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ATLANTA, GEORGIA 30332

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# Self Rewarding as an Influence on Industrial Performance

Th. J. F./Thoene
Milton R./Blood

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

An empirical investigation tests Blood's model of the interrelationships among variables that effect the relationship between performance and self rewarding (the latter being defined as the private, cognitive, affective consequence of a job behavior). This model conceives the relation between performance and self rewarding to be direct and reciprocal; it is moderated by the knowledge of performance goals and actual performance on one hand and by task interest and identification with the task and the product from the task on the other.

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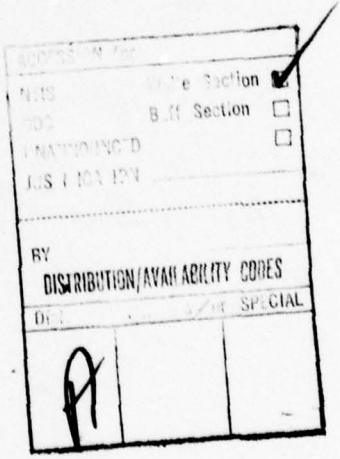
## Abstract

In turn these moderators are influenced by variables under organizational control.

The research design allowed for a test of Blood's model with both static (questionnaire-) data and with an experimental procedure that attempted to enhance goal- and performance recognition in order to strengthen the relation between self rewarding and performance. Three plants of a carpet manufacturing company acted as three separate samples in the analysis of the questionnaire-data and as two experimental and one control group respectively in the experimental phase of the research.

The questionnaire results consistently confirmed the hypotheses derived from Blood's model when perceived performance was used as the criterion variable; using performance against Industrial Engineering standards as criterion did not result in confirmation of the hypotheses. The experimental manipulations did not induce differences between the control- and experimental plants; the hypotheses for this part of the research could not be tested. The results are interpreted, their implications are discussed and suggestions for improvements on this research are given.

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# 1. Introduction and Literature Review

## 1.1 Introduction

The topic of intrinsic motivation has attracted considerable research in recent years. Numerous articles have been written about (1) its physiological and psychological underpinnings, (2) needs for achievement, growth and optimal arousal, (3) the effects of variables in the work situation on intrinsic motivation, and (4) the influence of extrinsic rewards on intrinsic motivation.

The present research will investigate "self rewarding," a part of the traditional intrinsic motivation concept. Self rewarding is the cognitive, evaluative consequence of work performance and is thus more limited in scope than "intrinsic motivation" which incorporates affective reactions toward both the task activity itself and toward task performance.

This literature review will consider, first, studies of the nature of intrinsic motivation, and second, studies concerning relationships between job characteristics and intrinsic motivation. Blood's (1978) model explicating the relation between self rewarding and performance will be linked to available research. It will be shown that this model fits the previous reseach data and makes explicit a notion that is usually implicit in other studies of intrinsic motivation.

## 1.2 Nature of Intrinsic Motivation

Throughout the years intrinsic motivation has resisted precise definition. In 1956 Koch focused attention on this subject and described intrinsically motivated behavior as: "intrinsically determined within the conditions of its own context, (...) self regulated, self determining, self-motivated, self-energizing, and, unfortunately, self-liquidating (Koch, 1956, p. 71). More recent attempts to define intrinsic motivation, though more explicit than Koch's, still lack specificity. Intrinsic motivation is usually described as being present: "...when the activity is valued for its own sake and appears to be self-sustained" (Young, 1961, p. 171), or: "...if there is no apparent reward except the activity itself or feelings which result from the activity" (Deci, 1972, p 217). These descriptions are sufficiently vague to allow very different interpretations and operationalizations to co-exist (Broedling, 1977).

Though hampered by the fuzziness of the definition, the theories explaining intrinsic motivation have come a long way since Montgomery (1954) postulated an "exploratory drive" to account for intrinsically motivated behavior in rats: incorporating most of the reseach, both physiological and psychological, in this area Deci (1975) provides a theoretical framework for the further investigation of intrinsic motivation. Building on earlier work of White (1959) and de Charms (1968) he asserts that intrinsically motivated behaviors are expected to satisfy "the human need for being competent and self-determining" (Deci, 1975, 1976). The satisfiers of this need are feelings of

competence and self-determination that a person gets from doing/having done the behavior.

Corresponding to the optimal incongruity theory of Hunt (1955), Deci further suggests that this need can best be satisfied by conquering challenges of an optimum level of difficulty. Intrinsically motivated behaviors therefore, will be either challenge-seeking or challenge-conquering, depending on the prevailing level of challenge.

Staw (1975) makes this same distinction when he distinguishes two components of intrinsic motivation: a component associated with the task behavior itself and one associated with task accomplishment. Both Deci (1975) and Staw (1975) use a cognitive, anticipatory model of motivated behavior.

Although much progress has been made, the current status of the definition and theory of intrinsic motivaton still can be considered sketchy; according to Deci (1975) more rigorous reseach is needed to provide specific explanations and a testable form of the theory. The major portion of the research on intrinsic motivation however, attempts to establish whether extrinsic rewards diminish intrinsic motivation. In spite of an impressive body of research (e.g., Deci, 1971, 1972; Kruglanski, Alon & Lewis, 1972; Lepper, Greene & Nisbett, 1973; Greene & Lepper, 1974; Eden, 1975; Hamner & Foster, 1975; Kruglanski, Riter, Amitai, Margolin, Shebtai & Zaksh, 1975; Salancik, 1975; Farr, 1976; Pittman, Cooper & Smith, 1977) this question does not yet have a satisfactory answer (Scott, 1976).

## 1.3 Job Characteristics and Intrinsic Motivation

Much attention has been given to the intrinsic components of the work situation and their effects on satisfaction and motivation since Herzberg and his colleagues (Herzberg, Mausner, Peterson & Capwell, 1957; Herzberg, Mausner & Snyderman, 1959) introduced the intrinsic-extrinsic distinction into discussions of the work situation.

A multitude of dissenting articles resulted regarding the relative contributions of intrinsic and extrinsic job elements to job satisfaction and job dissatisfaction (see e.g., Burke, 1966; Ewen, Smith, Hulin & Locke, 1966; Dunnette, Campbell & Hakel, 1967; House & Wigdor, 1967; Whitsett & Winslow, 1967). Contradictory results in the ensuing empirical studies are partly due to the lack of specificity in Herzberg's theory and, consequently, the many (mis)interpretations of it (see Whitsett & Winslow, 1967; King, 1970; Hackman & Lawler, 1971). In spite of methodological difficulties, however, the distinction between content and context variables is generally upheld (Burke, 1966; Campbell & Pritchard, 1976) and intrinsic factors have often been found to be more important than extrinsic ones in determining affective responses to the job (Ewen, Smith, Hulin & Locke, 1966; Dunnette, Campbell & Hakel, 1967; Hulin & Smith, 1967; Hulin & Waters, 1967; Whitsett & Winslow, 1967; Blood, 1973; Herold & Greller, 1975).

Turner and Lawrence (1965) addressed themselves to the problem of operationalizing the measures of job characteristics (a property that was lacking in Herzberg's original formulation of the two-factor theory). They developed measures for six "Requisite Task Attributes"

and examined the effects of these attributes upon attendance and affective reactions toward the job. The requisite task attributes were: variety, autonomy, required and optional interaction, required knowledge, and skill and responsibility. They found some support for the hypothesis that the task characteristics were related to both satisfaction and attendance in the sample, although there was one unexpected moderator variable: the dimension designating the rural or urban location of the people in the sample. For subjects with a rural background the hypotheses were partially confirmed, for the urban group they were not.

Basing their work on the findings of Turner and Lawrence (1965), Hackman and Lawler (1971) probed the matter further. With variety, task identity, autonomy and performance feedback as relevant task characteristics, they hypothesized a positive relationship between the four "core dimensions" and intrinsic motivation and job behavior. This hypothesis can be summarized as follows:

objective job characteristics ——> perceived job characteristics ——> work attitudes and behavior

The rural-urban dimension that Turner & Lawrence (1965) found to be important, meanwhile had been investigated by Blood and Hulin (1967; Hulin & Blood, 1968). They concluded that it was not the geographical location *per se* that made the difference, but rather what they called "alienation from middle-class norms". Hulin & Blood (1968) suggest that this alienation is fostered more in a big city environment than in a small town or a rural area.

Continuing in the direction taken by Blood and Hulin and going one step further, Hackman and Lawler (1971) measured the alienation variable "...directly at the individual level of analysis" (p. 261). They reversed its direction and, referring to the need hierarchies proposed by Maslow (1943) and Alderfer (1969), renamed it: Higher Order Need Strength. Both the hypothesis concerning the relationship between job characteristics and worker reactions and the one concerning the moderator-effect of Higher Order Need Strength, received support.

In 1975 Hackman and Oldham published the Job Diagnostic Survey. They used essentially the same theoretical model to describe the relationship between task characteristics and personal work outcomes that Hackman and Lawler had used four years earlier. The Job Diagnostic Survey was intended to measure more carefully the variables that were important in the studies done by Turner and Lawrence (1965) and Hackman and Lawler (1971). Subsequent research supports the JDS as a reliable and valid measure of task characteristics and generally confirms the model behind it (Oldham, 1976; Oldham, Hackman & Pearce, 1976; Umstot, Bell & Mitchell, 1976; Rousseau, 1977).

## 1.4 Self Rewarding

While past reseach has thus given us some insight as to which human needs are involved in intrinsic motivation and which task variables are related with satisfaction and motivation, the actual factors and processes that determine the relation between intrinsic motivation and job performance are still virtually uninvestigated. Both Hackman and Lawler (1971) and Hackman and Oldham (1975) consider

intrinsic motivation a work outcome; in their models it stands on the same level as job behavior.

In order to clarify the relationship between job performance and intrinsic motivation, Blood (1978) proposed a theoretical framework that posits a relationship between "self rewarding" and performance. Self rewarding "...is defined as the private, cognitive, affective consequence of a job behavior. Colloqial language would describe extreme positive self rewarding as pride and extreme negative self rewarding as shame" (Blood, 1978. p. 94). Self rewarding is closely related to growth satisfaction and performance satisfaction (Deci, 1975), both of which have been recognized since Herzberg et. al (1959) as important intrinsic satisfactions and as the cornerstone of intrinsic motivation. Hackman and Lawler (1971) assert that job conditions that encourage intrinsic motivation are effective in this respect because they provide opportunities to derive growth- and accomplishment satisfaction from good performance. Staw (1975) does not probe this matter in much depth, but hints that in his model also satisfaction with accomplishment is the basic need fulfillment underlying intrinsic motivation. Deci (1975) considers a similar construction. The feeling of competence and self determination derived from performance is the foundation of all intrinsic motivation in his theory. He defines intrinsic motivaton as the awareness of the satisfaction that can be obtained from, and is synonymous with this feeling.

In the psychological literature the term "intrinsic" is used in two different ways and self rewarding is exactly at the intersection of those two. Intrinsic as used in "intrinsic motivation" and "intrinsic satisfaction" means "coming from the task itself." In "intrinsic reward" however, the term means "administered by the person himself" and can vary from a Premack principle-type reward (Premack, 1965) to self rewarding, in which case the reward is both from the task and self administered.

Using self rewarding as a theoretical concept has advantages over using intrinsic motivation. It is a more limited and specific concept than the concept of intrinsic motivation that has had a variety of meanings and interpretations (Broedling, 1977). In terms of Staw (1975) self rewarding is related to only that part of intrinsic motivation that is inherent in achievement, not in the part inherent in the task activity itself. Self rewarding is more concrete, easier to conceptualize and easier to measure than intrinsic motivation.

Research on the effects of self administered rewards has led to abundant evidence that contingent self administered reinforcement results in significant increases in performance and higher levels of responding compared to noncontingent or no reinforcement treatments (Bandura & Perloff, 1967; Kaufmann & O'Leary, 1972; Glynn, Thomas & Shee, 1973; Glynn & Thomas, 1974; Switzky & Haywood, 1974; Litrownik, Franzini & Skenderian, 1976). Furthermore, the effects of extrinsic and intrinsic rewards are generally comparable in strength. Some reseachers even report that the effects of self administered rewards

