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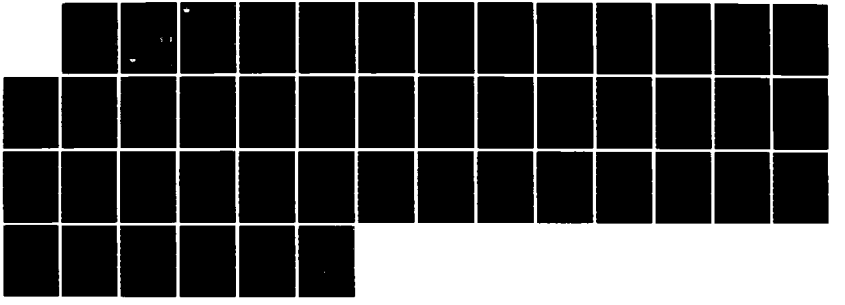

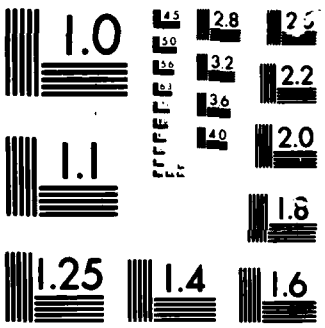

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WORK STRATEGIES: THE DEVELOPMENT AND TESTING OF A MODEL

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20 March 1986

From: Director

Subj: **WORK STRATEGIES: THE DEVELOPMENT AND TESTING OF A MODEL**

Encl: (1) HFOSL Technical Note 72-86-5

1. Enclosure (1) is submitted for your information. This technical report represents the second in a series within the exploratory development task area "Improving Individual and Unit Productivity" (subproject number RR63-521-804-018). It addresses the problem of how motivational techniques should be designed to maximize productivity and quality of work life.

2. This particular project forms the groundwork for designing individual and group feedback and reward systems in the workplace of the future. Exploratory development is needed in these areas to improve management techniques that increase employee motivation, productivity, health, and satisfaction. Work within the Organizational Systems Simulation Facility of the Human Factors and Organizational Systems Laboratory is testing many of the theoretical notions in this report.

R. E. BLANCHARD

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Work strategy refers to the plans and methods that workers use to do the tasks which are required by a job (e.g., scheduling rest periods, pacing the work, setting goals), and is a potentially powerful variable within the work environment. Research to date on work strategy suggests that a taxonomy of work strategies and a determination of the relationships between them and other work variables (e.g., ability) can add much to our understanding of worker productivity and motivation. A model of work strategy was developed which proposed several theoretical relationships between work strategy and other important work variables. An empirical investigation into some of the relationships suggested by the conceptual model was also conducted which involved 128 people employed to perform a data coding task in a simulated work environment. Work strategy was defined here as the length and frequency of rest periods taken by workers. The relationship of rest periods to task performance as well as to the workers' ability and choice of performance goals was explored. Results showed that there was a negative

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relationship between rest periods and task performance as well as between rest periods and goals. Contrary to other research, there was not an optimal rest period which balanced relief from fatigue against time away from the task. Rest periods can serve as a useful measure of work strategy, but other measures, such as pace of work, should be tested as well as other relationships between work strategies and work variables. Wage incentive and goal setting programs should be implemented in a variety of organizations to study work strategy and productivity.

HFOSL Technical Note 72-86-5

March 1986

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SUMMARY

Problem

Work strategy is a potentially powerful variable within the work environment. Work strategy refers to the plans and methods that workers use to do the tasks which are required by a job (e.g., scheduling rest periods, pacing the work, setting goals). There has been little research to date on work strategy, but the research which has been done suggests that a taxonomy of work strategies and a determination of the relationships between strategies and other work variables, such as ability, can add much to our understanding of worker productivity and motivation.

Purpose

The research had a twofold purpose. First, a model of work strategy was developed which proposed several theoretical relationships between work strategy and other important work variables (e.g., expectancy of job performance, performance goals, ability, experience). The second purpose was to conduct an empirical investigation into some of the relationships suggested by the conceptual model.

Approach

Data were obtained from 128 people employed to perform a data coding task in a simulated work environment. Measures were taken of the workers' performance, perceptions, attitudes, and motivations. Work strategy was defined here as the length and frequency of rest periods taken by the workers. The relationship of rest periods to task performance as well as to the workers' ability and choice of performance goals was explored.

Results and Conclusions

In general, the results showed that there was a negative relationship between rest periods and task performance as well as between rest periods and goals. Contrary to previous results reported in the literature, there was not an optimal rest period which balanced relief from fatigue against time away from the task. A path analysis showed that a positive relationship between performance goals and task performance was mediated by the negative relationship between rest periods and task performance. The same path analysis failed to show any connection between ability of the workers and rest breaks taken by those workers. It was concluded that rest periods can serve as a useful measure of work strategy, but that other measures, such as pace of work, should be tested. Other relationships between work strategies and work variables should be examined.

Recommendations

1. The work strategy model should be refined.

2. Wage incentive and goal setting programs should be implemented in a variety of organizations to study work strategy and productivity.

CONTENTS

INTRODUCTION

Problem

Work strategy is potentially one of the most powerful variables in the area of industrial and organizational psychology. However, to date, it has received little attention in the literature. Despite the fact that people use different strategies to solve problems, learn new skills, get good grades, pursue careers, and achieve many other goals in life, we know precious little about strategies in the everyday work environment. Within the context of goal setting there are only a handful of studies which address the issue of work strategies. In a recent review of the goal setting literature by Locke, Saari, Shaw, and Latham (1981), only one study discussed under the category of "strategy development" related directly to work strategy (Terborg, 1976). More recently, Locke and his colleagues (Locke, Frederick, Lee, & Bobko, 1984) and Riedel, Nebeker, and Cooper (in preparation) have concluded that strategy development and its relation to goal setting need more research.

Purpose

The purpose of this report is to present a model of work strategy which proposes various theoretical and empirical relationships between work strategy and other variables which operate within the work environment. Work strategy is analyzed within the context of expectancy and goal setting theories. Following the presentation of the model we discuss the results of an investigation of work strategy as it occurred within a simulated work environment. The model is intended to stimulate discussion and research, while the research is designed to test some aspects of the model in order to add to our knowledge and understanding of work strategies.

The Concept of Strategy

If we view work performance as a function of ability and motivation (Vroom, 1964), then work strategy fits into the motivational component of this equation. Motivation can be viewed as the energizing and directing of behavior, and strategies are the choices workers make about how much energy to expend on a task and the direction in which this energy will be focused. The general concept of strategy is obviously related to goal-directed behavior because the goals people set clearly influence the choices they make. In an industrial or organizational setting, workers set goals for themselves (e.g., meet a deadline, earn an incentive wage, get a promotion) and then devise strategies for meeting these goals (e.g., work through the night, use the proper tools, seek feedback from superiors). These strategies may be specific to the job or may be quite general in nature and could apply to a variety of jobs.

