JOB EXPECTATION VARIABLES BASED ON NORMATIVE-IPSATIVE SCORES

	Job Situation Variables							
Job Expectation Variables	Advancement	Company Policy	Compen-sation	Co-worker	Recog-nition	Super. Human Relations	Super. Tech. Skills	Working Conditions
Normative-Ipsative								
Ability	-.44*	-.29*	-.30*	-.32*	-.22	-.34*	-.24	-.32*
Achievement	-.30*	.06	-.33*	-.11	-.22	-.33*	-.25	-.08
Activity	-.31*	-.05	-.23	-.14	-.26	-.49*	-.38*	-.12
Creativity	-.26	-.01	-.06*	.1	.00	-.27*	-.31*	-.34*
Independence	-.33*	-.08	-.29*	-.25	-.22	-.44*	-.30*	-.14
Moral Values	-.28*	.07	-.25	-.03	-.28*	-.34*	-.21	.06
Responsibility	-.31*	-.21	-.12	-.13	-.13	-.42*	-.37*	-.25
Security	-.08	-.02	.05	.20	-.27*	-.21	-.11	.12
Variety	.35*	-.05	-.44*	-.20	-.41*	-.40*	-.24	.02

*$p < .001$

TABLE 18

PEARSON CORRELATIONS BETWEEN THE JOB SITUATION AND JOB EXPECTATION VARIABLES BASED ON NORMATIVE SCORES*

Job Expectation Variables	Job Situation Variables							
	Advancement	Company Policy	Compen-sation	Co-worker	Recog-nition	Super. Human Relations	Super. Tech. Skills	Working Conditions
Normative								
Ability	.47	.54	.39	.41	.61	.52	.50	.46
Achievement	.52	.67	.38	.50	.61	.52	.49	.55
Activity	.36	.50	.27	.34	.45	.29	.27	.40
Creativity	.50	.62	.46	.32	.65	.50	.42	.40
Independence	.31	.45	.19	.24	.43	.27	.27	.35
Moral Values	.38	.56	.26	.41	.44	.36	.36	.51
Responsibility	.55	.60	.50	.52	.67	.53	.48	.52
Security	.49	.53	.38	.54	.46	.43	.43	.54
Variety	.46	.59	.27	.41	.49	.44	.45	.56

*All correlations significant $p < .001$

extrinsic factors decrease. This interpretation appears consistent with the literature on intrinsic motivation which suggests that under certain conditions extrinsic rewards can actually reduce intrinsic motivation (Deci et al., unpublished manuscript). According to Deci the conditions where this phenomenon occurs are those where the perceived focus of causality or control has shifted from internal sources to external sources. Unfortunately the present study provides no direct means of assessing this.

Even though the general interpretation may have some meaning, it has not provided any new understanding to the actual processes involved. This information must be gleaned from the individual scales. To test the antagonistic hypohtesis, compare the ability scale to the eight job situation scales. According to the information in Table 17, ability has a substantial negative correlation with the job situation scales. In effect the interpretation would be, that those people who are more satisfied with the opportunity to use their abilities are less satisfied with their advancement opportunities. To a smaller degree these same people are also less satisfied with the way company policies are implemented, the pay they receive for the amount of work accomplished, their relations with co-workers, how their superiors handle the employees, and the working conditions. In addition these people feel that they are not getting the recognition they deserve or that their superior's expertise is adequate for making work related decisions. The interpretation appears plausible.

Another interesting test of the antagonistic hypothesis is found by contrasting creativity with the job situation factors. Here the coefficients are more diverse than in the first example. Employees who are satisfied with the opyortunities to try their own methods of doing a job are less satisfied with the opportunities for advancement, the superiors expertise and human relation skills, and the general working conditions. Satisfaction with company policies, compensation, co-workers, and recognition have little relationship to satisfaction with creativity. Again, it can be argued that this interpretation makes sense.