# ORGANIZATIONAL INFLUENCES ON THE SELF REWARDING - JOB PERFORMANCE RELATIONSHIP

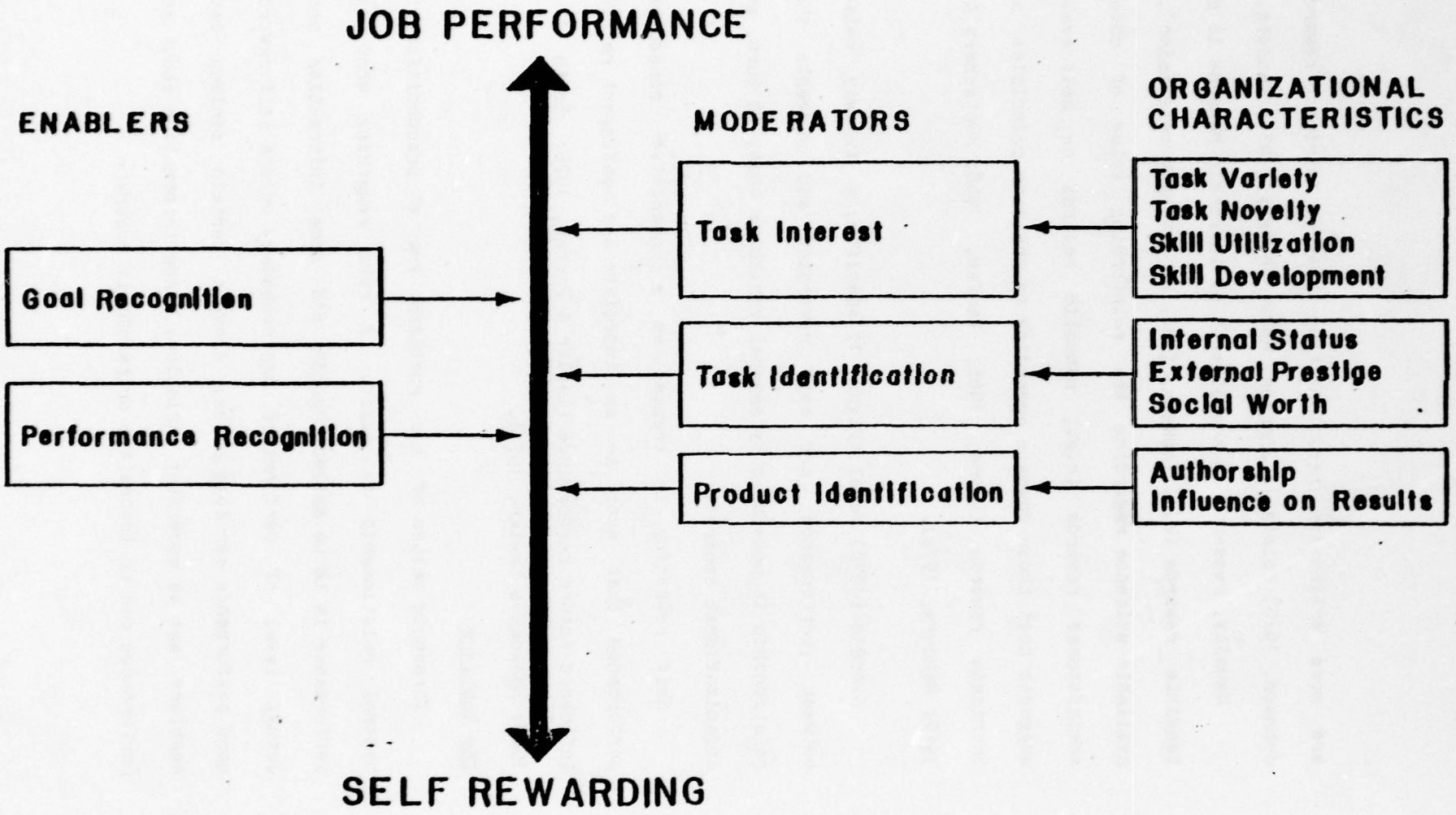


Figure 1

are more extinction resistant than those of extrinsic rewards (e.g., Johnson, 1970; Bolstad & Johnson, 1972; Jeffrey, 1974; Bandura, 1976).

Usually, research on the effects of intrinsic rewards is done with tangible rewards (e.g. tokens, food, or watching television), but the available evidence regarding the reinforcing value of covert self administered rewards (e.g., symbolic rewards or self evaluations) suggests that those operate according to the same principles as other intrinsic rewards (Homme, 1965; Kanfer, 1968; Montgomery & Parton, 1970; Bandura, 1976).

Blood's (1978) model (Figure 1) specifies a two-way relationship between performance and self rewarding and suggests that this relationship is moderated by several variables that, in turn, are under organizational control.

Self rewarding is treated as a cognitive consequence of performance that acts as an immediate and contingent reinforcer to influence future performance (Lawler & Porter, 1976; Smith & Cranny, 1968; Hackman & Lawler, 1971).

The Enablers

Threshold values of the enablers are a precondition for the central relationship to exist. A norm regarding what level of performance is to be called "good" and some information about the actual level of performance are necessary before self rewarding for good performance can take place. Above a certain minimum level the enablers act as moderator variables, since information about goals and performance can be incomplete or partially accurate.

The effects of goal and performance recognition are hard to tell apart and are often confounded in the literature (Locke, Cartledge & Koeppel, 1968). It is not clear which one of the two is the dominating factor, but some authors have preferred goal setting (Locke, 1968; Erez, 1977). Both factors, however, are confirmed by abundant evidence to be highly relevant in this context: Goal recognition has been related to:

-- performance (Locke, 1968; Steers & Porter, 1974; Latham & Yukl, 1975)
-- Overall and intrinsic job satisfaction (Locke, Cartledge & Knerr, 1970; Ivancevich, 1976; Kim & Hamner, 1976)
-- the effects of self administered rewards (Locke, Cartledge & Knerr, 1970 Bandura, 1971 Glynn & Thomas, 1974 Hamner & Harnett, 1974)

For performance recognition also there is evidence linking it with:

-- performance (e.g., Thorndike, 1927; Herold & Greller, 1975; Kim & Hamner, 1976; Erez, 1977)
-- overall and intrinsic job satisfacton (Hackman & Lawler, 1971; Brief & Aldag, 1975; Herold & Greller, 1975; Rousseau, 1977)
-- intrinsic motivation (Lawler; 1969; Hackman & Lawler, 1971 Ilgen & Hamstra, 1972; Deci, 1975)
-- the effects of intrinsic rewards (Bandura, 1971)

## The Moderators

Three variables moderate the performance - self rewarding relationship: task interest, task identification and product identification.

Task interest is the degree of personal interest a person has in his/her job. Task identification is the extent to which someone identifies with his/her job, i.e. the importance of the task for his/her self concept. Product identification is similar, but in it the identification is with the finished product instead of with the task

(e.g. "I make Brand X carpets!" rather than "I am a loom-greaser!"

Little research has been done specifically to investigate the relations among the variables in the self rewarding model, but the available literature supports, in a broad sense, Blood's (1978) hypotheses: Vroom (1964) links ego-involvement with intrinsic motivation; Hackman & Lawler's (1971) study confirms the relation between "experienced meaningfulness of the work" and intrinsic motivation; Nathanson & Becker (1973) found that task interest moderated the relationship between job performance and job satisfaction; Deci (1972, 1975) states that tasks must be interesting in order to be intrinsically motivating and Bandura (1976) asserts that the higher the "self-evaluative significance" of a task, the higher the motivating value of self rewarding.

The Task Characteristics

The Moderators are hypothesized to be influenced by task characteristics as depicted in Fig. 1. Variety, novelty, skill utilization and skill development influence task interest. Variety and novelty are variables that show up in almost every job enlargement program (e.g., Conant & Kilbridge, 1965; Walton, 1972; Dowling, 1973); they are conceptually related to task uncertainty, which, according to Staw (1975) is an important factor in task interest. Furthermore, research has established their relationship with job involvement (Hackman & Lawler, 1971) and intrinsic motivation (Hackman & Lawler, 1971; Hackman & Oldham, 1975; Rousseau, 1977).

Skill utilization was one of the Requisite Task Attributes in Turner & Lawrence's (1965) study and showed to be related to job satisfaction. Lawler (1969), Hulin (1971) and Deci (1972, 1975) all assert the necessity of the use of valued skills for intrinsically motivating jobs.

For Skill development too, there is both direct and indirect evidence that it is a relevant variable in this model. Deci (1975, 1976) suggests that conquering new challenges is one of the key factors in intrinsic motivation. Maslow's (1943) self actualization, the ultimate need fulfillment in his model, is an extreme kind of skill development; for White (1959) expansion of competence is the central key to individual development; Blood (1973) found opportunities for growth to be an important work reward and Rousseau (1977) found that the "learning" variable was related to job involvement and intrinsic motivation.

Internal status, external prestige and social worth influence task identification in the model. Internal status is the status of the job incumbent within the organization, external prestige is the status of the job outside of the organization and social worth is the perceived importance of the outcomes of the job for other people. These variables are conceptually related to what Hackman & Lawler (1971) called "task significance." In their study task significance had a positive correlation with intrinsic motivation, a result that was replicated in more recent research (Hackman & Oldham, 1975; Oldham, 1976; Rousseau, 1977).

Authorship and influence on results influence product identification. Authorship, "the ability to identify an individual worker as the creator of a particular product" (Blood, 1978) is related to the task identity variable originated by Turner & Lawrence (1965). Influence on results is similar to the responsibility variable from Turner & Lawrence's (1965) study. Vroom (1964); Lawler (1969) and Deci (1975) stress the relevance of this variable in the field of intrinsic motivation.

2. Hypotheses

The present research investigates the viability of Blood's model outside the laboratory by testing the following hypotheses.

--There is a positive relationship between job performance and self rewarding.

--The relationship between job performance and self rewarding is moderated by goal recognition, performance recognition, task interest, task identification and product identification.

--There is a positive relationship between the organizational characteristics and task interest, task identification and product identification as depicted in Figure 1.

--Enhancing the variables moderating the performance -- self rewarding rewarding relationship will strengthen that relationship.

3. Subjects and Research Setting

The samples consisted of workers in three plants of a nonunionized carpet manufacturing company, situated in rural areas in Georgia and South Carolina. The technology of the three plants was roughly similar: one was a weaving mill, the other two were tufting operations. All three mills covered the whole carpet manufacturing process from raw yarn to finished, ready to sell carpet. The number of subjects in the samples was 86% of the total population in each of the plants, 407, 414, and 331 respectively, 1152 in all.

The samples included all production, maintenance and clerical personnel, first level supervisors and department foremen (see Table 1 for breakdown). The skill level ranged from unskilled (for some of the maintenance jobs) to fairly highly skilled (for some of the actual manufacturing jobs). The average education was approximately two years of high school. For more detailed demographic information: see Table 2.

A first questionnaire was administered to all employees participating in the study in November and December 1977. Starting in January, three months of experimental manipulation followed. A second questionnaire was administered in April 1978. The questionnaires were administered in groups of up to 45 employees. The employees met in the training room of the plant where the senior author provided the instructions, assured the respondents of the confidentiality of their responses, and answered questions. The person administering the questionnaire was not an employee of the carpet company. In the

experimental phase of this research, Plant I (the weaving mill) acted as control group and Plants II and III as experimental groups.

Table 1

Breakdown of Samples by Occupational Group

(Percentages)

| | Plant I | Plant II | Plant III |
|---|---|---|---|
| Production | 68.1 | 68.7 | 62.6 |
| Maintenance | 14.5 | 9.9 | 12.1 |
| Clerical | 11.7 | 12.2 | 16.0 |
| Supervisory | 5.2 | 7.9 | 7.0 |
| Miscellaneous | .5 | .7* | 1.9* |

*When percentages don't add to 100, the balance is due to unusable answers.

Table 2

Demographic Information

| | Plant I | Plant II | Plant III |
|---|---|---|---|
| Initial N | 407 | 414 | 331 |
| Usable Questionnaires | 386 (95%) | 403 (97%) | 313 (94%) |
| Mean Years of Education | 10.47 | 10.41 | 10.26 |
| Mean Tenure at Company (years) | 11.02 | 6.49 | 9.38 |
| Mean Tenure at Occupation (years) | 7.73 | 3.74 | 6.41 |
| % Female | 18.7 | 40.2 | 73.5 |
| % Male | 81.1* | 59.8 | 26.5 |

*When percentages don't add to 100, the balance is due to unusable answers.

# 4. Measures

## 4.1 Measures of Performance

### 4.1.1 Self Rating

A self rating of performance, composed of three items, asked each subject to rate the quantity and quality of his/her work and the effort s/he made in job performance (Porter & Lawler, 1968). Ratings were given on a seven point scale with anchor points at the extremes and in the middle of the scale (See Appendix A). This self rating attempts to measure the cognitive representation by someone of his/her own performance, a representation on which self rewarding is founded.

Earlier research using this type of self rating of performance however, is not altogether encouraging; the self ratings are influenced by other factors besides the perception of one's own performance. Porter and Lawler (1968) report low correlations with more objective measures of performance and Turner and Lawrence (1965) conclude that "it failed to discriminate the attitude it was intended to reveal" (p. 135).

### 4.1.2 Objective Measure of Performance

For small groups of subjects (79 weavers in Plant I, 32 needlers in Plant II and 23 needlers in Plant III) individual figures for performance against Industrial Engineering standards were available in the latter stages of the research. These standards make corrections

for factors that influence production but are beyond control of the workers, e.g. type of fabric, yarn quality, grade of carpet, long or short runs and machine conditions.

The unit in which these standards are expressed is labor dollars, i.e., manhours times wages; performance is computed as a percentage of the standard. In Plant I the figure used is the weekly incentive payment directly tied to this percentage, in Plant II and III the figure used is the actual percentage. For each individual the performance over a four-week span was averaged and the resulting number was used as an objective measure of performance after the experimental intervention.

## 4.2 Measures of Psychological Variables

The instruments used to measure the psychological variables and the (perceived) job characteristics in the model draw heavily on earlier research by Turner and Lawrence (1965), Hackman and Lawler (1971) and Hackman and Oldham (1975). Many of the items and scales developed by these researchers have been used; some were revised, others were utilized in their original form. (For questionnaire: see Appendix A)

Except for Self Rewarding, Specific Satisfactions and Higher Order Need Strength all variables were measured with three Likert type items, scored on a seven point response scale. In each set of three items there were two positive questions and one negative. Scale scores were computed by averaging the three answers after the answers on the negative item were reversed.

Self rewarding was defined as the average of the scores on three variables:

--Growth: the sense of personal growth derived from the job,

--Pride: the feeling of pride in one's performance,

--Accomplishment: the feeling of accomplishing something important on the job. Each of these subscales was measured by three items in the format mentioned above.

The scales for Specific Satisfactions and Higher Order Need Strength are both from the JDS (Hackman & Oldham, 1975). Specific Satisfactions measured satisfaction with growth, pay, security, social opportunities and supervision. For Higher Order Need Strength six items in the "would like" format from the JDS were used.

Reports about previous experience with measuring perceived job characteristics and employee reactions to their jobs show that these measures of perceptions of job dimensions are sufficiently reliable, correlate fairly highly with ratings by neutral observers of the same characteristics, and are sensitive for between-job differences; measurements of employee reactions to their job have been highly reliable (e.g. Turner & Lawrence, 1965; Hackman & Lawler, 1971; Hackman & Oldham, 1975; Rousseau, 1977).