Task Versus Support Strategies

Making a distinction similar to that made by Dansereau et al. (1979) in the context of learning strategies, we can divide work strategies into two forms: task strategies and support strategies. Task strategies are those which are used by the worker specifically on the job, and support strategies are used by the worker to maintain a suitable work environment. Task strategies involve techniques and methods for doing a specific job or type of work. Support strategies, on the other hand, involve plans and methods which can be used on a variety of tasks and are not restricted by the particular nature of the task.

Toward a Taxonomy of Task Strategies

In general, task strategies will depend largely on the nature of the work (e.g., assembly-line work will require task strategies that are different from those required for managerial work). Support strategies, on the other hand, will usually apply across jobs and work situations. Despite the fact that task strategies will be largely specific to a given task, it is still useful to provide at least a rough classification of task strategies. It is reasonable to view task strategies as falling into two broad categories: motor strategies and cognitive strategies.

Motor Strategies. Motor strategies are task strategies which relate to motion, movement, and the use of the body and have concerned the industrial engineer for years (see Barnes, 1980, Chapters 11 and 15). For example, the Gilbreths (1923, 1924) developed a classification for fundamental hand motions and the use of the human body to perform motor tasks with minimum effort and maximum efficiency. One approach that could be taken by researchers interested in motor strategies would be to measure the extent to which workers follow the Gilbreths' scheme when performing motor tasks. Presumably, those workers who perform the job along the lines outlined by the Gilbreths' would be using a strategy superior to any others chosen by those workers.

Cognitive Strategies. Cognitive strategies are task strategies which relate to information processing. The field of cognitive psychology is replete with recommendations for how to be a more effective and efficient processor of information. For example, Shiffrin and Schneider (1977) made the distinction between controlled and automatic processing. In general, controlled processing is processing which requires some sort of "cognitive effort," whereas automatic processing requires little such effort. Controlled processing makes high demands on our limited capacity for processing information, but is a very flexible and useful strategy in other regards. Automatic processing makes fewer demands on our limited capacity, but once set into motion must continue generally until task completion. For example, a competent secretary may be able to type a manuscript while taking a phone message. The typing is an example of automatic processing and requires little cognitive effort, while taking a phone message is an example of controlled processing and can demand much effort. The secretary's work strategy is a good one in this case, because the typing can be set on "automatic pilot" without affecting work performance as she takes a phone message requiring a level of information integration that cannot be accomplished otherwise. Since very little is known about how workers use controlled or automatic processing, relating these processes to work strategies remains a challenge for researchers. The purpose of this model is to outline the variables which should affect this choice. Other cognitive strategies include: chunking in working memory (e.g., Charness, 1981; McKeithen, Reitman, Rueter, & Hirtle, 1981); maintenance and elaboration rehearsal strategies (e.g., Craik & Lockhart, 1972); hemispheric processing differences (e.g., Seamon & Gazzaniga, 1973); problem-solving strategies (e.g., Wickelgren, 1974); and decision-making strategies (e.g., Simon, 1956, 1979).

Toward a Taxonomy of Support Strategies

As mentioned earlier, support strategies are used to maintain the work environment. Because these strategies are not task-specific and can be applied across a wide variety of jobs and situations, a more detailed set of strategies can be offered. Below is a partial list of some of the support strategies which apply to the work environment. All of these strategies are used by workers to organize the environment, structure time and resources, or review and diagnose performance.

Rest Periods. The manner in which a person structures the time on and off the job can be viewed as a support strategy. The worker must take time out from the job in order

to recover from fatigue and boredom, but must not spend too much time away from the job lest productivity suffer. Workers will generally employ some strategy for scheduling rest periods which is intended to accomplish their work goals. Even if the organization has a rigid schedule of authorized rest periods, the workers will nonetheless take unauthorized work breaks and rest pauses (Barnes, 1980, p. 461).

Pace. Motivation is sometimes viewed as the force (amplitude and persistence) and direction of behavior (Campbell & Pritchard, 1976). Pace involves amplitude and persistence. Pace refers to the speed (i.e., amplitude) of the behavior, and the degree to which this level of performance remains stable over many observations (i.e., persistence). We suggest that workers make strategy choices about their work pace (both in terms of the average level of performance and the variability of that performance) and that these choices have costs or consequences in terms of effort. If the chosen pace is too fast, then the effort exerted will be too great and the worker will slow down. This is a slightly different view from the position which maintains that workers select a given effort level directly (Vroom, 1964), but the end result is much the same.

Pace should not be confused with rest periods. By pace we mean the activity level a worker maintains while performing the work and not the proportion of time on and off the job. By combining information on pace and rest periods, we can possibly derive an estimate of effort. One way to define effort might be in terms of the amount of "energy" expended by a person. This energy could be measured in absolute terms or relative to a person's capacity. In either case, there is some evidence that people can make subjective estimates of effort which correlate well with more objective measures (Borg, 1971; Fleishman, Gebhardt, & Hogan, 1984). Perhaps these subjective estimates of effort will also correlate with some derived estimate of effort based on pace, rest periods, or some other combination of strategies.

Time Management. It is conceptually convenient to keep time management separate from rest periods and pace, so time management is used here in the restricted sense of assigning work time to facets of a job and not to the proportion of time on and off the job. For example, a college professor must divide up her time between research, teaching, and committee work if she hopes to be reappointed.

Resource Management. Not only must a worker manage work time, he or she must also manage other more tangible work resources. One way of viewing resources is in terms of data, people, and things. Given this scheme, resource management refers to the manner in which a person utilizes these resources. For example, one common strategy for a managerial worker is the delegation of authority to key people within the organization. This strategy can be contrasted with the strategy of not delegating authority and centralizing the decision-making process. These two styles of management represent different ways of utilizing people as a resource. Similar examples can be given for "data" and "things." For example, Barnes (1980, Chapters 16 and 17) talks about principles of motion economy as related to the work place and tool design. The different ways in which workers arrange and design the things in their environment would qualify as resource management.

Goal Setting. The process of setting performance goals by establishing priorities and thinking in terms of long-range and short-term objectives represents another form of support strategy. Once the goals are set, these goals then become the objects for which strategies are developed. But, it is important to note that the process of setting goals is itself a strategy. The fact that goals can be both a strategy and the determinant of other strategies merely points out that work is dynamic and complex.

Seeking of Feedback. This is a support strategy which refers to the monitoring and seeking of performance feedback. This multidimensional category involves the manner of requesting feedback, the frequency of seeking feedback, the type of feedback requested, the use to which the feedback is put, and so forth. Monitoring performance feedback and using that feedback to diagnose and change work behavior are very important work strategies (Ashford & Cummings, 1983).