The final example is satisfaction with security. In this row there are both positive and negative coefficients. Apparently satisfaction with security and satisfaction with co-workers are positively related. To a lesser extent, a positive relationship is also exhibited between security and working conditions. Satisfaction with recognition and the superiors ability to handle the workers are antagonistically related. Advancement opportunities, company policy, and compensation appear to be largely unrelated to the perceptions of job security. In this example, the intuitive appeal of antagonistic relationships is somewhat weaker than in the previous examples.

To provide some corroboration of this interpretation, Table 19 includes the intercorrelations for the two factors cited in the examples. If either of these matrices contained many negative coefficients some doubt would be cast over the antagonistic interpretations. The occurrence of negative values would suggest that there probably is no real meaning, but rather that they are only a mathematical artifact which by chance

TABLE 19

INTERCORRELATIONS OF THE JOB EXPECTATION VARIABLE USING BOTH NORMATIVE AND NORMATIVE-IPSATIVE SCORES

Scores	Ability	Achievement	Activity	Creativity	Indep.	Moral Values	Respons.	Security	Variety
Normative-Ipsative									
Ability	--	.21	.18	.48*	.27*	.02	.30*	-.04	.30*
Achievement		--	.39*	-.11	.21	.21	.36*	.10	.42*
Activity			--	.07	.39	.28*	.35*	.21	.35*
Creativity				--	.18	-.04	.35*	-.29*	.18
Independence					--	.39*	.19	.20	.35*
Moral Values						--	-.02	.06	.12
Responsibility							--	-.05	.29*
Security								--	.08
Variety									--
Normative									
Ability	--	.75*	.64*	.82*	.65*	.58*	.61*	.57*	.75*
Achievement		--	.73*	.67*	.63*	.65*	.82*	.62*	.80*
Activity			--	.50*	.64*	.61*	.73*	.58*	.69*
Creativity				--	.59*	.52*	.79*	.42*	.69*
Independence					--	.64*	.64*	.54*	.67*
Moral Values						--	.44*	.50*	.59*
Responsibility							--	.59*	.77*
Security								--	.58*
Variety									--

*p < .001

alone lend themselves to meaningful interpretation. The intercorrelation matrices should all be positive since it was posited that the variables were simply measuring different facets of the same construct (Weiss, 1967). Apparently this has happened. There are almost no negative correlations. It is suggested that the negative correlations are not arranged in a pattern due to chance alone.

One further observation concerns the comparison of the two intercorrelation matrices (Table 19). As expected they are different, but the differences are not as dramatic as those illustrated in the other matrices. The most obvious difference is the reduction of the coefficient size in the normative-ipsative matrix. This is probably due to the nature of the scores, i.e., the correlations in this matrix are based on deviations from the mean. The pattern of the coefficients also changes somewhat between the two matrices. Examining across rows, the rank order of the coefficients are not identical. Therefore conclusions based on the two tables would be different. It is interesting to note, however, that as the variables being examined become increasingly refined the differences in interpretation decrease.

CHAPTER VII

DISCUSSION

Dependent Variables

Steers and Rhodes (1978) contend that many of the contradictions in the absence literature are due to measurement error. Some attention in the literature has been devoted to comparing the different types of measures, such as frequency or duration, and the desperate results they yield (Nicholson and Goodge, 1976), but that is not enough. The individuals' real ability to attend is also an important distinction; one that has not yet been investigated. Steers and Rhodes (1978) indicated that this distinction between involuntary and voluntary absence may clear away much of the confusion now existing in the literature. Other research also supports this notion (Smith, 1977) although no direct comparison has ever been made. Correlations between these different types of absences were able to be made in this study (Table 12, page 68) and suggest that the "ability to attend variable" is important when investigating absence behavior. Although the correlations between these variables were significant, in most cases they were low. This is disturbing since prior research has virtually ignored the reasons for absence, i.e., the ability to attend. The evidence here suggests that some of the contradictions existing in the literature are due to differences in the measurement of absenteeism itself.