In comparison with JDS-scales (Hackman & Oldham, 1974) the scales used in this research are shortened and in many places reworded, as a response to the warning by Hackman and Oldham (1974, 1975) that a fairly high level of literacy is required to understand and complete their questionnaire. The questionnaire used in the present research was tested in earlier samples by Blood (Note 1) and proved itself to be

psychometrically satisfactory.

## 5. Procedure

### 5.1 Administration of the Questionnaire

The subjects were notified in advance of the upcoming survey and were asked (by department) to fill in the questionnaire during normal work hours. Subjects who had serious objections against participating were not forced to comply, they just got an extra one-hour break. Perhaps because of the quality of the coffee in the canteens, very few people made use of this option. The questionnaire was administered to groups varying in size from 17 to 45 people, averaging about 30, and took 45 minutes to complete.

The preliminary remarks from the researcher and the first page of the questionnaire introduced the research team, explained the purpose of the survey, told about the planning of the research and stressed the facts (a) that the questionnaire was not a test but asked for opinions about the jobs and (b) that no individual answers would be made available to the company, that confidentiality was guaranteed.

In the same introductory speech the answering code was extensively explained and examples of the different sections of the questionnaire were given. Attention was given to the fact that there was one reversed item in each set of three.

All questions related to answering, purpose, use, or planning of the questionnaire were answered. The subjects were encouraged to make sure the meaning of every item in the questionnaire was clear before they answered it, and to ask for explanation whenever that was not the case. Many people indeed did so, indicating that Hackman and Oldham's

(1974, 1975) warning for required literacy was correct.

5.2 Experimental Manipulations

The intervention was aimed at manipulating two groups of variables:

--goal-and performance recognition,

--product identification and social worth.

Goal- and performance recognition were improved by:

--posting production goals and actual production figures,

--focusing on positive performance feedback from supervisors.

5.2.1 Posting

Both production goals and performance data were expressed in Industrial Engineering standards. The standards themselves acted as production goals, the actual performance was computed per week as a percentage of the standard.

In every department for which a reliable standard was available (see Table 3 for a listing) a 77.5 x 57.5 cm poster went up that showed the 100%-of-the-standard line, a vertical bar that marked the beginning of the intervention and the performance against standard for the department in the six weeks before the intervention started. Bulletin boards with these graphs were located in places in each department where everybody was likely to walk by several times a day; favorite places were department canteens and walls near the entrance or exit.

Table 3

Departments in Intervention

| Plant II | (N) | Plant III | (N) |
|---|---|---|---|
| Material Preparation | 37 | Material Preparation | 41 |
| Needling | 96 | Needling | 79 |
| Kuster Tak Dyeing | 24 | Beck Dyeing | 34 |
| Tuft Dyeing | 30 | Tuft Dyeing | 3 |
| Backcoating | 33 | Drying | 5 |
| Shearing | 3 | Backcoating | 18 |
| Inspection | 29 | Shearing | 6 |
| | | Inspection | 41 |
| | 252 | | 227 |

Department foremen updated the graphs each week as soon as the new data were known; usually a week's figure was available the following Wednesday. In addition, graphs were posted at several different places in the mills, showing the overall quality of the carpet that was produced, again compared to a standard that corrected for prevailing conditions and materials. These graphs looked the same as the departmental ones, except for the fact that the unit of measurement on these plantwide quality graphs was the percentage of perfect carpet compared to the standard. Information on plantwide quality was available weekly on the Thursday following the week for which the quality figure was computed. Plant managers updated the graphs as soon as the new information was available. Foremen and plant managers were used to update the graphs to demonstrate to employees that supervisory personnel were aware of and participating in this program.

Unfortunately it became clear during the research project that the Industrial Engineering standards did not correct for all the major external factors that influenced production: new materials caused unexpected problems and spectacular drops in the performance figures; absence of one employee did usually not lower production in the departments but showed up as an efficiency increase in the figures; overtime payments in times of great demand were calculated as efficiency losses, thus lowering performance figures. Due to these problems the objective performance data are not an accurate reflection of worker performance on the job tasks.

5.2.2 Positive Performance Feedback

Meetings were held with all the supervisory personnel in groups of 25-30. In these meetings the effect of positive feedback was explained and its importance emphasized. Three general situations were identified to give positive feedback:

--in case of outstanding peformance,

--in case of improved performance,

--in case of correct performance.

Specific examples were given as to when and how to give positive feedback. Supervisors were asked to give extra attention to the three kinds of performance mentioned above for all of their subordinates. Supervisors were encouraged to find two instances each day to praise some employees for their performances. The entire hierarchy of the plant's supervisory personnel was included in this intervention, the highest level being the corporate vice president of manufacturing. During the program there were frequent, short, individual follow-up sessions with each supervisor involved in which the problems encountered while giving positive feedback were discussed and guidelines for future behavior were offered by the researchers. After two months, however, it was clear that giving positive feedback was still a problem for the majority of the supervisors. To solve this, a training program was initiated in the two intervention plants for all personnel with any supervisory function, from crew leaders to plant managers. The training consisted of one main session with two follow-up sessions, one and eight days later respectively. The

training groups consisted of approximately eight people.

In the main session:

--more background information was provided about positive performance feedback,

--situations suited for praising workers and ways to do that were identified by the supervisors,

--the actual giving of positive feedback was practiced by role playing.

Between the main session and the first follow-up the supervisors were asked to look for the kinds of situations identified in the training, to give positive performance feedback where it was appropriate, and to record what they had commented on, what they had said and what the workers' reactions were. In the first follow-up session one day after the initial training (using the recording sheets as starting point) the experiences of the supervisors were discussed and problem-situations were repeated in role play.

Between the first and second follow-up session the supervisors were asked to bring their new skills into practice on the shop floor. They were to look for at least two instances each day to give positive feedback on performance and to record what was said and done. In the second follow-up session (one week after the first) problems encountered were discussed and situations, when necessary, were repeated in role play.

5.2.3 Product Identification and Social Worth

Another part of the experimental manipulation was directed at enhancing Product Identification and Social Worth by giving the workers:

--more feedback about customer reactions,

--more feedback about retailer reactions,

-- more information about the use of their carpet by big contract-customers (e.g. airlines, federal government). Poster size blow ups of letters from customers and retailers, pictures of installations for big contract-customers, and summaries of the answers on the consumer survey (a list of questions asking for customer-reactions, given to every person who buys a piece of carpet manufactured by this company) were displayed on the same bulletin boards as the performance graphs.

The questionnaire was administered for the second time four months after the first. The procedure for administering the questionnaire was identical on the two occasions.

## 6. Specific Predictions

The specific predictions of the study were:

1.1.a There is a positive correlation between the self rating of performance and Self Rewarding.

1.1.b There is a positive correlation between performance against IE standards and Self Rewarding.

2.1.a Goal Recognition has a moderating effect on the relationship between self rating of performance and Self Rewarding.

2.1.b Goal Recognition has a moderating effect on the relationship between performance against IE standards and Self Rewarding.

2.2.a Performance Recognition has a moderating effect on the relationship between self rating of performance and Self Rewarding.

2.2.b Performance Recognition has a moderating effect on the relationship between performance against IE standards and Self Rewarding.

2.3.a Task Interest has a moderating effect on the relationship between self rating of performance and Self Rewarding.

2.3.b Task Interest has a moderating effect on the relationship between performance against IE standards and Self Rewarding.

2.4.a Task Identification has a moderating effect on the relationship between self rating of performance and Self Rewarding.

2.4.b Task Identification has a moderating effect on the relationship

between performance against IE standards and Self Rewarding.

2.5.a Product Identification has a moderating effect on the relationship between self rating of performance and Self Rewarding.

2.5.b Product Identification has a moderating effect on the relationship between performance against IE standards and Self Rewarding.

3.1.a There is a positive correlation between Variety and Task Interest.

3.1.b There is a positive correlation between Novelty and Task Interest.

3.1.c There is a positive correlation between Skill Utilization and Task Interest.

3.1.d There is a positive correlation between Skill Development and Task Interest.

3.2.a There is a positive correlation between Internal Status and Task Identification.

3.2.b There is a positive correlation between External Prestige and Task Identification.

3.2.c There is a positive correlation between Social Worth and Task Identification.

3.3.a There is a positive correlation between Authorship and Product Identification.

3.3.b There is a positive correlation between Influence on Results and Product Identification.

4.1.a In the two experimental plants the correlation beween Self Rewarding and the self rating of performance will be higher after the intervention than before.

7. Statistical Analyses

The hypothesized central relationship between job performance and Self Rewarding will be tested with the correlation between Self Rewarding and the performance measures. Likewise, the suggested relationships between job characteristics and the Moderator variables will be tested with the simple correlation coefficient between those variables.

There are several ways to analyze research data on the existence of the presumed moderator effects. The first is subgroup analysis, performed by splitting the data in a number of groups, using arbitrary values of the hypothesized moderator variable as cutting points and seeing if the correlations between independent and dependent variable differ among the subgroups. This method is a simple and convenient one, hence often used, but there are substantial objections to it:

--The information in the data is reduced by forcing continuous variables into two or three discrete values,

--In case of three groups even more information is lost when (as is usually done) only the low and high group are compared with each other, thus reducing the N by the number of people in the middle group,

--The place of the cutting points is arbitrary,

--In case of correlations between the moderator variable (z) and the dependent variable (y ), the standard deviation of y in the subgroups of the moderator z will be reduced which results in inflated correlation coefficients for each subgroup, according to the formula

$$r = b \frac{SD_x}{SD_y} \qquad (1)$$

where b is the regression coefficient for the independent variable and i signifies the $i^{th}$ subgroup (Peters & Champoux, Note 4).

A method generally (Saunders, 1956; Zedeck, 1971; Peters & Champoux, Note 4) considered to be superior to subgroup analysis is moderated regression analysis in which the moderator effect will show up as the relationship between the dependent variable and the cross product of the independent and moderator variable. Making use of more of the available information and statistically sound, this analysis is free from all the drawbacks of the subgroup analysis. However, Blood and Mullet (Note 2) show that entering the interaction term in the regression equation after the two linear terms have been removed gives the moderator effect credit only for explained variance in the dependent variable beyond that accounted for by the linear effects. Any covariance that is shared by the main and moderator effects is credited to the main effects. Mathematically it is equally justifiable to enter the interaction- (or moderator-) term first, thus giving preference to the moderator effects. They argue that the decision as to the order of entering the variables in the equation must be based on theoretical grounds, i.e., if a moderator effect is expected, it must be given a fair chance to manifest itself, a chance it hardly gets when entered after the linear terms.

A second relevant comment on the moderated regression analysis comes from Peters and Champoux (Note 4). They state that the moderated regression analysis does not yield enough information about the magnitude of the moderator effect, only about its significance. According to these authors, information about the magnitude should be

obtained from analysis of the standardized regression coefficients of the independent variable in the moderated regression equation for the range of values of the moderator.

In order to generate these regression coefficients they use the values of the moderator variable that would divide a normal distribution into six approximately equal parts (X - SD, X - 1/2 SD, X, X + 1/2 SD, X + SD) and compute the regression coefficient for the independent variable for each of these values according to the equation:

$$y = a + bx + cz + dzx \qquad (2)$$

restated as:

$$y = a + cz + (b + dz)x \qquad (3)$$

In the case of empirical data, b and d are known and a regression coefficient for the independent variable x can be computed for different values of the moderator z. Compared to the Blood and Mullet (Note 2) analysis, the method suggested by Peters and Champoux (Note 4) makes more complete use of the available information by incorporating both the moderator effect and the linear effect of the independent and moderator variable in the analysis.

The significance of the moderator effects will be analyzed in this research with the method provided by Blood and Mullet (Note 2). An indication of the magnitude of the moderator effects will be obtained from the analysis as advised by Peters and Champoux (Note 4).

The hypotheses regarding the effects of the experimental manipulations will be tested by comparing the correlation between Self Rewarding and the self rating of performance before and after treatment, and by testing the significance of the difference with the method provided by McNemar (1969, p. 157).

# 8. Results

The Results section is divided into three subsections. The first two of these consider the static data from the first and second survey respectively, the third subsection deals with the results of the experimental manipulations.

## 8.1 First survey

### 8.1.1 Descriptive Statistics

The means, standard deviations and reliabilities of the measures of performance and the psychological variables are reported in Table 4; they show that the three plants not only are comparable in technology and type of work, but have similar initial scores too. The means are not too extreme, the standard deviations not too small and the reliabilities high enough. The conclusion seems justified that the questionnaire is psychometrically satisfactory for research purposes in this sample.

In order to check whether the reversed questions in each section were properly understood, the correlation was computed between the three item scales and the sum of the two positive items from those scales. Over the three plants these correlations ranged from .85 to .95, the median was .92. This indicated that the negative questions in each section did not cause problems of understanding for the participants in the study.