General Issues

Several issues can be raised at this point regarding strategies in general and work strategies in particular. We can ask:

Are strategies a conscious, cognitive phenomenon or merely a behavioral tendency? It is tempting to conclude that strategies must be consciously (intentionally) constructed to be genuinely goal-directed. Locke et al. (1981) used the term "action plan" to describe an individual's attempt to guide behavior toward a goal. The term "action plan" implies intentionality, purpose, and a conscious process. But an intention to do something does not always mean that the plan is successfully executed. Moreover, a person could conceivably learn a strategy (either on his or her own or by being taught) without intending to do so.

Some examples may show how both action plans (cognitions) and action executions (behaviors) are important dimensions of strategy. Person A has developed a good plan for becoming a top salesperson for a small firm. The plan involves working evenings and traveling three times a week to nearby cities. However, the person becomes ill unexpectedly and is unable to carry out the plan. The plan still represents a good strategy, but the inability to execute the plan prevents it from being a successful strategy; hence both plan and execution are necessary components of this strategy. Person B works at a factory doing the same routine task day in and day out. Over the years, this person has developed a pattern of behavior which is effective in performing the job and producing a decent wage. The person did not intend (plan) to develop this pattern, but the action is now being executed skillfully and serves well as a strategy for achieving the person's goals. For person B, a conscious plan was not needed for a behavioral strategy to develop. The point of these two examples is to show that strategies can be goal-directed and nonetheless be consistent with either a conscious cognitive or a behavioral point of view. As Locke (1969) argues, goal-directed behavior is not necessarily conscious or purposive. Likewise, goal-directed strategies are not necessarily conscious or purposive.

Is strategy an independent variable or a dependent variable? To the extent that we are interested in strategy as a determinant of work performance and goal achievement, then strategy is an independent variable. For example, we may be interested in how different patterns of rest periods or different levels of pace affect work performance. If we are interested in rest periods and pace as strategies, then we are viewing strategy as an independent variable and work performance as a dependent variable. In a sense, this is one question which has interested the industrial engineer ever since the time of F. W. Taylor. On the other hand, it is conceivable that we might want to study strategy as the outcome of various work conditions (e.g., introductions of feedback or wage incentives, increased goal difficulty), and thus strategy (or more specifically strategy development) becomes a dependent variable. For example, we may be interested in how different patterns of rest periods develop as a function of different levels of wage incentives. Here we view strategy as a dependent variable and level of wage incentive as an independent variable.

Are work strategies employed by groups as well as individuals? If goals are seen as hierarchical in nature, then both individual and group strategies are possible. Just as individuals have goals to achieve, groups also have goals which can only be met through coordinated action. These higher level group goals may suggest patterns of work which are distinctly different from activities engaged in by an individual acting alone. Ideally, of course, group and individual goals are compatible. Unfortunately, this is not always the case, and sometimes the strategies adopted by individual workers conflict with the strategies adopted at a higher level.

Can two strategies employed by the same individual conflict? Just as group and individual strategies can conflict, two or more strategies employed by a single individual may conflict. Multiple goals in work are probably quite common, and a strategy to reach one goal may well interfere with the strategy to reach another goal. The secret to good strategy development may be to coordinate strategies and to set priorities among goals. For example, a college professor may have a strategy for accomplishing her research goals and another strategy for accomplishing her teaching goals, and these two strategies may conflict. The professor should either devalue one of her goals or attempt to coordinate the two conflicting strategies.

Can a person have two or more strategies for a single goal? A task strategy and a support strategy could be developed for reaching a single goal. For example, a key entry operator paid an incentive wage for exceeding a standard number of keystrokes per hour could work to improve her typing speed (a task strategy) and organize her rest periods to minimize eye strain and fatigue (a support strategy). Ideally these two strategies would work in tandem, but it may be possible for a person to have two conflicting strategies for attaining a single goal.

A Conceptual Model of Work Strategies

Having developed the concept of strategy and having discussed some of the salient issues, we now face the difficult task of mapping out the relationships between strategy and other important variables within the work environment. As noted earlier, work strategy is considered as part of the motivational process in models of work performance. Although motivation has two basic properties, force (which includes amplitude and persistence) and direction, most process theories of motivation seem to emphasize force or effort over direction (Campbell & Pritchard, 1976). Clearly, if a worker wants to meet a certain performance goal, one of the choices he or she can make is to work harder. But there are other choices available to the worker besides increasing speed or working with greater persistence, and work strategy is a concept intended to capture a wider range of these choices (i.e., "work smarter not harder"). The model which follows is an attempt to place this view of work strategy within the context of the early formulations of expectancy theory (e.g., Porter & Lawler, 1968; Vroom, 1964) and Locke's (1968) work on goal setting.

The merging of goal setting and expectancy concepts gives us a view of work in which performance is seen as the complex interaction of many variables. Some of the more important variables are ability (both objectively measured and subjectively assessed), valence of job outcomes, effort-performance expectancy, performance-reward instrumentality, goal setting, individual differences, context, and feedback. One recent model which captures most of these variables has been outlined by Riedel et al. (in preparation). Borrowing heavily from this scheme, Figure 1 depicts a model which incorporates work strategy into the conceptual framework of goal setting and expectancy theory. If work strategy is placed as the pivotal construct in the model, then all the other variables can