Another point raised by this distinction is the increased importance of attitude in determining attendance. Assuming that the employee has

the ability to attend, his actual attendance must then be only a function of his attitude or perception of the job situation. Voluntary attendance becomes a motivational problem; a process of balancing costs against benefits. Since much of the absence was considered voluntary, just under 30% in this study, this information becomes important. Also it is totally consistent with the model. It suggests that voluntary absence should be able to be controlled through job situation variables. That is, by making the job situation positive, and making absence costly, the rate of voluntary absence should decrease. This is not a new idea, but the dynamics involved are crystalized. As was stated, voluntary attendance becomes strictly a motivational problem. The process model becomes a restatement of expectancy theory.

The voluntary aspect of the model takes on a more importance when it is noted that the same set of variables, age, sex, education and salary, correlate significantly with voluntary frequency, voluntary duration, and involuntary frequency, but not involuntary duration. In fact nothing correlates significantly with the involuntary duration measure, nor is it able to be adequately predicted by the variables used in this study (Table 15, page 77). The model suggests at least that background characteristics should be related to the involuntary measures. While this holds true for the frequency measure, it does not hold for the duration measure. It is odd that the involuntary frequency measure correlates more with both voluntary absence measures than it does with the involuntary duration measure (Table 12, page 68).

A possible explanation might be that sickness and accidents are actually unpredictable. If this were true, however, there probably would be few variables correlated to involuntary frequency. The causes for lengthy or brief illness should be related to an individual's susceptability to them. This doesn't seem to be the case here. Age is negatively correlated to the variable as is education level, and salary earned (hourly vs. salary). Women are out for involuntary reasons more than men. Based on the background factors, younger people at the lower levels of the organization are out more for involuntary reasons. Again this does not fit a random pattern, nor does it fit well with other research.

Further investigation among the Pearson correlations indicates, surprisingly, that there are many attitudinal variables which are negatively correlated to the involuntary measure. Based on previous arguments that involuntary absence should be due to background factors, not attitudinal ones, an apparent contradiction arises. Involuntary absence is being predicted in the same manner as voluntary absence.

The most reasonable explanation for this is a problem with the company policy. The system allows for a certain number of paid sick days. These are recorded as involuntary absences. However, the data suggests that many of these involuntary sick days are actually voluntary sick days. The data are completely consistent with this explanation. First, are the higher correlations to the voluntary measures (Table 12, page 68) indicating some degree of overlap. Second, are the similarities of independent variables which predict these dependent measures (except

involuntary duration). Third, is the abundance of attitudinal variables which correlate negatively to the involuntary frequency measure. It is the people who are relatively new to the company and who occupy its lower ranks, based on salary and education level, who are taking advantage of these sick days. Also the attitudinal variables express a dissatisfaction with their roles in the company. The job situation apparently is not rewarding, and the company is obviously willing to pay the worker to stay away from the job on occasion with no official costs incurred. This suggests that the "pressure to attend" factor (Figure 1) is low. Specifically the reward system is designed to encourage absenteeism. This data is important. These suggests, first, that voluntary absence is much more prevalent than previously believed in this company. Second, they drive home the point that company policy can strongly influence attendance behavior. Proper use of policy can reduce absenteeism.

Additionally it raises the question concerning the distinction between voluntary and involuntary absence measures. The question is not whether it is real or not; Table 12, page 68 supports this distinction, but whether or not it can be accurately assessed. Based on the experience here the answer would be no because of the confound with company policy. It is difficult to imagine a situation where it would not be confounded with the voluntary measures. However, as can be seen, the partition is nevertheless a useful one. It simply means that caution must be used in interpreting results based on this dichotomy.

Multiple Regression

The Conceptual Model. The correlations in Table 12, page 68, help explain what took place in the multiple regression equations (Tables 14 and 16, pages 75 and 79). These equations were run to test how well the model predicted the total absence measures and to investigate the utility of the normative-ipsative scores. The data in Table 14, page 79, indicate the inability of the model to predict total duration. This apparently is due to the close overlap between total duration and involuntary duration ($r = .95$ $p \leq .00$). The conclusion from this data is that the model is unable to predict the duration of involuntary absence. This, however, is logical, since the model would assume that that the employees do indeed want to attend, but are unable to due to reasons beyond their control. By definition, the length of involuntary absence should not be predictable.