Table 4

Means, Standard Deviations and Reliabilities

First Survey

| | Mean | | | SD | | | Reliability (Cronbach's Alpha) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Plant I | Plant II | Plant III | Plant I | Plant II | Plant III | Plant I | Plant II | Plant III |
| Performance (self rating) | 5.6 | 5.3 | 5.2 | 1.0 | 1.1 | 1.0 | .66 | .63 | .60 |
| Self Rewarding | 5.0 | 5.0 | 5.2 | .9 | .9 | .9 | .79 | .75 | .78 |
| Goal Recognition | 5.2 | 5.2 | 5.3 | 1.2 | 1.4 | 1.3 | .60 | .72 | .73 |
| Performance Recognition | 4.3 | 4.4 | 4.6 | 1.2 | 1.2 | 1.2 | .40 | .44 | .56 |
| Task Interest | 4.3 | 4.3 | 4.5 | 1.4 | 1.4 | 1.4 | .68 | .68 | .64 |
| Task Identification | 5.0 | 5.1 | 5.1 | 1.3 | 1.2 | 1.1 | .55 | .59 | .51 |
| Product Identification | 4.7 | 4.8 | 5.1 | 1.3 | 1.3 | 1.1 | .52 | .61 | .54 |
| Variety | 4.1 | 3.7 | 4.1 | 1.6 | 1.7 | 1.7 | .71 | .82 | .79 |
| Novelty | 4.0 | 3.5 | 3.9 | 1.6 | 1.7 | 1.7 | .75 | .81 | .81 |
| Skill Utilization | 4.4 | 4.2 | 4.4 | 1.4 | 1.4 | 1.4 | .62 | .63 | .67 |
| Skill Development | 4.7 | 4.5 | 4.8 | 1.4 | 1.5 | 1.4 | .66 | .66 | .74 |
| Internal Status | 4.5 | 4.3 | 4.4 | 1.4 | 1.4 | 1.4 | .72 | .65 | .68 |
| External Prestige | 4.6 | 4.3 | 4.6 | 1.2 | 1.3 | 1.2 | .63 | .73 | .69 |
| Social Worth | 5.0 | 4.8 | 4.8 | 1.3 | 1.3 | 1.4 | .73 | .77 | ,76 |
| Authorship | 4.7 | 4.6 | 4.5 | 1.4 | 1.5 | 1.5 | .67 | .63 | .67 |
| Influence on Results | 4.9 | 4.8 | 4.8 | 1.2 | 1.4 | 1.3 | .49 | .57 | .52 |
| Higher Order Need Strength | 4.2 | 4.3 | 4.2 | 1.4 | 1.5 | 1.5 | -- | -- | -- |
| Satisfaction with | | | | | | | | | |
| --growth | 4.7 | 4.7 | 4.8 | 1.3 | 1.3 | 1.3 | -- | -- | -- |
| --pay | 4.0 | 4.2 | 4.3 | 1.6 | 1.6 | 1.6 | -- | -- | -- |
| --security | 4.5 | 4.7 | 4.7 | 1.4 | 1.4 | 1.5 | -- | -- | -- |
| --social opportunities | 5.4 | 5.6 | 5.7 | 1.0 | .9 | .9 | -- | -- | -- |

8.1.2 The Focal Relationship

In evaluating the model the first concern is the relationship between Self Rewarding and performance. The only measure of performance available in this stage was the self rating of performance. The correlations between self rating and Self Rewarding are reported in Tables 5, 6 and 7.

Although not of an overwhelming magnitude, the positive correlation between Self Rewarding and the self rating of performance is indeed significant. In Plants I and III Self Rewarding is a better predictor of the performance self rating than all other variables investigated; in Plant II it is the second best predictor.

8.1.3 The Relationship Between Organizational Characteristics and the "Moderators"

The hypotheses concerning the relationship between the organizational characteristics and the "Moderators" are only partly confirmed by the data (See Tables 5, 6 and 7). While the model predicts strong relationships with only one moderator variable for each job characteristic, the results show that often job characteristics have high correlations with two moderators, sometimes not even including the one predicted by the model. Variety and Novelty are an exception in these results: their predicted relationship with Task Interest is uncontestably confirmed in every plant.

Table 5

Correlations Between All Variables

First Survey

Plant I

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Performance (self rating) | | | | | | | | | | | | | | | |
| 2 | Self Rewarding | .20 | | | | | | | | | | | | | | |
| 3 | Goal Recognition | -.03 | 22 | | | | | | | | | | | | | |
| 4 | Performance Recognition | .06 | .36 | .28 | | | | | | | | | | | | |
| 5 | Task Interest | .12 | .60 | .15 | .29 | | | | | | | | | | | |
| 6 | Task Identification | .12 | .63 | .29 | .30 | .52 | | | | | | | | | | |
| 7 | Product Identification | .09 | .36 | .25 | .32 | .33 | .41 | | | | | | | | | |
| 8 | Variety | .12 | .45 | .01 | .24 | .49 | .33 | .15 | | | | | | | | |
| 9 | Novelty | .18 | .39 | -.09 | .20 | .41 | .24 | .12 | .67 | | | | | | | |
| 10 | Skill Utilization | .05 | .37 | .15 | .23 | .41 | .35 | .15 | .39 | .34 | | | | | | |
| 11 | Skill Development | .11 | .48 | .06 | .30 | .44 | .41 | .24 | .44 | .41 | .42 | | | | | |
| 12 | Internal Status | .00 | .41 | .20 | .27 | .41 | .44 | .30 | .38 | .32 | .31 | .47 | | | | |
| 13 | External Prestige | .17 | .47 | .28 | .30 | .39 | .46 | .39 | .29 | .24 | .34 | .44 | .48 | | | |
| 14 | Social Worth | .14 | .52 | .18 | .33 | .44 | .45 | .29 | .30 | .26 | .29 | .44 | .39 | .47 | | |
| 15 | Authorship | .09 | .29 | .14 | .19 | .25 | .24 | .21 | .18 | .17 | .14 | .22 | .32 | .36 | .33 | |
| 16 | Influence on Results | .08 | .33 | .24 | .22 | .19 | .33 | .26 | .28 | .29 | .15 | .23 | .44 | .39 | .30 | .28 |

Note: .09 < r < .12 : p < .05 .12 < r < .16 : p < .01 r > .16 : p < .001

Table 6

Correlations Between All Variables

First Survey

Plant II

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Performance (self rating) | | | | | | | | | | | | | | | |
| 2 | Self Rewarding | .17 | | | | | | | | | | | | | | |
| 3 | Goal Recognition | .02 | .16 | | | | | | | | | | | | | |
| 4 | Performance Recognition | .08 | .26 | .29 | | | | | | | | | | | | |
| 5 | Task Interest | .09 | .48 | .23 | .29 | | | | | | | | | | | |
| 6 | Task Identification | .11 | .57 | .23 | .31 | .58 | | | | | | | | | | |
| 7 | Product Identification | .06 | .37 | .01 | .07 | .20 | .36 | | | | | | | | | |
| 8 | Variety | .05 | .29 | .03 | .24 | .47 | .35 | .11 | | | | | | | | |
| 9 | Novelty | .10 | .25 | .00 | .23 | .39 | .28 | .09 | .73 | | | | | | | |
| 10 | Skill Utilization | .06 | .28 | .10 | .21 | .31 | .41 | .15 | .41 | .37 | | | | | | |
| 11 | Skill Development | .07 | .47 | .15 | .36 | .44 | .47 | .21 | .51 | .52 | .52 | | | | | |
| 12 | Internal Status | .05 | .38 | .22 | .33 | .38 | .31 | .28 | .34 | .30 | .28 | .43 | | | | |
| 13 | External Prestige | .08 | .31 | .20 | .38 | .37 | .43 | .25 | .28 | .24 | .31 | .38 | .46 | | | |
| 14 | Social Worth | .22 | .42 | .25 | .28 | .33 | .47 | .29 | .16 | .15 | .19 | .34 | .21 | .30 | | |
| 15 | Authorship | .11 | .18 | .01 | .04 | .17 | .18 | .11 | .13 | .07 | .15 | .23 | .18 | .22 | .14 | |
| 16 | Influence on Results | .17 | .37 | .16 | .17 | .16 | .23 | .22 | .23 | .19 | .24 | .30 | .19 | .28 | .24 | .20 |

Note: $.08 < r < .12 : p < .05$ $.12 < r < .15 : p < .01$ $r < .15 : p < .001$

Table 7

Correlations Between All Variables

First Survey

Plant III

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Performance (self rating) | | | | | | | | | | | | | | | |
| 2 | Self Rewarding | .24 | | | | | | | | | | | | | | |
| 3 | Goal Recognition | -.05 | .30 | | | | | | | | | | | | | |
| 4 | Performance Recognition | .08 | .32 | .37 | | | | | | | | | | | | |
| 5 | Task Interest | .04 | .54 | .22 | .40 | | | | | | | | | | | |
| 6 | Task Identification | .03 | .56 | .25 | .31 | .62 | | | | | | | | | | |
| 7 | Product Identification | .13 | .45 | .21 | .17 | .31 | .49 | | | | | | | | | |
| 8 | Variety | .07 | .44 | .07 | .30 | .52 | .42 | .26 | | | | | | | | |
| 9 | Novelty | .06 | .36 | -.06 | .15 | .42 | .30 | .15 | .67 | | | | | | | |
| 10 | Skill Utilization | .06 | .35 | .20 | .27 | .39 | .32 | .18 | .42 | .36 | | | | | | |
| 11 | Skill Development | .14 | .51 | .06 | .27 | .42 | .43 | .31 | .53 | .43 | .50 | | | | | |
| 12 | Internal Status | .08 | .47 | .27 | .37 | .47 | .46 | .24 | .40 | .34 | .37 | .38 | | | | |
| 13 | External Prestige | .12 | .47 | .09 | .27 | .49 | .58 | .34 | .40 | .34 | .31 | .43 | .51 | | | |
| 14 | Social Worth | .19 | .57 | .22 | .25 | .41 | .47 | .24 | .29 | .23 | .29 | .36 | .38 | .50 | | |
| 15 | Authorship | .17 | .27 | .05 | .20 | .30 | .22 | .05 | .31 | .24 | .22 | .18 | .24 | .31 | .26 | |
| 16 | Influence on Results | .16 | .38 | .25 | .29 | .41 | .44 | .22 | .31 | .30 | .27 | .38 | .33 | .42 | .35 | .29 |

Note: $.09 < r < .12 : p < .05$ $.12 < r < .17 : p < .01$ $r > .17 : p < .001$

Skill Utilization, Skill Development, Internal Status, External Prestige and Social Worth have high correlations that often differ only slightly from each other with both Task Interest and Task Identification.

For Authorship the predictions are not confirmed at all. Not only has this variable low correlations with the Moderators compared to the other job characteristics, but its highest relations are with Task Interest and Task Identificaton, while its predicted correlaton with Product Identification turns out to be barely significant in one plant (II) and virtually nonexistent in another (III). Influence on Results shows the same pattern, though less extreme. Here too, the highest correlations are never with Product Identification but with Task Interest and Task Identification instead.

8.1.4 Moderating influences on the Performance - Self Rewarding Relationship.

The significance of the moderating effects was tested with the moderated regression analysis advocated by Blood & Mullet (Note 2), the results of which are reported in Table 8. The influences of all variables predicted to moderate the performance - Self Rewarding relationship are significant at the .05 level or better.

In order to estimate the magnitude of the moderator effects the method suggested by Peters & Champoux (Note 4) was used (for results see Table 9). Generally the results show moderate increases in the regression coefficients for Self Rewarding with increasing values of the moderator variables.

Table 8

Moderating Effects on the Relationship Between

Self Rewarding and Self Rating of Performance

First Survey

| Moderator | Plant I | Plant II | Plant III |
|---|---|---|---|
| Goal Recognition | .10* | .09* | .10* |
| Performance Recognition | .14** | .15*** | .19*** |
| Task Interest | .17*** | .13** | .14** |
| Task Identification | .17*** | .16*** | .14** |
| Product Identification | .16*** | .12** | .21*** |

* $p < .05$
** $p < .01$
*** $p < .001$

Note: The figures given are the standardized regression coefficients in the moderated regression equation $y = a + bxz$

Table 9

Analysis of the Magnitude of the Moderating Effects

First Survey

| Moderator | Standardized Regression Coefficients for Self Rewarding | | | | | |
|---|---|---|---|---|---|---|
| | Plant I | | Plant II | | Plant III | |
| | r | $r^2$ | r | $r^2$ | r | $r^2$ |
| Goal | .200 | .04 | .191 | .04 | .192 | .04 |
| Recognition | .247 | .06 | .181 | .03 | .236 | .06 |
| | .293 | .08 | .171 | .03 | .281 | .08 |
| | .340 | .11 | .161 | .03 | .325 | .11 |
| | .386 | .15 | .151 | .02 | .369 | .14 |
| Performance | .185 | .03 | .077 | .01 | .080 | .01 |
| Recognition | .196 | .04 | .136 | .02 | .163 | .03 |
| | .201 | .04 | .196 | .04 | .246 | .06 |
| | .219 | .05 | .255 | .07 | .334 | .11 |
| | .231 | .05 | .315 | .10 | .411 | .17 |
| Task | .169 | .03 | .136 | .02 | .214 | .05 |
| Interest | .191 | .04 | .158 | .02 | .281 | .08 |
| | .213 | .05 | .179 | .03 | .349 | .12 |
| | .236 | .06 | .200 | .04 | .416 | .17 |
| | .258 | .07 | .221 | .05 | .483 | .23 |

Note: For complete regression equations and entered values of the moderators see Appendix B.

Table 9 (continued)

Analysis of the Magnitude of the Moderating Effects

First Survey

| | Standardized Regression Coefficients for Self Rewarding | | | | | |
|---|---|---|---|---|---|---|
| | Plant I | | Plant II | | Plant III | |
| Moderator | r | $r^2$ | r | $r^2$ | r | $r^2$ |
| Task | -.028 | .00 | .111 | .01 | .244 | .06 |
| Identification | -.009 | .00 | .142 | .02 | .299 | .09 |
| | .010 | .00 | .173 | .03 | .355 | .13 |
| | .029 | .00 | .204 | .04 | .410 | .17 |
| | .048 | .00 | .235 | .06 | .467 | .22 |
| Product | .187 | .04 | .123 | .01 | .187 | .04 |
| Identification | .192 | .04 | .151 | .02 | .216 | .05 |
| | .198 | .04 | .178 | .03 | .244 | .06 |
| | .203 | .04 | .206 | .04 | .273 | .07 |
| | .208 | .04 | .233 | .05 | .301 | .09 |
| All | .15 | .02 | .11 | .01 | .17 | .03 |
| Moderating | .22 | .05 | .16 | .03 | .31 | .10 |
| Variables | .28 | .08 | .22 | .05 | .44 | .19 |
| Combined | .35 | .12 | .28 | .08 | .58 | .34 |
| | .41 | .17 | .34 | .12 | .71 | .50 |

Note: For complete regression equations and entered values of the moderators see Appendix B.