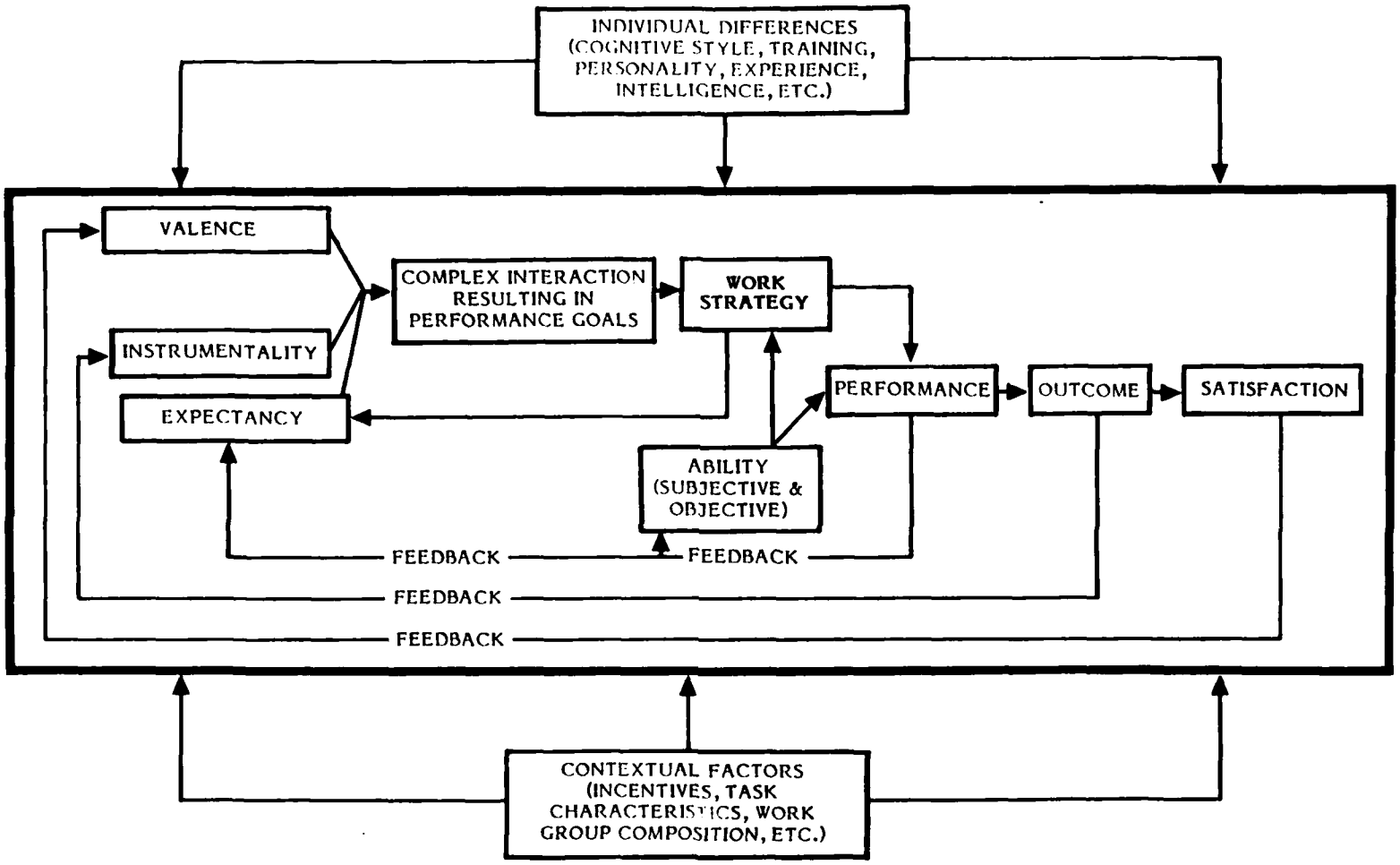

Figure 1. Model of work strategy (based on Riedel et al., in preparation).

be seen in relation to it. This portrayal is not intended to give the impression that strategy is more central than the other variables; the model is portrayed in this fashion merely to focus attention on the concept of strategy.

Valence, Instrumentality, Expectancy, and Performance Goals

Moving from left to right in the model, we begin with the concepts of valence, instrumentality, and expectancy. These three concepts are used in the same sense as that described by Ilgen, Nebeker, and Pritchard (1981). Valence refers to the worker's anticipated satisfaction with the job outcomes. Instrumentality refers to the worker's perceived connection between his or her performance and the outcomes or consequences of that performance. Expectancy refers to the worker's perceived connection between his or her effort and job performance. These three variables interact in a complex fashion (outlined in greater detail by Riedel et al., in preparation) and result in the workers setting performance goals. These performance goals vary in specificity, difficulty, and the degree to which workers are committed to the attainment of these goals. The pertinent point here is that the setting of goals is an important determinant of work strategies. The model predicts that work strategies are more likely to be developed and will be more effective when workers set difficult goals and when they are committed to these goals. There is some research evidence to support this prediction (see Locke et al., 1981).

Individual Differences

The top of the diagram in Figure 1 shows that individual differences can affect all parts of the model as a whole. Strategy development in particular can be affected by these individual differences. For example, personality and intelligence tests are hypothesized to correlate with measures of strategy development. One interesting possibility is that certain measures of "cognitive style" will show relationships to work strategy. As an example, consider the possibility that workers who differ in cognitive complexity (e.g., Vannoy, 1965; Wardell & Royce, 1978) develop different strategies for their work. The strategies used by the person high in cognitive complexity may not be usable by the person low in cognitive complexity. This raises the interesting possibility that there might be some person-strategy fit to be considered in optimizing work strategy.

Training and experience can have a direct effect on work strategies. This relationship is not surprising and simply implies that the more highly trained (more experienced) workers are more likely to develop and use effective strategies than those with less training and experience. This further suggests that people can be trained to use strategies which will improve their performance on a task (see Locke et al., 1984).

Ability

Ability usually plays a key role in most models of work performance. In the present model, ability can be measured either subjectively or objectively. Subjective ability is defined by the individual and may not reflect what objective measures indicate about his or her ability to perform a task. Expectancy (the belief that one's efforts will result in changes in performance) is obviously related to subjective ability in that they both refer to the perceived connection between effort and performance. Ability, both subjective and objective, can have a direct influence on strategy. Someone with high ability on a task may adopt a strategy different from one adopted by someone with moderate ability. In addition, people may differ in their ability to develop strategies. The model also predicts that ability will have a direct effect on performance, and that changes in performance over an extended period of time can feed back and create changes in ability.

Performance

So far we have discussed strategy primarily as a dependent variable, that is, as a behavior which is affected by other variables (e.g., goal setting, ability, training). The model also shows strategy as an independent variable which can affect dependent variables such as performance, expectancy, and satisfaction.

The relationship between strategy and performance may be reciprocal, as the model suggests. Locke et al. (1984) have shown that strategies can have a direct effect on performance under some conditions. But performance may feed back and cause adjustments to be made in the strategies that are used. This feedback loop is mediated by changes in the worker's expectancy which, in turn, creates changes in performance goals. In support of this view, Locke et al. (1984) demonstrated that performance has a direct effect on self-efficacy (a concept developed by Bandura, 1977, which is similar to the concept of expectancy used here). The present model proposes that these changes in expectancy (self-efficacy) will lead to changes in performance goals which will ultimately cause adjustments in work strategy. In fact, this feedback loop may be one thing that distinguishes the good worker from the poor worker; good workers maintain high levels of performance because they are constantly adjusting their work strategies to meet changing conditions, whereas poor workers doggedly stick to the same strategies despite changes in the work environment.

The model predicts that work strategy may also have a direct influence on expectancy. In other words, a person's expectations need not always be a result of a change in his or her performance. A person may have never used a strategy (and therefore never experienced its effect on performance), but he or she may have observed others using the strategy. This vicarious experience may be sufficient to change the worker's expectancy.

Performance Outcomes and Satisfaction

The outcomes or consequences of performance are the tangible and intangible events (e.g., pay, recognition, promotion) which are the result of the worker's performance. These outcomes feed back and influence the worker's instrumentality (i.e., the perceived connection between performance and its consequences). The satisfaction or dissatisfaction experienced from these outcomes forms the basis of valence (i.e., anticipated satisfaction of the performance outcomes). Valence and instrumentality both change future strategies and behavior through the feedback loops shown.