The identical argument should hold for involuntary frequency. The frequency of illness or accidents should generally be random in the work force. The exception to this might be variables such as age or marital status, but here they did not play an important role. The reason for the ability of the model to predict involuntary absence is probably because the measure is confounded with the voluntary measure as discussed previously.

The model is able to predict total frequency of absence (Table 14, page 75). This variable is comprised of both the voluntary and involuntary frequency measures. Both measures correlate highly to the total frequency

variable, and also exhibit a moderate relationship to each other (Table (Table 12, page 68). It is argued that the model is able to predict voluntary absence because (1) it is not random, but predictable by both attitudinal and background factors, and (2) because the voluntary duration measure is confounded with the involuntary measure. This confound increased the attitudinal facet of the involuntary measure. It is suggested that if it was not confounded, the total frequency measure would not be effectively predicted by this model.

Normative-Ipsative Scores

In terms of utility the data in Table 14, page 75, indicate that the normative-ipsative scores predict total frequency only slightly better than normative scores. Also, the normative-ipsative scores are entered into the equation before the normative scores. Therefore, in this circumstance the normative-ipsative measures do account for more variance than the normative scores.

Another aspect of the normative-ipsative scores concerned the differences found in the intercorrelation matrices when compared to their normative counterparts. Specifically, Broverman (1961) argued that the negative signs present in the normative-ipsative correlation matrix were more than a mathematical artifact. He proposed that the negative correlations represented antagonistic factors which would add insights into the process of the construct being studied. Several examples of this phenomenon were presented in the preceding chapter. The evidence from these examples supports the antagonistic variable hypothesis. In

general the interpretation of the antagonistic variables in Table 17, page 81, may fit Deci's (1975) work concerning the effects of extrinsic rewards on intrinsically motivated behavior. His findings, and findings of others (Pritchard & Campbell, 1977; Deci et al., unpublished manuscript) suggest that the introduction of extrinsic rewards can in some circumstances reduce the influence of the intrinsic motivators. Conclusions made from the normative matrix would not support this research. Rather, the conclusion would be that all of the variables are related to each other in a positive manner.

The theoretical aspect of the normative-ipsative scores apparently have some promise in exploring underlying processes. But they also may have an applied application in the classification and placement of people. These procedures call for the assignment of an individual to one area when several options are available. Specifically classification deals with selecting the right job from several different kinds of work, while placement involves the assignment of an individual to a specific level of work within the same job (Cronbach, 1970). In either case the goal is to optimize the match between the individuals' abilities and the job requirements. It is in this capacity that the use of normative-ipsative scores may reach their greatest potential.

CHAPTER VIII

CONCLUSIONS

The research results here have raised as many questions as they have answered. From one perspective this was to be expected. The ideas were unexplored. The behavior of normative-ipsative scores in applied settings was essentially unknown. At the same time Steers and Rhodes' (178) process model was being tested for the first time. However, questions raised concerning the model were not so much a consequence of exploring the unknown as they were a consequence of a limited sample size. While the conclusions from the data indicate a usefulness for the understanding of absenteeism, they must be considered tenuous. Some of the results could be significant by chance alone. This is unfortunate, but does not indicate that the research was a failure. To the contrary, as an exploratory study it was a success. The research points in many new directions both theoretical and applied. Future research should first corroborate the conclusions found here and then explore the new questions in a broader context.

Normative-Ipsative Scores

In terms of utility, it must be concluded that the normative-ipsative scores do not predict absenteeism any better than the normative scores. While the normative-ipsative scores accounted for more variance in five out of six cases, at no time was it a significant increase. One can only conclude that the normative-ipsative scores predict no better than the normative scores.