Goal Recognition and Performance Recognition show relatively strong moderating effects in two plants and both have what seems to be an unfortunate exception in the third. Task Interest and Task Identification show fairly strong moderating effects in Plant III but much weaker effects in the other two. The moderating effects of Product Identification are small.

The last series of figures in Table 9 reflects the magnitude of the effect of all moderating variables combined. This effect was estimated by averaging the scores on all moderating variables, multiplying this average times Self Rewarding and using the crossproduct as moderator term z in the moderated regression equation

$$y = a + cz + (b + dz)\, x$$

wherein y = estimated value of self rating of performance

x = self rewarding

z = average of five moderator variables

Noteworthy is the fact that the results of this analysis (Table 9) differ from those of the moderated regression analysis (Table 8). Higher significances in the moderated regression analysis do not always coincide with large increases in r for higher values of the moderator and vice versa.

8.1.5 Higher Order Need Strength

The "higher order need strength" variable does not yet have a place in the investigated model and therefore testable hypotheses about its effects are lacking in this reseach. It is, however, possible to

make an educated guess about its workings and to see if the data support that notion. In the model developed by Hackman and Lawler (1971; Hackman & Oldham, 1975) higher order need strength has a moderating influence on the relation between organizational characteristics and internal motivation. Translating this in terms of Blood's model leaves two possible places where the relation between job characteristics and self rewarding could be moderated (see Figure 1). One place is the relationship between job characteristics and task interest, task identification and product identification, the other is the relation between the moderator variables and the focal self rewarding - performance relationship. This second possibility does not seem to be feasible. Not only is it difficult to conceptualize how a variable *moderates a moderator effect*, but it is also unlikely that someone low in higher order need strength should derive a lot of task interest from an enriched job but should fail to self reward for good peformance.

It makes more sense to suggest that higher order need strength moderates the relationship between job characteristics and task interest, task identification and product identification, a suggestion that can be tested with the method suggested by Blood & Mullet (Note 2). The results of this analysis are shown in table 10 and they provide firm support for this tentative hypothesis.

Table 10

Moderating Effects of Higher Order Need Strength

First Survey

| Moderated Relationship | Plant I | Plant II | Plant III |
|---|---|---|---|
| Variety - Task Interest | .39*** | .36*** | .46*** |
| Novelty - Task Interest | .30*** | .29*** | .40*** |
| Skill Utilization - Task Interest | .31*** | .20*** | .38*** |
| Skill Development - Task Interest | .27*** | .28*** | .37*** |
| Internal Status - Task Identification | .35*** | .21*** | .41*** |
| External Prestige - Task Identification | .34*** | .27*** | .46*** |
| Social Worth - Task Identification | .35*** | .28*** | .38*** |
| Authorship - Product Identification | .25*** | .14** | .14* |
| Influence on Results - Product Identification | .26*** | .22*** | .22*** |

* $p < .05$
** $p < .01$
*** $p < .001$

## 8.2 Second survey

### 8.2.1 Descriptive statistics

Means, standard deviations and reliabilities of the measures of performance and the psychological variables are reported in Table 11. As noted before, the measure of performance used in Plant I was different from those used in Plants II and III (incentive earnings and performance as a percentage of the standard respectively); this is the reason why the means of this variable differ so vastly.

### 8.2.2 The Focal Relationship

The predicted positive relation between Self Rewarding and performance does indeed show up in the data when the self rating is used as the measure of performance (see Tables 12, 13 and 14): the correlations are significant at the .001 level in all three plants.

When performance agains IE standards is used as the measure of performance for the small samples for which these figures were available, the predictions concerning the correlations between Self Rewarding and Performance cannot be confirmed. The correlations between the two variables do not differ significantly from zero. However there was a marked "recency effect" in all plants in the correlations between performance against standard and the self rating and/or in the correlations between performance against standard and Self Rewarding. The correlations are low for the performance figures from the first week and become larger for performance figures from more recent weeks.

Table 11

Means, Standard Deviations and Reliabilities

Second Survey

| Variable | Mean | | | SD | | | Reliability (Cronbach's Alpha) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Plant I | Plant II | Plant III | Plant I | Plant II | Plant III | Plant I | Plant II | Plant III |
| Performance | 487.95 | 95.99 | 103.33 | 59.61 | 18.71 | 14.17 | .86 | .86 | .68 |
| Performance (self rating) | 5.5 | 5.4 | 5.4 | 1.2 | 1.2 | 1.2 | .74 | .75 | .76 |
| Self Rewarding | 5.0 | 5.1 | 5.0 | .9 | 1.0 | 1.0 | .76 | .83 | .83 |
| Goal Recognition | 5.0 | 5.1 | 5.2 | 1.3 | 1.3 | 1.3 | .66 | .74 | .73 |
| Performance Recognition | 4.2 | 4.3 | 4.6 | 1.1 | 1.2 | 1.2 | .37 | .55 | .46 |
| Task Interest | 4.1 | 4.0 | 4.1 | 1.3 | 1.5 | 1.4 | .59 | .73 | .71 |
| Task Identification | 4.8 | 4.9 | 4.8 | 1.2 | 1.3 | 1.3 | .61 | .70 | .70 |
| Product Identification | 4.7 | 4.8 | 4.6 | 1.2 | 1.3 | 1.2 | .55 | .66 | .60 |
| Variety | 4.0 | 3.7 | 4.0 | 1.7 | 1.6 | 1.7 | .82 | .80 | .83 |
| Novelty | 3.9 | 3.5 | 3.8 | 1.6 | 1.6 | 1.6 | .81 | .82 | .81 |
| Skill Utilization | 4.2 | 4.1 | 4.2 | 1.4 | 1.4 | 1.4 | .67 | .70 | .67 |
| Skill Development | 4.6 | 4.3 | 4.3 | 1.4 | 1.4 | 1.5 | .71 | .72 | .74 |
| Internal Status | 4.3 | 4.1 | 4.3 | 1.4 | 1.3 | 1.4 | .68 | .66 | .73 |
| External Prestige | 4.4 | 4.2 | 4.4 | 1.3 | 1.2 | 1.3 | .69 | .74 | .71 |
| Social Worth | 4.8 | 4.7 | 4.6 | 1.3 | 1.4 | 1.3 | .77 | .84 | .81 |
| Authorship | 4.3 | 4.5 | 4.3 | 1.4 | 1.5 | 1.5 | .59 | .72 | .68 |
| Influence on Results | 4.8 | 4.6 | 4.7 | 1.3 | 1.4 | 1.3 | .57 | .57 | .67 |
| Higher Order Need Strength | 3.9 | 4.2 | 3.9 | 1.5 | 1.6 | 1.5 | -- | -- | -- |
| Satisfaction with | | | | | | | | | |
| --growth | 4.4 | 4.4 | 4.5 | 1.3 | 1.4 | 1.3 | -- | -- | -- |
| --pay | 3.6 | 3.8 | 3.8 | 1.5 | 1.7 | 1.6 | -- | -- | -- |
| --security | 4.1 | 4.3 | 4.3 | 1.4 | 1.6 | 1.5 | -- | -- | -- |
| --social opportunities | 5.1 | 5.4 | 5.2 | 1.2 | 1.1 | 1.1 | -- | -- | -- |
| --supervision | 4.6 | 4.7 | 4.8 | 1.5 | 1.6 | 1.5 | -- | -- | -- |

Table 12

Correlations Between All Variables

Second Survey

Plant I

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Performance | | | | | | | | | | | | | | | | |
| 2 | Performance (self rating) | .10 | | | | | | | | | | | | | | | |
| 3 | Self Rewarding | .03 | .30 | | | | | | | | | | | | | | |
| 4 | Goal Recognition | .04 | .05 | .32 | | | | | | | | | | | | | |
| 5 | Performance Recognition | -.22 | .08 | .32 | .29 | | | | | | | | | | | | |
| 6 | Task Interest | -.01 | .07 | .52 | .21 | .28 | | | | | | | | | | | |
| 7 | Task Identification | .13 | .19 | .62 | .27 | .28 | .53 | | | | | | | | | | |
| 8 | Product Identification | .13 | .13 | .45 | .25 | .18 | .37 | .52 | | | | | | | | | |
| 9 | Variety | -.04 | .09 | .40 | .12 | .26 | .53 | .31 | .27 | | | | | | | | |
| 10 | Novelty | -.07 | .12 | .34 | .01 | .28 | .49 | .27 | .25 | .61 | | | | | | | |
| 11 | Skill Utilization | -.13 | .02 | .39 | .19 | .28 | .36 | .37 | .23 | .36 | .30 | | | | | | |
| 12 | Skill Development | .15 | .10 | .50 | .10 | .31 | .36 | .43 | .28 | .42 | .43 | .40 | | | | | |
| 13 | Internal Status | -.07 | .13 | .37 | .16 | .26 | .37 | .41 | .31 | .28 | .24 | .34 | .35 | | | | |
| 14 | External Prestige | .01 | .17 | .47 | .25 | .30 | .37 | .45 | .34 | .29 | .27 | .38 | .41 | .50 | | | |
| 15 | Social Worth | -.09 | .13 | .46 | .25 | .24 | .28 | .43 | .36 | .25 | .28 | .18 | .47 | .33 | .42 | | |
| 16 | Authorship | -.16 | .14 | .22 | .14 | .19 | .25 | .24 | .17 | .14 | .13 | .25 | .14 | .26 | .27 | .20 | |
| 17 | Influence on Results | .12 | .20 | .34 | .32 | .25 | .19 | .35 | .32 | .19 | .18 | .22 | .28 | .32 | .37 | .32 | .22 |

Note: Column 1 : $r < .19 : p < .05$

Column 2-16: $r < .9 : p < .05$ $.12 < r < .16 : p < .01$ $r < .16 : p < .001$

Table 13

Correlations Between All Variables

Second Survey

Plant II

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Performance | | | | | | | | | | | | | | | | |
| 2 | Performance (self rating) | .06 | | | | | | | | | | | | | | | |
| 3 | Self Rewarding | -.03 | .29 | | | | | | | | | | | | | | |
| 4 | Goal Recognition | .22 | .00 | .17 | | | | | | | | | | | | | |
| 5 | Performance Recognition | -.05 | .13 | .40 | .29 | | | | | | | | | | | | |
| 6 | Task Interest | -.22 | .25 | .61 | .11 | ,35 | | | | | | | | | | | |
| 7 | Task Identification | -.27 | .23 | .64 | .20 | .37 | ,58 | | | | | | | | | | |
| 8 | Product Identification | -.18 | .11 | .43 | .13 | .21 | .30 | .49 | | | | | | | | | |
| 9 | Variety | -.15 | .16 | .34 | .00 | .27 | .49 | ,33 | .15 | | | | | | | | |
| 10 | Novelty | -.20 | .16 | .33 | -.04 | .28 | .45 | .29 | .12 | .71 | | | | | | | |
| 11 | Skill Utilization | -.32 | .18 | .35 | .10 | .31 | .41 | .34 | .22 | .39 | .31 | | | | | | |
| 12 | Skill Development | -.19 | .20 | .49 | .17 | .35 | .49 | .41 | .20 | .51 | .50 | .53 | | | | | |
| 13 | Internal Status | -.05 | .01 | .37 | .16 | .26 | .33 | .29 | .20 | .34 | .39 | .32 | .43 | | | | |
| 14 | External Prestige | -.17 | .13 | .45 | .17 | .29 | .42 | ,47 | .33 | .34 | .33 | .26 | .39 | .43 | | | |
| 15 | Social Worth | -.30 | .25 | .54 | .04 | .27 | .34 | .44 | .31 | .33 | .34 | .30 | .33 | .31 | .35 | | |
| 16 | Authorship | .42 | .23 | .23 | .04 | .17 | .23 | .21 | .06 | .23 | .23 | .15 | .27 | .15 | .23 | .13 | |
| 17 | Influence on Results | .17 | .16 | .46 | .29 | .28 | .33 | .38 | .18 | .34 | .31 | .27 | .45 | .33 | .31 | .26 | .22 |

Note; Column 1 : $r < .30 : p < .05$

Column 2-16: $-.09 < r < .12 : p < .05$ $.12 < r < .15 : p < .001$ $r > .15 : p < .001$

Table 14

Correlations Between All Variables

Second Survey

Plant III

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Performance | | | | | | | | | | | | | | | | |
| 2 | Performance (self rating) | .44 | | | | | | | | | | | | | | | |
| 3 | Self Rewarding | .05 | .25 | | | | | | | | | | | | | | |
| 4 | Goal Recognition | -.09 | .14 | .32 | | | | | | | | | | | | | |
| 5 | Performance Recognition | .22 | .20 | .42 | .48 | | | | | | | | | | | | |
| 6 | Task Interest | .26 | .10 | .57 | .30 | .44 | | | | | | | | | | | |
| 7 | Task Identification | .15 | .08 | .65 | .35 | .44 | .60 | | | | | | | | | | |
| 8 | Product Identification | -.19 | .18 | .59 | .19 | .27 | .33 | .45 | | | | | | | | | |
| 9 | Variety | .12 | .13 | .40 | .21 | .26 | .50 | .43 | .30 | | | | | | | | |
| 10 | Novelty | -.01 | .05 | .40 | .07 | .24 | .48 | .36 | .33 | .66 | | | | | | | |
| 11 | Skill Utilization | .06 | .09 | .34 | .29 | .32 | .53 | .45 | .17 | .48 | .48 | | | | | | |
| 12 | Skill Development | .35 | .14 | .43 | .20 | .40 | .47 | .52 | .30 | .44 | .45 | .41 | | | | | |
| 13 | Internal Status | .02 | .07 | .34 | .33 | .44 | .48 | .48 | .30 | .37 | .39 | .46 | .49 | | | | |
| 14 | External Prestige | .33 | .15 | .42 | .26 | .37 | .54 | .53 | .23 | .36 | .32 | .31 | .47 | .51 | | | |
| 15 | Social Worth | .19 | .22 | .51 | .17 | .37 | .41 | .49 | .38 | .24 | .31 | .24 | .49 | .40 | .50 | | |
| 16 | Authorship | .34 | .20 | .37 | .28 | .42 | .37 | .37 | .24 | .20 | .29 | .31 | .40 | .43 | .41 | .40 | |
| 17 | Influence on Results | -.20 | .18 | .43 | .30 | .41 | .36 | .52 | .32 | .33 | .37 | .40 | .50 | .40 | .40 | .46 | .39 |

Note: Column 1 : $r < .36 : p < .05$
Column 2-16: $.09 < r < .15 : p < .05$ $.15 < r < .19 : p < .01$ $r > .19 : p < .001$

8.2.3 Relationships Between Job Characteristics and the Moderators

Almost exactly the same pattern of correlations can be found in the results of the second survey as was obtained from the first (see Tables 5 to 7, 12 to 14). Generally speaking the correlations predicted by the model do exist but several of the job characteristics have high correlations with variables other than the ones predicted as well. The job characteristics are moderately interrelated.