Contextual Factors

The last box in the diagram refers to various contextual factors in the work environment. As with individual differences, contextual factors can influence all parts of the model. It is proposed that these contextual factors (e.g., work incentives, task characteristics, composition of work groups) may have direct and indirect influences on work strategy. Take, for example, pay incentives. If one worker receives a pay incentive while another does not, it is possible that the worker receiving an incentive will develop a different work strategy than the worker not receiving one. According to the model, the effect the incentive has on work strategy could also be indirect: A pay incentive may affect the worker's instrumentalities, expectancies, or the valence of the outcomes which would, in turn, affect strategy. To use an example, let us suppose that worker A receives $5.00 for each item produced over some known standard, while worker B receives nothing for above standard production. Worker A may develop a more effective work strategy

than worker B because now worker A sees a real connection between performance and a valued outcome. It is the instrumentality which mediates the development of the work strategy here and not the work incentive per se.

To use another example, consider the work group. As mentioned earlier, the group may have goals different from those of the individual and hence different work strategies may be called for to meet group, as opposed to personal, goals. If the group and individual goals are incompatible, then this situation would alter the valence, the instrumentality, or the expectancy, and certain strategies (either group or personal) would develop as a result of these changes. To be more specific, let us suppose that the personal goals of a college professor is to publish three articles per year, and she has devised a strategy (e.g., she grades fewer papers and advises fewer students to free more time for writing) for accomplishing that goal. However, the implicit assumption of her colleagues and the administration is that someone who spends so much time publishing cannot be sufficiently committed to teaching. The subtle group influences may change the professor's views on publishing. She may reassess the value of publishing three articles per year and may conclude that her performance (publishing) does not lead to a desired outcome (good relations with her colleagues and the administration). Under these conditions she may change her goals and her strategy, not as a direct result of the work group but indirectly through changes in the valence of the outcome and her perceptions of the performance-reward contingencies.

Contextual factors may influence other variables in the model besides valence, instrumentality, and expectancy, but outlining these complex relationships is beyond the scope of the model.

An Empirical Investigation

Research to investigate all of the variables in the proposed model and examine all of the various types of work strategies would be an ambitious undertaking indeed. The scope of the present research is limited and is intended as a preliminary investigation in the area. The present investigation examined work strategies within the context of a simulated work environment. Work strategy was defined as the rest periods employed by the workers.

Since this research focuses on rest periods, it is useful to review some of the relevant literature on them. It is commonly believed that rest periods have greater recuperative value for heavy, physical labor; for labor performed under conditions of high temperature and humidity; for work requiring close attention and concentration; and for repetitive and monotonous work (Barnes, 1980, pp. 461-462). The evidence suggests that distributed rest periods (several short rest periods) are more effective than, and preferable to, massed rest periods (a few long rest periods) (Barnes, 1980; Bhatia & Murrell, 1969). In general, frequent rest periods which are taken before the onset of fatigue are more effective than longer, but less frequent, rests taken after fatigue has set in (Cakir, Hart, & Stewart, 1980). Because the employee knows best when fatigue is setting in, the findings reported by Cakir et al. (1980) suggest that rest periods are more effective if they are taken at the workers' discretion rather than rigidly scheduled by the company. Bishop and Hill (1971) reported that workers in a condition where rest breaks were discretionary were away from the job up to three times longer than workers in a scheduled rest break condition, but that the workers allowed to use discretion were no less productive and the quality of their work was significantly higher. The results of Bishop and Hill's (1971) research reinforces the notion that "time on task" is not the crucial variable in determining productivity increases from rest breaks. Indeed, the classical work by Taylor gives examples of

increasing output by reducing work time (see Taylor, 1911, p. 57). Moreover, Graf (cited in Cakir et al., 1980) demonstrated that there is an optimal rest period length above which productivity is lost because of lost work time and below which productivity is lost because of increased fatigue.

All of the above studies lead to the conclusion that the proper arrangement of rest periods (preferably at the worker's discretion) can lead to improved work performance. Workers can use the scheduling of rest periods as a strategy to increase the quantity and quality of their work. It is in the spirit of these studies that rest periods have been selected as a proper focus for work strategies.

The present investigation of work strategies is embedded within a more ambitious research project concerned with the effects of wage incentives on worker productivity, motivation, attitudes, and perceptions. Briefly, the project consisted of hiring 128 workers to perform the job of "data coding" (transferring answers from a paper and pencil survey onto a machine-read form). Each of the 128 workers was randomly assigned to one of seven work shifts. The shifts differed in the degree of wage incentive they received and in whether or not they were informed of a performance standard. Each shift worked for four hours per day for five consecutive days. During the week, measures of work output were taken. At three separate points during the week all workers were given a lengthly questionnaire to fill out. The questionnaire contained items on a wide variety of topics such as worker expectation, goal setting, worker perceptions, attitudes, etc. The purpose of the present investigation was, of course, to determine whether work strategy (defined in terms of rest periods) was related to the other variables (such as ability and goal level) as depicted in the conceptual model.

METHOD

Research Design and Overview

The work simulation consisted of a coding task which required the employees to transfer responses from questionnaires onto standardized answer sheets which could be machined-scored. The questionnaires were Fleet Experiences Questionnaires (FEQs) which had been completed earlier by a group of first-term Navy personnel to assess their attitudes about their fleet experiences. Seven shifts of employees were hired to work five four-hour days beginning on a Monday and ending the following Friday. Before the start of the job the subjects were told that they would be paid a minimum of $4.40 per hour and that they would work for at least one day but no more than five.

Each of the seven work shifts represented one level of the treatment condition. Shifts 1-5 corresponded to the five levels of incentive. Shift 6 was a control group which received no incentive wage, but employees were given feedback regarding how their performance compared with the standard rate of 5.75 FEQs per hour. Shift 7 was another control group which, like shift 6, received no incentive wage but, unlike shift 6, was not informed about the standard rate and was given feedback only on their raw performance results.

Subjects

A total of 224 applications were received as a result of recruitment through newspaper advertisements and flyers distributed at stores and schools in the area. From this applicant pool, 140 employees were selected based on high scores on the clerical form

of the Short Employment Test (SET) developed by Bennett and Gelink (1953). Each of the 140 employees was randomly assigned to one of the seven work shifts with each shift consisting of 20 persons. Because of "no shows" the first day and attrition during the week, the shifts varied between 17-20 employees. The final sample of 128 employees consisted of 70 females and 58 males varying in age between 16 and 47 with an average age of 21 years. Approximately 40% were high school students and 60% were college students.