The second research question dealt with a separate issue. Irregardless of predictive efficiency, could this transformation lead to a better understanding of the underlying processes? Specifically, does the antagonistic variable hypothesis make sense? The data continued in the covulation matrix (see Table 17, page 81) suggests that is could, but, because of the unexpected results, the answer is unclear. A case can be made to support this interpretation but it rests on a supposition, not fact.

As indicated there are no negative correlations in the normative correlation matrix but there are many in the normative-ipsative matrix (see Tables 17 and 18, pages 81 and 82). Obviously conclusions based on these two tables would be disparate. If the negative signs found in the normative-ipsative matrix could be meaningfully interpreted it would suggest that behavior is determined by an interaction of positively and negatively related attitudes with individuals, instead of an individual having more or less of an attitude than the rest of the population. In general terms this idea of interactive attitudes is consistent with much of the learning and personality development literature as indicated in Chapter II. Still the question remains as to whether the interpretation of the normative-ipsative matrix makes sense.

According to Deci et al. (unpublished manuscript) there are some circumstances where extrinsic motivation can reduce intrinsic motivation. As described in cognitive evaluation theory this happens whenever the individual perceives a shift of causality from internal sources to external sources. Phrased in another way, the person feels less self

determining when the situation is controlling as opposed to informative (Deci et al., unpublished manuscript). Under these conditions a negative correlation could be expected between extrinsic and intrinsic variables. This is what the data indicates in the normative-ipsative matrix. The negative signs appear between the extrinsic and intrinsic variables. If the situation is informative this relationship would not be expected.

The problem here is obvious. This result was a complete surprise, therefore, no measure was included to ascertain whether the situation was controlling or informative. One could specualte that in most industries the circumstances are generally controlling and therefore the antagonistic variable hypothesis holds, but that kind of speculation is not appropriate. The evidence suggests that the antagonistic variables hypothesis may have some promise, but more work must be done with it.

If further research indicates that the antagonistic interpretation generalizes to other instruments, then a related use of these scores as mentioned in the discussion might be found in selection applications. The unique feature again coming from the antagonistic interpretation of the negative correlations. Using these scores would enable a company to classify its jobs in terms of requirements in attitudes and abilities. For example, where there is a job which has an exceptionally high turnover rate, a questionnaire could be given to all people doing the job which measures their general attitudes to the job and which measures their abilities. Next, the sample is divided into those who stay on the job and those who leave. Using normative-ipsative scores, this would leave you with a profile of the workers most likely to remain on

the job. The same questionnaire could now be given to applicants for the job. Again the normative-ipsative score is used resulting in a profile comparable to that of the successful worker. The choice among applicants would be that individual which most closely resembled the composite profile of successful workers. The procedure outlined above is simplified, but the point is clear. A greater understanding of the job and the individual is made available through the use of the transformation. The result might be a higher hit rate in selection situations. Again more work is necessary to see if the antagonistic hypothesis holds in other situations.

The Process Model

The investigation of the process model of absenteeism was the focus of the third research question. In general the conceptualization is useful. The unique variable, ability to attend, illuminates some of the problems inherent in the earlier research. Most significant is the conclusion that voluntary absence can be predicted quite well by the attitudinal variables while involuntary absence can not. This conclusion emphasizes the similarity between voluntary attendance behavior and motivation theory. Apparently voluntary attendance is determined by the individual's perception of the costs and benefits of missing work. In this company, for example, many people who indicated dissatisfaction with the job would call in sick because the company was will to pay the employee for being absent. While this policy sounds absurd, it is relatively common. Many companies have a

certain number of paid sick days available to their employees. The largest program which pays people to stay away from work is welfare. Why should an individual take a menial job if he or she can stay home and get paid? The model clearly indicates the power of company policy in influencing attendance at least on a voluntary basis.