Variety, Novelty and Social Worth are the only variables for which the predictions are unconditionally true. Skill Utilization, Skill Development, Internal Status and External Prestige correlate relatively strongly with both Task Interest and Task Identification, thus partly confirming the predictions, and Authorship and Influence on Results again have their highest correlations with the two variables with which the model did not associate them.

8.2.4 Moderating Influences on the Performance - Self Rewarding Relationships

Because there were two different measures of performance in this stage of the research two separate moderator analyses were performed: one for the self rating as measure of performance (reported in the first section of this part) and one for performance against IE standards as measure of performance (reported in the second part).

8.2.4. a

When the self rating is used as measure of performance, the hypotheses are strongly confirmed by the results of the moderated regression analysis (see Table 15). Of the fifteen standardized regression coefficients reported, three are significant on the .01 level, the others are significant at the .001 level.

The results of the Peters & Champoux analysis, meant to give some insight in the magnitude of the moderator effects, are summarized in Table 16. These results however are not compatible with those of the moderated regression analysis. For instance, the largest moderating effect according to the Peters & Champoux analysis is credited to Task Identification in Plant III, which happens to be one of the least significant effects according to the moderated regression anaysis. Another example: two of the cases (Goal Recognition in Plant II, Performance Recognition in Plant III) where the Peters & Champoux method yields a negative moderating effect (the focal relation becomes weaker for higher values of the moderator variables) are cases where the moderated regression analysis signals a highly significant result.

8.2.4 b

Using performance against standards as the dependent variable in the moderated regression did not result in confirmation of the hypotheses. As Table 17 shows, there are even negative regression coefficients due to some outliers in the very small sample, and none of the coefficients are significant.

Table 15

Moderating Effects on the Relationship Between

Self Rewarding and Self Rating of Performance

Second Survey

| Moderator | Plant I | Plant II | Plant III |
|---|---|---|---|
| Goal Recognition | .20*** | .15** | .23*** |
| Performance Recognition | .20*** | .22*** | .26*** |
| Task Interest | .18*** | .29*** | .18** |
| Task Identification | .25*** | .29*** | .17** |
| Product Identification | .23*** | .27*** | .24*** |

* $p < .05$
** $p < .01$
*** $p < .001$

Note: The figures given are the standardized regression coefficients in the moderated regression equation $\hat{y} = a + bxz$

Table 16

Analysis of the Magnitude of the Moderating Effects

on the Relationship Between Self Rewarding and Self Rating of Performance

Second Survey

| Moderator | Standardized Regression Coefficients for Self Rewarding | | | | | |
|---|---|---|---|---|---|---|
| | Plant I | | Plant II | | Plant III | |
| | r | $r^2$ | r | $r^2$ | r | $r^2$ |
| Goal | .25 | .06 | .43 | .18 | .26 | .07 |
| Recognition | .27 | .07 | .38 | .14 | .25 | .06 |
| | .30 | .09 | .33 | .11 | .24 | .06 |
| | .33 | .11 | .27 | .07 | .23 | .05 |
| | .36 | .13 | .21 | .04 | .22 | .05 |
| Performance | .27 | .07 | .33 | .11 | .21 | .04 |
| Recognition | .29 | .08 | .32 | .10 | .21 | .04 |
| | .31 | .10 | .32 | .10 | .21 | .04 |
| | .32 | .10 | .32 | .10 | .21 | .04 |
| | .34 | .12 | .32 | .10 | .21 | .04 |
| Task | .32 | .10 | .24 | .06 | .26 | .07 |
| Interest | .35 | .12 | .24 | .06 | .29 | .08 |
| | .39 | .15 | .25 | .06 | .32 | .10 |
| | .42 | .18 | .26 | .07 | .35 | .12 |
| | .45 | .20 | .26 | .07 | .38 | .14 |

Note: For complete regression equations and entered values of the moderators see Appendix C.

Table 16 (continued)

Analysis of the Magnitude of the Moderating Effects on the Relationship Between Self Rewarding and Self Rating of Performance

Second Survey

| Moderator | Standardized Regression Coefficients for Self Rewarding | | | | | |
|---|---|---|---|---|---|---|
| | Plant I | | Plant II | | Plant III | |
| | r | $r^2$ | r | $r^2$ | r | $r^2$ |
| Task | .31 | .10 | .26 | .07 | .32 | .10 |
| Identification | .32 | .10 | .28 | .08 | .36 | .13 |
| | .32 | .10 | .31 | .10 | .40 | .16 |
| | .33 | .11 | .33 | .11 | .43 | .18 |
| | .33 | .11 | .35 | .12 | .47 | .22 |
| Product | .30 | .09 | .28 | .08 | .21 | .04 |
| Identification | .31 | .10 | .31 | .10 | .22 | .05 |
| | .32 | .10 | .35 | .12 | .24 | .06 |
| | .33 | .11 | .38 | .14 | .25 | .06 |
| | .34 | .12 | .41 | .17 | .26 | .07 |
| All | .29 | .08 | .28 | .08 | .21 | .04 |
| Moderating | .32 | .10 | .28 | .08 | .23 | .05 |
| Variables | .34 | .12 | .28 | .08 | .25 | .06 |
| Combined | .36 | .13 | .28 | .08 | .26 | .06 |
| | .38 | .14 | .28 | .08 | .28 | .08 |

Note: For complete regression equations and entered values of the moderators see Appendix C.

Table 17

Moderating Effects on the Relationship Between

Self Rewarding and Performance Against IE Standards

Second Survey

| Moderator | Plant I | Plant II | Plant III |
|---|---|---|---|
| Goal Recognition | .09 | .19 | -.06 |
| Performance Recognition | -.13 | -.05 | .17 |
| Task Interest | .04 | -.20 | .18 |
| Task Identification | .08 | -.22 | .12 |
| Product Identification | .09 | -.14 | -.11 |

* $p < .05$
** $p < .01$
*** $p < .001$

Note: The figures given are the standarized regression coefficients in the moderated regression equation $\hat{y} = a + bxz$

Since estimating the magnitude of nonsignificant moderator effects is not useful (and because this report certainly does not need more tables) no Peters & Champoux analysis was performed on these data.

In view of the recency effect in the correlations with performance against standard that was noted above, the moderated regression analysis was done with the most recent performance figures available. Although this resulted in more and higher coefficients in the expected direction, these failed to reach significance (partly due to the small samples).

Finally the effects of Higher Order Need Strength in these data were investigated. Once more a moderated regression analysis was performed to see if Higher Order Need Strength influences the relationship between the job characteristics and Task Interest, Task Identification and Product Identification. The data in Table 18 indicate that the suggested moderator effect does indeed exist.

Table 18

Moderating Effects of "Higher Order Need Strength"

Second Survey

| Moderated Relationship | Plant I | Plant II | Plant III |
|---|---|---|---|
| Variety - Task Interest | .38*** | .40*** | .42*** |
| Novelty - Task Interest | .34*** | .37*** | .41*** |
| Skill Utilization - Task Interest | .23*** | .30*** | .41*** |
| Skill Development - Task Interest | .19*** | .34*** | .33*** |
| Internal Status - Task Identification | .34*** | .30*** | .40*** |
| External Prestige - Task Identification | .41*** | .39*** | .44*** |
| Social Worth - Task Identification | .34*** | .34*** | .41*** |
| Authorship - Product Identification | .24*** | .15** | .31*** |
| Influence on Results - Product Identification | .32*** | .22*** | .35*** |

** $p < .01$
*** $p < .001$

## 8.3 Results of the Experimental Manipulations

The report of the results of the experimental manipulations is a short and not a cheerful one, summarized in Table 19, which compares the means and standard deviations in the first and second data point for all variables that could possibly be influenced by the experimental manipulations. For all of these variables the results are identical: there is an overall trend to score lower in the second survey than in the first, a trend that exists in both the control plant and in the two experimental ones. Even after a breakdown of the data in departments no effects of any intervention can be detected in the data, there are no between-treatment differences. The predictions concerning the results of the manipulations could not be tested, since there is no indication that the manipulation itself occurred.

Table 19

Comparison of Means and Standard Deviations in

First and Second Survey

| | | Plant I | | Plant II | | Plant III | |
|---|---|---|---|---|---|---|---|
| | | $\bar{X}$ | SD | $\bar{X}$ | SD | $\bar{X}$ | SD |
| Performance (self rating) | first | 5.6 | 1.0 | 5.3 | 1.1 | 5.2 | 1.0 |
| | second | 5.5 | 1.2 | 5.4 | 1.2 | 5.4 | 1.2 |
| | change | -.1 | | .1 | | .2 | |
| Self Rewarding | first | 5.0 | .9 | 5.0 | .9 | 5.2 | .9 |
| | second | 5.0 | .9 | 5.1 | 1.0 | 5.0 | 1.0 |
| | change | .0 | | .1 | | -.2 | |
| Goal Recognition | first | 5.2 | 1.2 | 5.2 | 1.4 | 5.3 | 1.3 |
| | second | 5.0 | 1.3 | 5.1 | 1.3 | 5.2 | 1.3 |
| | change | -.2 | | -.1 | | -.1 | |
| Performance Recognition | first | 4.3 | 1.2 | 4.4 | 1.2 | 4.6 | 1.2 |
| | second | 4.2 | 1.1 | 4.3 | 1.2 | 4.6 | 1.2 |
| | change | -.1 | | -.1 | | .0 | |
| Product Identification | first | 4.7 | 1.3 | 4.8 | 1.3 | 5.1 | 1.1 |
| | second | 4.7 | 1.2 | 4.8 | 1.3 | 4.6 | 1.2 |
| | change | .0 | | .0 | | -.5 | |
| External Prestige | first | 4.6 | 1.2 | 4.3 | 1.3 | 4.6 | 1.2 |
| | second | 4.4 | 1.3 | 4.2 | 1.2 | 4.4 | 1.3 |
| | change | -.2 | | -.1 | | -.2 | |
| Social Worth | first | 5.0 | 1.3 | 4.8 | 1.3 | 4.8 | 1.4 |
| | second | 4.8 | 1.3 | 4.7 | 1.4 | 4.6 | 1.3 |
| | change | -.2 | | -.1 | | -.2 | |

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# 9. Discussion

Because the experimental manipulations did not cause any differences between the plants, the only conclusions pertaining to the model come from the static data provided by the questionnaire-scores obtained on two occasions four months apart in three different samples. The results in all plants are virtually identical in all aspects both in the first and in the second survey; for simplicity's sake they will be discussed together.

The order of discussion topics is as follows: questionnaire measures, current status of the investigated model, moderator analyses used in this report, and suggestions for improvements on this research.

## 9.1 Questionnaire Measures

The reliabilities, means and standard deviations of the variables measured by the questionnaire generally are consistent with earlier reports about these and similar scales (e.g. Hackman & Oldham, 1975; Blood, Note 1) and do not give much reason for psychometric objections.

The alpha values for the scales are approximately in the same range as those reported by Hackman and Oldham for an industrial sample. The internal consistency figures in the present research look meager in comparison with the results found by Blood (Note 1), but this difference is probably due to the nature of the sample and the instructions in the earlier study. The subjects were college students who were asked to "fill in this questionnaire as if 'being a student'

is your job". A student population can be expected to be more proficient at completing a questionnaire than the present sample of carpet mill workers and the instructions in Blood's study may have led the subjects to think more about their answers. Both factors can account for the high consistency in the answers.

The means of the scales for organizational characteristics are lower than those reported by Hackman & Oldham and Blood, but this difference could well be explained by the jobs and job levels in the respective samples. For instance, the average subject in Hackman and Oldham's study had a higher level of education and probably held a higher level job than the average carpet mill worker. It is not surprising that a higher level job is rated higher on variables having to do with intrinsic motivation.

These data combined lead to the conclusion that the questionnaire measures did not do notably worse than their predecessors that already had established their usefulness in measuring job variables. This was noted earlier by Blood (Note 1) for samples of students, but is now confirmed for an industrial sample with less than a high school diploma as the average education level.