Procedure

Each of the seven shifts was run for five consecutive days for four hours each day. Shifts 1, 3, 5, and 6 were run during the morning hours (7:30 a.m. - 11:30 a.m.) and shifts 2, 4, and 7 were run during the afternoon (12:00 noon - 4:00 p.m.). Four of the shifts (shifts 1-4) were run the first week of the study, while the remaining three (shifts 5-7) were run the following week. Shifts which ran concurrently in the morning or afternoon were located in separate buildings to avoid contact between employees from different shifts. Contact between morning and afternoon shifts in the same building was avoided by allowing one-half hour between shifts, enough time to allow one shift to leave before the next shift arrived.

Two principal kinds of data were collected from each of the seven groups. The first was production data that consisted of both rate measures (e.g., number of FEQs coded per hour, percent of standard) and error measures. The second kind of data was information gathered through questionnaires that the employees filled out (not to be confused with the FEQs that the employees were coding) that asked questions about the employees' work expectations, goals, etc. These questionnaires were administered at three separate times during the week. The first was administered about half way through the first workday (Monday). The second was administered during the first 45 minutes of the third workday (Wednesday). The last research questionnaire was administered during the first 45 minutes of the last workday (Friday).

First Workday

The first workday consisted mainly of explaining the various aspects of the work to the subjects, training the subjects on the data coding task, and allowing them some time to practice. Training and practice took approximately one hour. At this point they were told that after the training and practice sessions they would be given a "work sample" which they were required to work on for a 10-minute period. They were told that if the work sample did not meet certain minimal standards that the applicant would not be retained for the remainder of the week. These instructions were designed to make the work sample a maximum performance test which can be used as a measure of objective ability. At the end of the 10 minutes, the supervisor graded the work sample for speed, accuracy, and neatness. No applicants were eliminated based on the work sample results. After the subjects completed the work sample, they then worked on the actual task for approximately one hour. The subjects were then administered the questionnaire and, upon completing the questionnaire, returned to work on the data coding task.

Days Two Through Five

At the beginning of each workday the employees were given a feedback report (called an "Efficiency Report") on their performance from the previous day. For shifts 1-5 (the incentive wage groups) the report consisted of feedback on the following aspects of performance (refer to Table 1): (1) number of FEQs completed (QS COMP); (2) number of hours spend in actual production (PHRS); (3) FEQs per hour (Q/HR), computed as completed FEQs divided by the production hours; (4) percent of errors (% ERR), computed

Table 1

Example of Feedback Report Given to a Worker in an Incentive Wage Group (25% Sharing Rate)

Navy Questionnaire Coding Contract Performance Efficiency Report												
ID #	Day	QS COMP	PHRS	Q/HR	% ERR	% PERF EFF	THRS	Earnings ($)		Incentive Pay ($)		Total Pay ($)
104	MON	7.00	1.1	6.36	.31	110.67	4.0	17.60	+	.47	=	18.07
	TUE	25.00	3.7	6.76	2.70	117.51	4.0	17.60	+	.77	=	18.37
	WED	25.00	3.2	7.81	1.07	135.87	4.0	17.60	+	1.57	=	19.17
	THU	30.00	3.9	7.69	2.70	133.78	3.9	17.16	+	1.45	=	18.61
TOTAL	4	87.00	11.9	7.16	1.69	124.46	15.9	69.96	+	4.24	=	74.22

as the proportion of incorrect entries on the FEQ answer sheet; (5) percent performance efficiency (% PERF EFF), that is, performance as a percent of the standard rate; (6) total hours worked (THRS), computed as production hours plus time spent completing the research questionnaires, training, practicing, etc.; and (7) earnings (minimum wage, incentive pay, and total earnings per day). For shift 6 (control group) the feedback report had all the information contained on reports for shifts 1-5 except for the incentive pay information. For shift 7 (control group) the feedback report omitted the information on incentive pay and that on performance efficiency.

During each session, the workers were allowed to take breaks as frequently as they wished. There were facilities located close to each room which provided refreshments. There were separate facilities for shifts run simultaneously, which meant workers from different shifts were not likely to meet. The workers were asked not to abuse the privilege of taking breaks and, in fact, with only a few exceptions, the workers did not take unreasonably frequent or long breaks. The workers were allowed to talk to their coworkers when coding the FEQs, but they were encouraged to do so quietly. The workers were also allowed to bring radios and cassette players as long as they used headsets. No food or drink was allowed at the work stations.

Incentive Wage System

The incentive wage system was used only for shifts 1-5. Each of these shifts was given a chart which showed the standard rate of performance plus various dollar values which could be earned by performing above this standard rate. The standard rate of 5.75 FEQs per hour was established using industrial engineering techniques described by Barnes (1980, pp. 273-304).

In general, the standard rate simply refers to the rate at which the average worker working under normal conditions can code FEQs. The amount of incentive pay for each shift was determined by computing a 25 percent, 50 percent, 75 percent, 100 percent, or 125 percent sharing rate for each of the shifts 1-5 respectively. The sharing rate refers to that portion paid to the employee of the money saved by the organization for production above the standard rate. For example, in the 25 percent incentive group, if a person codes 6.75 FEQs per hour (one FEQ above the standard rate), that person is operating at 117 percent of the standard rate. If that person were only paid $17.60 for a 4-hour day ($4.40 per hour), the Navy would save $2.99 (117% of $17.60 = $20.59 which is $2.99 more than $17.60). If the Navy gives the worker 25 percent of the savings, then the worker receives an additional $0.75 for that day. Obviously the higher the rate of production over the standard rate, the more money the employee is able to earn. Likewise, the higher the sharing rate, the more money the employee is able to earn at all production levels. The different charts which were shown to shifts 1-5 made clear to the employees how much they could earn in incentive pay for different rates of production.

While shifts 1-5 were given an explanation of the incentive wage system, shifts 6 and 7 were given different instructions. Shift 6 was told about the standard rate but was not given an incentive wage for performing above the standard. Shift 7 was not told about the existence of a standard rate. All shifts were informed that there were other shifts working under different pay systems, but no specific information was given regarding these other shifts.

Research Questionnaires

There were three research questionnaires administered during the work week (one on Monday, another on Wednesday, and a third on Friday). Because this work simulation project was designed to address issues other than work strategy, the questionnaires had many items which were not relevant to the present investigation. Only those items which are directly related to the present investigation are discussed. In addition, only the data from Wednesday's questionnaire will be reported since this was the only time when all the relevant questions were asked. Table 2 provides a summary of the major constructs measured in the present research. A copy of the actual items used to measure these constructs is provided in the Appendix.

Table 2

Summary of Major Constructs

Construct	Operationalization	
	Questionnaire Item (Appendix) or Measure	Computation From Riedel et al. Model (in preparation)
Valence (V)	Items 1-4, pp. A-3 - A-4	
Instrumentality (I)	Items 1-4, pp. A-7 - A-10	
Performance *Valence* (PV)		Sum of products of V and I $\sum(P * I)$
Expectancy (E)	Item 3, p. A-10	
Self-reported Goal Level (SG)	Items 2a-2b, p. A-11	
Predicted Goal Level (PG)		Goal level determined by computing the weighted average of all PVs
Subjective Ability (SA)	Item 3, p. A-10 (same as expectancy)	
Objective Ability (OA)	Work sample	
Work Strategy (WS)	Objective observations of work breaks	
Task Performance (TP)	Production rate (FEQs per hour) for days 2-5	

Valence

Valence is the anticipated satisfaction of obtaining an outcome. In the present research the valence was measured by having the employees rate the attractiveness of various outcomes of the job (refer to example on page A-2 of the Appendix).