Interestingly, the data collected here suggests that much of the involuntary absence was in fact voluntary. This means that voluntary absence is more prevalent and costly than originally suspected. It also suggests the difficulty of determining when an absence is voluntary or involuntary. For example, an employee may get hurt on the job and sent home to recover. He is told to return to work when he feels up to it. This would be recorded as an involuntary absence. Based on the process model, however, the length of the recovery period will be influenced by the employee's perception of the situation. The duration of the involuntary absence in fact becomes a voluntary absence. The employee is the one who decides when it is appropriate to return to work. These variables, company policy, and their effects on the individual's perception of the job make it difficult to assess involuntary absence measures. This confound between the two types of measures is the weakest link in the model. Despite this, the discussion presented in Chapter VII indicates that the dichotomy is useful in understanding absence.

As was indicated, many of the significant statistics in the aspect of the study could be significant by chance alone. While the model works well in explaining the dynamics underlying the behavior and is

able to predict frequency of absence successfully, generalizations concerning the usefulness of the ability to attend variable must be made carefully. The model must be tested with a much larger sample to be sure that the conclusions reached here are correct.

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APPENDICES

APPENDIX A

Properties of Ipsative Scores (after Hicks, 1970)

1. An ipsative intercorrelation matrix can be expressed as a simple function of the matrix of intercorrelations for the same variables prior to ipsatizing.

2. The sums of the columns (or rows) of an ipsative covariance matrix must always equal zero.

3. In the special case when the ipsative variances are equal, the sums of the columns (or rows) of the ipsative intercorrelation matrix are equal to zero.

4. Ipsative intercorrelation matrices are nonbasic or singular and thus have no regular inverse.

5. The sum of the covariance terms obtained between a specified criterion and a set of ipsative variables is zero.

6. The multiple correlation of a set of ipsative variables with a criterion can be expressed as a function of the multiple correlation for the pre-ipsatized variables and their B coefficients, and except in one rare special case, the ipsative multiple correlation is always less than the multiple correlation for the same variables prior to ipsatizing.

7. The least-square estimate of a criterion using all of the variables of an ipsative set is identical with the least-square solution with any single variable deleted.

8. When the variables in non-ipsative form are orthogonal, the ipsative intercorrelations will all be a negative constant value determined only by the number of variables.

9. When the variables in non-ipsative form are all correlated with each other to some constant degree, the ipsative intercorrelations will be exactly the same as if the original variables had been orthogonal, as in number 8.

10. When the column sums of the pre-ipsative intercorrelation matrix are all equal and the off-diagonal correlations are distributed normally, the proportion of negative values in the ipsative intercorrelation matrix can be determined readily from tabled values of the normal curve.

11. When the original scores are in normalized units with a mean of zero and a standard deviation of unity and the sums of the columns (or rows) of the original intercorrelation matrix are all equal, then the ipsative covariance matrix and the first-centroid residual are identical.

12. Under special restrictions, a set of ipsative variables will correlate perfectly with their absolute counterparts.

13. If the column means of the pre-ipsative matrix are equal, the column means of the resulting ipsative matrix must be equal.

14. If the variance, but not the means, were equated prior to ipsatizing, transforming the resulting ipsative scores to deviation units will yield interpretable results.

15. If the variances were not equated prior to ipsatizing, normalizing after ipsatizing will not make the resulting scores meaningful.

APPENDIX B

Hicks (1970) lists several ways of insuring a pure ipsative score. During test construction, a measure of multiple attributes will be pure if assessed by (a) preferential choice, (2) paired comparison, (c) or some other forced choice format,[1] and (d) where items are ranked or matched, provided all alternatives are ranked, all alternatives scored, and if alternatives representing all assessed variables are compared with each other and presented in preferential choice by the respondent.

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[1]Forced choice items will not be ipsative if: (a) the respondents only partially order item alternatives, (b) the scales have differing numbers of items, (c) not all the alternatives ranked are scored, (d) the scales are scored differently for respondents with different characteristics, (e) the scored alternatives are differentially scaled, (f) one or more scales from the ipsative set is deleted when analyzed, or (g) the test contains normative sections.

VITA

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