## 9.2 Current Status of the Investigated Model

The hypothesis concerning the focal relation between Self Rewarding and performance is consistently confirmed by the results when perception of performance is used as the criterion variable. When performance against Industrial Engineering standards was used as the

criterion, the hypothesis could not be confirmed. At least two alternative explanations can be given for these results and for the finding that the self rating and peformance against standards did not correlate very highly with each other.

The first possibility is to conclude that the self rating of performance does not reflect actual performance while the objective measure does, and that the obtained relationsips between Self Rewarding and perceived performance are caused by nothing but method variance. This conclusion would derive some support from the fact that both straight correlations and the moderator analyses do not discriminate between "real" variance and consistent response tendencies. The earlier disappointing experiences with the use of self ratings of performance (Turner & Lawrence, 1965; Porter & Lawler, 1968) would also back up this conclusion.

The second explanation argues that performance against standards figures do not reflect actual performance accurately due to the distortion of these figures caused by unexpected problems with materials and irregularities in the production process (typically, the scores for performance recognition after the intervention are still low, barely above the neutral point). Because of these flaws, performance against standards would only have a weak and shortlived relationship with perceptions of performance and with Self Rewarding. This second explanation would account for some of the failure of the intervention and for the "recency effect" detected in the data. It leaves a more favorable impression of the research with the reader. Needless to say the authors strongly prefer this latter interpretaton

of the results, yet a conclusive statement is not possible at this point. Probably both interpretations are partially true but the research design and the small samples for which performance data were collected do not allow a profound analysis of this problem. The only thing one could safely infer from the available information is that performance relates to self rewarding via the person's own perception of that performance. This confirms an important assumption of the model.

As was the case for the central relationship, the hypotheses concerning the variables moderating that relationship are only substantiated when perceived performance is used as the criterion. When this requirement is met, Goal Recognition, Performance Recognition, Task Interest, Task Identification and Product Identification act, as predicted, as moderators on the relationship between performance and Self Rewarding. This is a step toward further explanation of the relationship between performance and self rewarding. Until now this relationship had not been given careful treatment, and was (if at all) usually considered to be a simple linear one, although the notion of variables moderating the relationship between performance and self rewarding could be derived from most theories in this field (see e.g. Hackman & Lawler, 1971; Deci, 1975).

In a narrow sense, the hypotheses concerning the relationship between organizational characteristics and the variables called "Moderators" generally are confirmed. All correlations predicted by the model are -- with only one exception -- significant at least at the .05 level. However, most of the organizational characteristics have

high correlations with more than one "Moderator", a result found earlier in the study by Blood (Note 1). In that report Blood proposes to alter his model in view of the new information. In order to reflect the more complex pattern of relationships the new model would look like Figure 2. This modified model would fit the results of the present research.

It is not a new finding that task variables have considerable intercorrelations and act as one block to influence psychological states. Hackman and Lawler (1971) report this same result. Turner and Lawrence (1965) and Hackman and Oldham (1975) started their research using separate task characteristics but later combined those into one larger variable, RTA (Requisite Task Attribute) and MPS (Motivation Potential Score) respectively.

Although Higher Order Need Strength is not incorporated in the model, some tentative research was done on its influences relative to the variables in the model. Ironically, the means of the Higher Order Need Strength scale are much lower than those reported by any former user of this scale (e.g. Hackman & Lawler, 1971; Hackman & Oldham, 1975; Oldham, 1976; Umstot, Bell & Mitchell, 1976; Blood, Note 1). "Ironically" because the Higher Order Need Strength scale originated from the rural-urban dimension that moderated the performance-satisfaction relationship in the study by Turner & Lawrence (1965; Blood & Hulin, 1976; Hulin & Blood, 1968; Hackman & Lawler, 1971). This rural-urban dimension was supposedly translated into the Higher Order Need Strength scale so that high on this scale was analogous to "coming from a rural background" on the Turner & Lawrence dimension.

# ORGANIZATIONAL INFLUENCES ON THE SELF REWARDING ~ JOB PERFORMANCE RELATIONSHIP

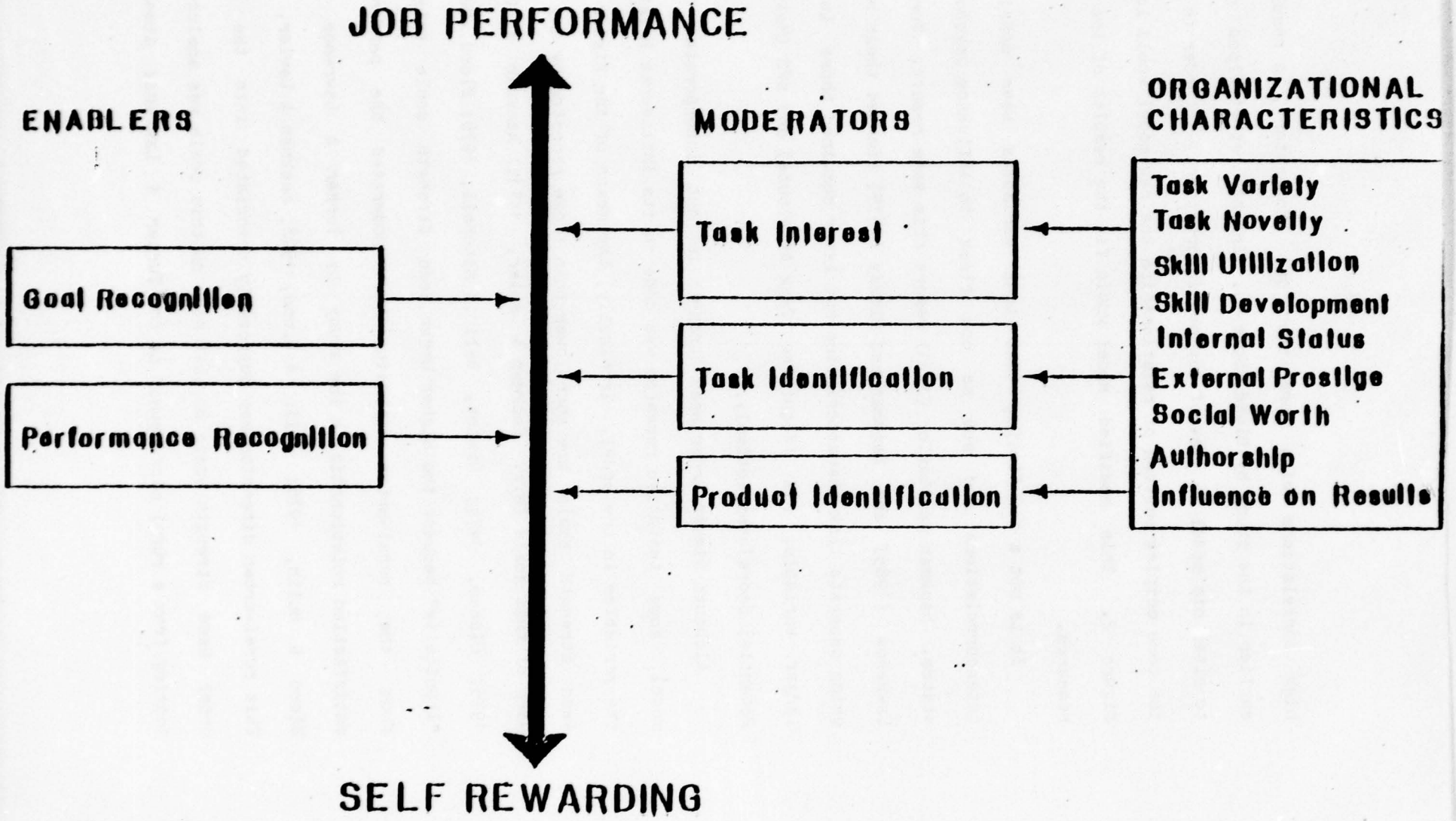


Figure 2

In this extremely rural sample, however, the Higher Order Need Strength score hits an all time low.

## 9.3 Moderator Analyses Used

Two types of moderator analyses were used in this reseach: the moderated regression analysis as suggested by Blood and Mullet (Note 2) and the estimation of the magnitude of the moderator effects proposed by Peters and Champoux (Note 4). When these two methods were applied to the data, the results were incompatible. When the moderated regression analysis indicated a significant moderator effect, the Peters & Champoux method often showed only a small, sometimes a negative moderating influence. This incongruity provoked some post hoc reconsideration of the differences between the two procedures.

The moderated regression analysis signals a significant effect if the cross product of the independent and the moderator variable accounts for a significant amount of variance in the dependent variable that was unexplained before the interaction term was entered in the equation. The estimation method of Peters & Champoux generates the estimated regression coefficients of the independent variable for different values of the moderator variable in the complete regression equation:

$$y = a + cz + (b + dz)x \qquad (3)$$

The regression coefficients in a complete regression reflect two properties of the data, not only the relationship of the independent - and moderator variable with the dependent variable, but also the relation of the independent - and moderator variable with each other (McNemar, 1969). It is this second influence upon the regression coefficents that causes the difference in results between the two methods of moderator analysis. Because of the confounding of effects, the method provided by Peters & Champoux (Note 4) does not produce direct estimates of moderator effects.

## 9.4 Suggestions for Improvements

After this research the evidence concerning Blood's (1978) model for the relationship between performance and self rewarding is still in the stage where questionnaire measures of cognitive variables are shown to be related to questionnaire measures of other cognitive variables, without control on spurious relationships. While the available research so far supports Blood's model, evidence compiled in research using other methods is needed. First of all, the relationship between performance and self rewarding must be substantiated with objective performance data that are <u>perceived</u> by the workers to reflect performance in an accurate way. Also, the interactive effect between those variables implied by the model needs empirical support. The direction of the relation between organizational characteristics and the "Moderators" must be confirmed in a control group- or multiple baseline experimental design and the same is true for the effect of Moderators and Enablers on the focal relationship.

The present research was an attempt to provide the experimental evidence to meet many of the requirements, an attempt that in this respect obviously was not successful (although more information may come from the third phase of this research project---the implementation of the experimental changes in the control plant).

This project has provided support for the cognitive model from static data. The experimental data neither confirmed nor disconfirmed the model since the manipulation was insufficient. Clearly, future research must use a much more substantial intervention in a field site or must make controlled changes in a laboratory situation.

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COLLEGE OF
DUSTRIAL MANAGEMENT

Dear Bigelow Employee:

This survey is a part of a study of what jobs are like at Bigelow. The study is being conducted by Professor Milton R. Blood of the Georgia Institute of Technology and Mr. Ted Thoene, his assistant.

We want to know what your job is like. There are no wrong answers and there are no trick questions. Please read the instructions carefully at the start of each section and answer every question.

ALL OF YOUR ANSWERS WILL BE KEPT STRICTLY CONFIDENTIAL. NO INDIVIDUAL QUESTIONNAIRES OR RESPONSES WILL BE MADE AVAILABLE TO BIGELOW. A report summarizing the responses will be prepared for the company, but no individuals will be identified.

We hope that your participation in the survey will be pleasant for you and that it will give you a chance to think about your job. Please answer as honestly and accurately as possible.

Thank you for your time and effort.

Milton R. Blood, Ph.D.

Ted Thoene

MRB&TT/lss

This part of the questionnaire asks you
to indicate how you feel about your job.

Each of the following statements is something that a person might say about his/her job. Please indicate your own personal feelings about your job by marking how much you agree with each of the statements.

Write a number in the blank for each statement, based on the following scale:

How much do you agree with the statement?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Disagree Strongly | Disagree | Disagree Slightly | Neutral | Agree Slightly | Agree | Agree Strongly |

Example:

_____ At the end of a working day, I feel good because I know I have accomplished something.

If you disagreed with the above statement, you would place a 1, 2, or 3 in the blank to the left of the statement, depending upon how strongly you disagreed.

If you had no opinion, you would place a 4 in the blank.

If you agreed with the statement, you would place a 5, 6, or 7 in the blank, depending upon how strongly you agreed.

This section asks if you accomplish something important on your job.

_____ I don't feel like I accomplish much on my job.

_____ Doing my job makes me feel like I'm really getting something done.

_____ I have accomplished a lot since I have been on my present job.

* * *

This section asks if you are interested in your job.

_____ Most of the things I do on my job are interesting to me.

_____ I often think about my job even when I'm not doing it because it is so interesting.

_____ I frequently get bored on my job.

* * *

This section asks if you are pleased that you have this job.

_____ I like to tell people about my job.

_____ I'm usually embarrassed to tell people what my job is.

_____ What I do on my job is a very important part of my life.

* * *

This section asks if you are pleased with the product of your job.

_____ I don't usually tell other people what I make on my job.

_____ I like to be known for the products I work on.

_____ I like people to know what I make on my job.

* * *

## SECTION TWO

This section contains statements
which can be used to describe a job.

Please describe your <u>own</u> job by agreeing (the statement does describe your job) or by disagreeing (it does <u>not</u> describe your job). Please try to be as <u>objective</u> as you can in deciding how accurately each statement describes your job regardless of your <u>own</u> feelings about that job.

Write a number in the blank beside each statement, based on the following scale:

How much do you agree with the statement?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Disagree Strongly | Disagree | Disagree Slightly | Neutral | Agree Slightly | Agree | Agree Strongly |

<u>Example</u>:

_____ My job is routine with the same thing happening all the time.

If you disagreed with the statement because it does not describe your job, you would place 1, 2, or 3 in the blank to the left, depending upon how strongly you disagreed.

If you had no opinion, you would place a 4 in the blank.

If you agreed with the statement because it does describe your job, you would place a 5, 6, or 7 in the blank, depending upon how strongly you agreed.