The outcomes which were selected for this research were (1) informal supervisor recognition, (2) sense of accomplishment, (3) pay, (4) coworker friendship and admiration, and (5) a comparison of the highest levels of the above four outcomes. This measure of attractiveness is similar to that used by Ilgen, Pritchard, Bigby, and Nebeker (1982). Items 1-5, pages A-3 through A-5 of the Appendix, measure the outcome valences, but item 5 was not used in this study.

Instrumentality

Instrumentality is the perceived link between performance and outcomes. In the present research, instrumentality was measured by asking the employees to make an estimate of how likely certain outcomes are (refer to example on page A-6 of the Appendix).

The outcomes used to assess instrumentality were the same as the first four outcomes used above for valence. The instrumentality measure is similar to that used by Ilgen et al. (1982). Instrumentality was measured by items 1-4, pages A-7 through A-10 of the Appendix.

Expectancy

Expectancy is the worker's expectation that a certain amount of effort will lead to a given level of performance. In the present research, the employees were asked to estimate their performance (in FEQs per hour) for three levels of effort (slowest work pace, average work pace, and fastest work pace). Expectancy was measured by the last item (item 3), page A-10 of the Appendix.

Goal Setting

The next six items (pages A-11 through A-13 of the Appendix) were goal setting items. These items asked about the content of goals which may have been established by the employees. The three content areas were (1) production goals (how many FEQs per hour would the person like to achieve), (2) error goals (what error rate would the person like to achieve), and (3) effort goals (how hard does the person want to work). For the purposes of this research, only items 2a-2b (p. A-11) of the production goals were used to assess goal level. When workers selected item 2b, the midpoint of this range of values was used as the data point.

Debriefing

The last 15-minute period of the final day (Friday) was reserved for thanking the employees for their help and for debriefing. The employees were told the purpose of the research and were given an opportunity to ask questions. No employee revealed that he or she suspected that the task was part of a controlled experiment. The employees were all promised a brief summary of the research results. The names and addresses of those who desired this summary were taken and the summary was mailed within a month.

RESULTS

Because the main focus of this research is on work strategies, the findings concerning the many other variables measured in the work simulation project will not be described (for a description of other variables see Riedel et al., in preparation). What will be described is

a summary of the important findings regarding work strategy and some of the relationships between strategy and other work variables. Table 3 shows the matrix of zero-order correlations for the important variables in this study. The total time measure for rest periods (4) is described below.

Table 3

Matrix of Zero-order Correlations for Variables Measured in the Empirical Study

Variable	N	Mean	SD	Intercorrelations 2	3	4	5
1 Objective ability (FEQs per hr)	128	5.67	1.13	.15	.28	-.14	.42
2 Predicted goal level (FEQs per hr)	123	7.64	.32	--	.56	-.24	.36
3 Self-reported goal level (FEQs per hr)	65	6.70	1.39		--	-.13	.56
4 Rest period (total time in min)	128	8.30	8.65			--	-.42
5 Production (FEQs per hr)	128	5.98	1.77				--

Note. All correlations above the absolute value of .14 are significant at $p < .05$.

Outcomes Related to Rest Periods

Rest periods represented the measure of work strategy used in this investigation. The researchers kept a log of both the frequency and duration of time spent away from the work station by each worker. To obtain a measure of total rest period time, the frequency and duration measures were multiplied. Total time was then analyzed as an independent variable with production as the dependent variable. Production was measured as FEQs per hour over the last four days. Research described earlier (Cakir et al., 1980) indicated that there should be an optimal rest period in terms of the total time off task. In other words, if the rest periods are too short, the worker does not recover from fatigue and productivity suffers. However, if the rest periods are too long, the worker spends too much time off the task and productivity again suffers. This reasoning suggests that there should be a curvilinear relationship between rest periods and task performance. In our study, the relationship between total rest period time and productivity failed to show any significant deviation from linearity, $F(2, 125) = 2.16$, $p > .05$. To the contrary, there was a significant linear trend between these two variables, $F(2, 125) = 10.65$, $p < .05$.

To follow up these results, a more detailed analysis was done to explore the precise relationship between rest periods and task performance. A regression analysis was performed using productivity as the dependent variable and the total rest period time as the predictor variable. The results showed that rest periods were significantly correlated with productivity ($r = -.42$, $p < .05$). The equation which relates rest periods to

productivity was: $Y' = -.09X + 6.69$. This regression equation shows that by not taking any rest periods the average worker can produce 6.69 FEQs per hour. With each minute away from the task, the worker lowers his or her productivity by .09 FEQs per hour. For the average worker who takes about eight minutes per day away from the job, this would amount to a reduction in productivity of approximately .7 FEQs per day.

It is an open question as to whether or not a strategy of taking rest breaks is beneficial over and above the effects of time on task. If rest periods further benefit performance, one would expect a general curvilinear relationship between rest breaks and performance. As noted earlier, this relationship did not occur. However, one does not know what an individual's task performance would have been if he or she had not taken the rest breaks. It is entirely possible that without the respite from fatigue and stress, performance might have been lower than the average constant of 6.69 FEQs per hour. This leads one into a quandary about the experiment. We know from research (Bishop & Hill, 1971) that rest breaks taken at the worker's discretion are more beneficial than breaks which are imposed on the worker. However, we cannot know what effect various rest break levels have on an individual worker unless we subject that worker to different levels (e.g., no breaks, breaks of varying length and frequency, imposed breaks versus discretionary breaks). Until this problem is resolved, we can conclude very little about optimal work breaks from these data.

Relationships Among Rest Periods and Other Variables

The next analyses used total rest period time as an index of work strategy and showed how some of the work variables presented in the model related to this strategy. As stated above, workers can improve their work performance by taking fewer rest periods. This result is not surprising and simply shows that greater time on task results in higher productivity. If the expected curvilinear relationship between rest periods and performance had been observed, time on task would not be the only explanation for improved performance. However, the relationship did not occur and so we may only conclude in this study that rest periods influence performance merely by allowing the workers to vary their time on the task. Varying the time on the task is clearly a behavior which the workers can use as a strategy for increasing (or decreasing) their productivity.