<u>This section asks if you know how well you are doing your job.</u>

_____ I get frequent and accurate information about how well I'm doing my job.

_____ No one ever tells you whether you are doing good work in this company.

_____ On my job I can easily tell how well I'm performing.

* * *

<u>This section asks if you know what the duties of your job are.</u>

_____ Sometimes I end up doing the wrong thing on my job just because it's not clear what's expected of me.

_____ The specific duties of my job are very well defined.

_____ I always know what is expected of me on this job.

*

This section asks if your job lets you do many different things.

_____ My job has a lot of variety; it requires me to many different things at work, using a variety of skills and talents.

_____ I get to do a lot of different things in my job.

_____ My job uses just a few skills over and over.

* * *

This section asks if your job involves new and unexpected situations.

_____ My job is constantly presenting me with something new and unexpected.

_____ My job is a routine; everything stays the same from one day to the next.

_____ My job has much novelty; I am constantly being confronted with new things from one day to the next.

* * *

This section asks if you use your training and abilities on your job.

_____ I have important work skills that aren't required by my job.

_____ My job allows me to use my training and experience.

_____ My job challenges me to use the abilities that I possess.

* * *

This section asks if you have a chance to learn new skills on your job.

_____ I have to work at improving my skills in order to do well on my job.

_____ My job allows me to develop my abilities; I can do many things now that I couldn't do when I started on the job.

_____ I have not acquired many new skills or abilities as a result of my job.

* * *

This section asks what other people in your company think of your job.

_____ People in my company look up to me because of my job; it is thought of as one of the good jobs to have.

_____ People in my company consider my job to be one of the worst ones to have in the organization.

_____ My job is very highly regarded by people in my company.

* * *

This section asks what people outside of your company think of your job.

_____ People outside of my company generally do not have much respect for my job.

_____ People are usually impressed when I tell them what I do.

_____ People outside of my company have a great deal of respect for my job.

* * *

This section asks if your job contributes anything worthwhile to society.

_____ My job makes a worthwhile contribution to other people.

_____ My job makes important contributions to the lives of other people.

_____ The outcomes of my work are not likely to have important effects on other people.

* * *

This section asks if other people can tell what you produce on the job.

_____ It is easy for others to identify what I produce on my job.

_____ There's no way to tell what part of the work I have done after it is finished.

_____ The results of my work are easily identifiable — other people can tell that it came from me.

* * *

This section asks how much control you have over what you produce.

_____ The results of my work are about the same no matter how hard or carefully I work.

_____ I have a lot of influence over how the finished product from my job turns out.

_____ I control how well the work is done on my job.

* * *

## SECTION THREE

This section asks how satisfied you are with your job.

Please indicate how satisfied you are with each aspect of your job listed below.

How satisfied are you with each aspect of your job?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Extremely Dissatisfied | Dissatisfied | Slightly Dissatisfied | Neutral | Slightly Satisfied | Satisfied | Extremely Satisfied |

Example:

_____ The amount of freedom which my job lets me have.

If you were dissatisfied with the above aspect of your job, you would place a 1, 2, or 3 in the blank to the left of the statement, depending upon how dissatisfied you were.

If you had no opinion, you would place a 4 in the blank.

If you were satisfied with the above aspect of your job, you would place a 5, 6, or 7 in the blank, depending upon how satisfied you were.

_____ The amount of job security I have.

_____ The amount of pay and fringe benefits I receive.

_____ The amount of personal growth and development I get in doing my job.

_____ The people I talk to and work with on my job.

_____ The degree of respect and fair treatment I receive from my boss.

_____ The feeling of worthwhile accomplishment I get from doing my job.

_____ The chance to get to know other people while on the job.

_____ The degree to which I am fairly paid for what I contribute to this organization.

_____ How secure things look for me in the future in this organization.

_____ The overall quality of the supervision I receive in my work.

## SECTION FOUR

Listed below are a number of characteristics which could be present on any job. People differ about how much they would like to have each one present in their own jobs. We are interested in learning <u>how much you personally would like</u> to have each one present in your job.

Using the scale below, please indicate the <u>degree</u> to which you <u>would like</u> to have each characteristic present in your job.

NOTE: The numbers on this scale are different from those used in the previous scales.

| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|
| Would like having this only a moderate amount (or less) | | | Would like having this very much | | | Would like having this <u>extremely</u> much |

<u>Example</u>:

_____ Chances to learn from my coworkers.

If you would like to have the above characteristic present in your job extremely much, you would place a 10 in the blank to the left.

If you were interested in having the above characteristic on your job very much but not extremely much you would place a 7, 8, or 9 in the blank, depending on the degree of your preference.

If you were not very interested in having the characteristic present on your job, you would place a 4 in the blank.

_____ Stimulating and challenging work.

_____ Chances to exercise independent thought and action in my job.

_____ Opportunities to learn new things from my work.

_____ Opportunities to be creative and imaginative in my work.

_____ Opportunities for personal growth and development in my job.

_____ A sense of worthwhile accomplishment in my work.

**The questions in this section ask you about yourself. Please answer them as accurately as possible.**

1) Circle the number indicating the total years of school that you have finished.

| 1 2 3 4 5 6 7 8 | 9 10 11 12 | 13 14 15 16 | more |
|---|---|---|---|
| grade school | high school | college | |

2) How long have you worked for your present employer?

_____years and _____months.

3) What is your present job in this company? Be specific. _____

What department do you work in? _____ Shift? _____

How long have you worked in your present job?

_____years and _____months.

4) Sex: _____Male

_____Female

**Please answer the following questions about how you do your job by circling the appropriate numbers.**

In general, do you do quite large quantities of work?

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| No, I don't do a very large amount of work. | | | | | | Yes, I do a very large amount of work. |

In general, do you do quite high quality work?

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| No, I generally don't do very high quality work. | | | | | | Yes, I generally do very high quality work. |

In general, how hard do you work on your job?

| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|
| I do not work hard at all; almost everybody else works harder. | | | I work about as hard as everybody else. | | | I work very hard; maybe harder than anybody else in this organization. |

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## Values of Moderator Variables Used in Table 9

**Plant I**

| Moderator | $\bar{X}$ - SD | $\bar{X}$ - 1/2 SD | $\bar{X}$ | $\bar{X}$ + 1/2 SD | $\bar{X}$ + SD |
|---|---|---|---|---|---|
| Goal Recognition | 4.00 | 4.61 | 5.23 | 5.85 | 6.46 |
| Performance Recognition | 3.11 | 3.73 | 4.34 | 4.96 | 5.58 |
| Task Interest | 2.86 | 3.58 | 4.30 | 5.01 | 5.73 |
| Task Identification | 3.70 | 4.33 | 4.96 | 5.59 | 6.21 |
| Product Identification | 3.45 | 4.09 | 4.73 | 5.37 | 6.01 |
| All Combined | 3.43 | 4.07 | 4.71 | 5.35 | 5.99 |

**Plant II**

| | | | | | |
|---|---|---|---|---|---|
| Goal Recognition | 3.72 | 4.42 | 5.12 | 5.82 | 6.52 |
| Performance Recognition | 3.14 | 3.48 | 4.36 | 4.96 | 5.57 |
| Task Interest | 2.92 | 3.63 | 4.33 | 5.03 | 5.74 |
| Task Identification | 3.97 | 4.56 | 5.14 | 5.73 | 6.31 |
| Product Identification | 3.56 | 4.20 | 4.85 | 5.49 | 6.13 |
| All Combined | 3.46 | 4.11 | 4.76 | 5.41 | 6.06 |

**Plant III**

| | | | | | |
|---|---|---|---|---|---|
| Goal Recognition | 4.06 | 4.69 | 5.31 | 5.94 | 6.56 |
| Performance Recognition | 3.38 | 4.01 | 4.63 | 5.29 | 5.87 |
| Task Interest | 3.13 | 3.81 | 4.49 | 5.17 | 5.85 |
| Task Identification | 4.00 | 4.57 | 5.14 | 5.71 | 6.28 |
| Product Identification | 3.92 | 4.49 | 5.06 | 5.63 | 6.20 |
| All Combined | 3.70 | 4.31 | 4.92 | 5.53 | 6.14 |

## Regression Equations Used in Table 9

### Plant I

| Moderator | Regression Equation |
|---|---|
| Goal Recognition | $\hat{y} = 7.196 - .258x - .553z + .097xz$ |
| Performance Recognition | $\hat{y} = 4.869 + .143x - .112z + .021xz$ |
| Task Interest | $\hat{y} = 5.072 + .090x - .170z + .035xz$ |
| Task Identification | $\hat{y} = 5.168 + .065x - .157z + .034xz$ |
| Product Identification | $\hat{y} = 4.591 + .180x - .029z + .009xz$ |
| All Combined | $y = 6.960 - .211x - .626z + .108xz$ |

### Plant II

| | |
|---|---|
| Goal Recognition | $\hat{y} = 3.814 + .309x + .092z - .018xz$ |
| Performance Recognition | $\hat{y} = 6.787 - .292x - .620z + .124xz$ |
| Task Interest | $\hat{y} = 5.041 + .062x - .194z + .038xz$ |
| Task Identification | $\hat{y} = 5.832 - .125x - .311z + .067xz$ |
| Product Identification | $\hat{y} = 5.598 - .036x - .287z + .054xz$ |
| All Combined | $y = 6.409 - .225x - .479z + .097xz$ |

### Plant III

| | |
|---|---|
| Goal Recognition | $\hat{y} = 6.307 - .114x - .546z + .085xz$ |
| Performance Recognition | $\hat{y} = 7.511 - .445x - .847z + .160xz$ |
| Task Interest | $\hat{y} = 6.183 - .115x - .728z + .119xz$ |
| Task Identification | $\hat{y} = 6.740 - .175x - .748z + .117xz$ |
| Product Identification | $\hat{y} = 5.154 - .010x - .300z + .060xz$ |
| All Combined | $y = 9.748 - .687x - 1.442z + .234xz$ |

## Values of Moderator Variables Used in Table 16

**Plant I**

| Moderator | $\bar{X}$ - SD | $\bar{X}$ - 1/2 SD | $\bar{X}$ | $\bar{X}$ +1/2 SD | $\bar{X}$ + SD |
|---|---|---|---|---|---|
| Goal Recognition | 3.780 | 4.410 | 5.040 | 5.670 | 6.300 |
| Performance Recognition | 3.086 | 3.661 | 4.235 | 4.810 | 5.384 |
| Task Interest | 2.759 | 3.421 | 4.065 | 4.718 | 5.371 |
| Task Identification | 3.652 | 4.245 | 4.838 | 5.431 | 6.024 |
| Product Identification | 3.494 | 4.107 | 4.719 | 5.332 | 5.944 |
| All Combined | 3.744 | 4.165 | 4.586 | 5.007 | 5.428 |

**Plant II**

| | | | | | |
|---|---|---|---|---|---|
| Goal Recognition | 3.790 | 4.457 | 5.123 | 5.790 | 6.456 |
| Performance Recognition | 3.019 | 3.636 | 4.252 | 4.869 | 5.485 |
| Task Interest | 2.573 | 3.308 | 4.043 | 4.778 | 5.513 |
| Task Identification | 3.597 | 4.246 | 4.894 | 5.543 | 6.191 |
| Product Identification | 3.483 | 4.132 | 4.780 | 5.429 | 6.071 |
| All Combined | 3.747 | 4.190 | 4.632 | 5.075 | 5.517 |

**Plant III**

| | | | | | |
|---|---|---|---|---|---|
| Goal Recognition | 3.876 | 4.526 | 5.176 | 5.826 | 6.476 |
| Performance Recognition | 3.376 | 3.973 | 4.570 | 5.167 | 5.764 |
| Task Interest | 2.687 | 3.374 | 4.061 | 4.748 | 5.435 |
| Task Identification | 3.509 | 4.142 | 4.774 | 5.407 | 6.039 |
| Product Identification | 3.398 | 4.004 | 4.609 | 5.215 | 5.820 |
| All Combined | 3.709 | 4.173 | 4.637 | 5.101 | 5.565 |

## Regression Equations used in Table 16

**Plant I**

| Moderator | Regression Equation |
|---|---|
| Goal Recognition | $\hat{y} = 5.17 + .10x - .36z + .64xz$ |
| Performance Recognition | $\hat{y} = 4.47 + .24x - .26z + .04xz$ |
| Task Interest | $\hat{y} = 4.78 + .23x - .47z + .07xz$ |
| Task Identification | $\hat{y} = 3.68 + .38x - .05z + .01xz$ |
| Product Identification | $\hat{y} = 3.87 + .33x - .09z + .02xz$ |
| All Combined | $\hat{y} = 5.32 + .13x - .48z + .07xz$ |

**Plant II**

| | |
|---|---|
| Goal Recognition | $\hat{y} = 1.19 + .90x + .44z - .10xz$ |
| Performance Recognition | $\hat{y} = 3.39 + .40x + .01z - .003xz$ |
| Task Interest | $\hat{y} = 3.76 + .26x + .01z + .01xz$ |
| Task Identification | $\hat{y} = 4.13 + .17x - .11z + .04xz$ |
| Product Identification | $\hat{y} = 4.76 + .13x - .31z + .06xz$ |
| All Combined | $\hat{y} = 3.42 + .35x + .06z - .003xz$ |

**Plant III**

| | |
|---|---|
| Goal Recognition | $\hat{y} = 3.19 + .39x + .15z - .02xz$ |
| Performance Recognition | $\hat{y} = 3.54 + .27x + .13z - .004xz$ |
| Task Interest | $\hat{y} = 4.67 + .18x - .30z + .05xz$ |
| Task Identification | $\hat{y} = 5.34 + .14x - .49z + .07xz$ |
| Product Identification | $\hat{y} = 4.20 + .19x - .05z + .02xz$ |
| All Combined | $\hat{y} = 4.70 + .11x - .18z + .04xz$ |

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