A path model is presented in Figure 2, a simplified version of Figure 1, that focuses on a few of the major variables measured during the work simulation project. In particular, the path model shows the expected relationships between objective ability (OA), performance goal level (PG), work strategy (WS), and task performance (TP). The path analysis uses the constructs and variables outlined in Tables 2 and 3. Predicted goal level was used rather than self-reported goal level because the number of cases was larger and because predicted goal level is consistent with the measure used by Riedel et al. (in preparation). According to the model outlined in Figure 1, there should be significant path coefficients between goal level and strategy and between ability and strategy. Further, there should be a significant path coefficient between ability and performance and between strategy and performance. Theoretically there should be no direct relationship between goal level and performance because, according to the model, work strategies must be devised in order to implement performance goals. However, in this study we have only measured rest periods as a strategy, and so it may appear that goal level is directly related to performance when, in fact, it may be influencing performance via some other strategy that we have not measured. All of the path coefficients were obtained from a path analysis as outlined by Pedhazur (1982, Chapter 15).

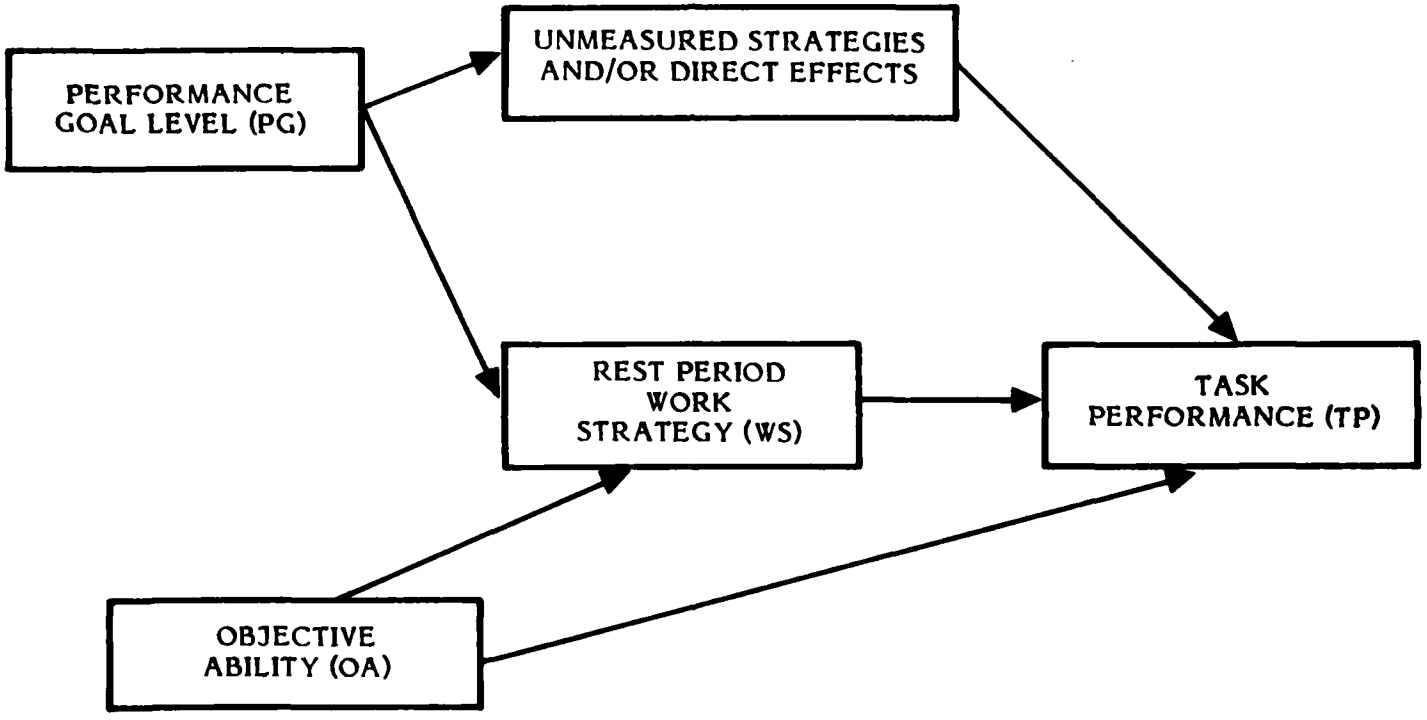

Figure 2. Hypothesized path model of the relationships between goals, ability, work strategy, and task performance.

Although the larger model outlined in Figure 1 is a nonrecursive model (i.e., the model contains causal loops), the recursive path analysis shown in Figure 1 is appropriate because the feedback loops from task performance to goals and from task performance to ability do not involve simultaneous causality. At any given time the causal flow is assumed to be in only one direction. For example, performance feedback may alter a worker's goals, but the effect would be on subsequent goals, not the current goals. At the moment when performance goals are measured, the causal flow will always be in the direction of goals affecting performance. The same reasoning applies to the relationship between task performance and ability. Improvements in task performance can feed back and change a person's ability level, but performance will influence ability only after some extended period of time. As with performance goals, at the time the measures of ability are taken the causal flow is unidirectional, that is, ability affects task performance but not vice versa.

A test of the path model shown in Figure 2 provides some support for the larger model outlined in Figure 1. Figure 3 recreates Figure 2 and shows the estimated path coefficients.

The relationship between goal level and strategy supported the general model. The zero-order correlation between predicted goal level and performance ($r = .36$, $p < .05$) suggests that those workers who set higher performance goals tend to perform better at the task. Examination of the path coefficients gives support to the model's prediction that part of the relationship between goal level and performance is mediated by work strategy ($P = -.23$, $p < .05$). In other words, those workers who set higher performance goals also spent less time engaged in rest breaks (i.e., they spent more time on task). Although not predicted by the model, a direct relationship between goal level and performance was also observed ($P = .23$, $p < .05$). This relationship between goal level and performance may be the result of some strategy other than rest periods which was not measured in this study.

The relationship between objective ability and performance gave only partial support to the model. The zero-order correlation between ability and performance ($r = .42$, $p < .05$) suggests that workers with greater ability perform better on the data coding task. The path coefficients show that ability has a significant direct relationship to performance ($P = .34$, $p < .05$). However, contrary to the model, the path coefficient between ability and strategy (rest periods) was not significant ($P = -.11$, ns). In other words, workers with greater ability did not tend to adopt a strategy of taking less time off the task, in the form of rest breaks, relative to their coworkers of lower ability.

CONCLUSIONS

The purpose of this research was to develop a model that proposed several theoretical relationships between work strategy and other work variables and to report on the results of an empirical investigation that measured those relationships. The model attempted to place the concept of work strategy within the context of the expectancy and goal setting literature. The empirical investigation focused on the relationship between work strategy (defined as worker-scheduled rest periods) and several other work variables (i.e., performance goals, ability, and task performance). The investigation achieved two objectives. First, it examined the concept of rest periods per se but was unable to show the anticipated curvilinear relationship between rest periods and task performance. The research also failed to support the concept of an optimal rest period (Cakir et al., 1980).

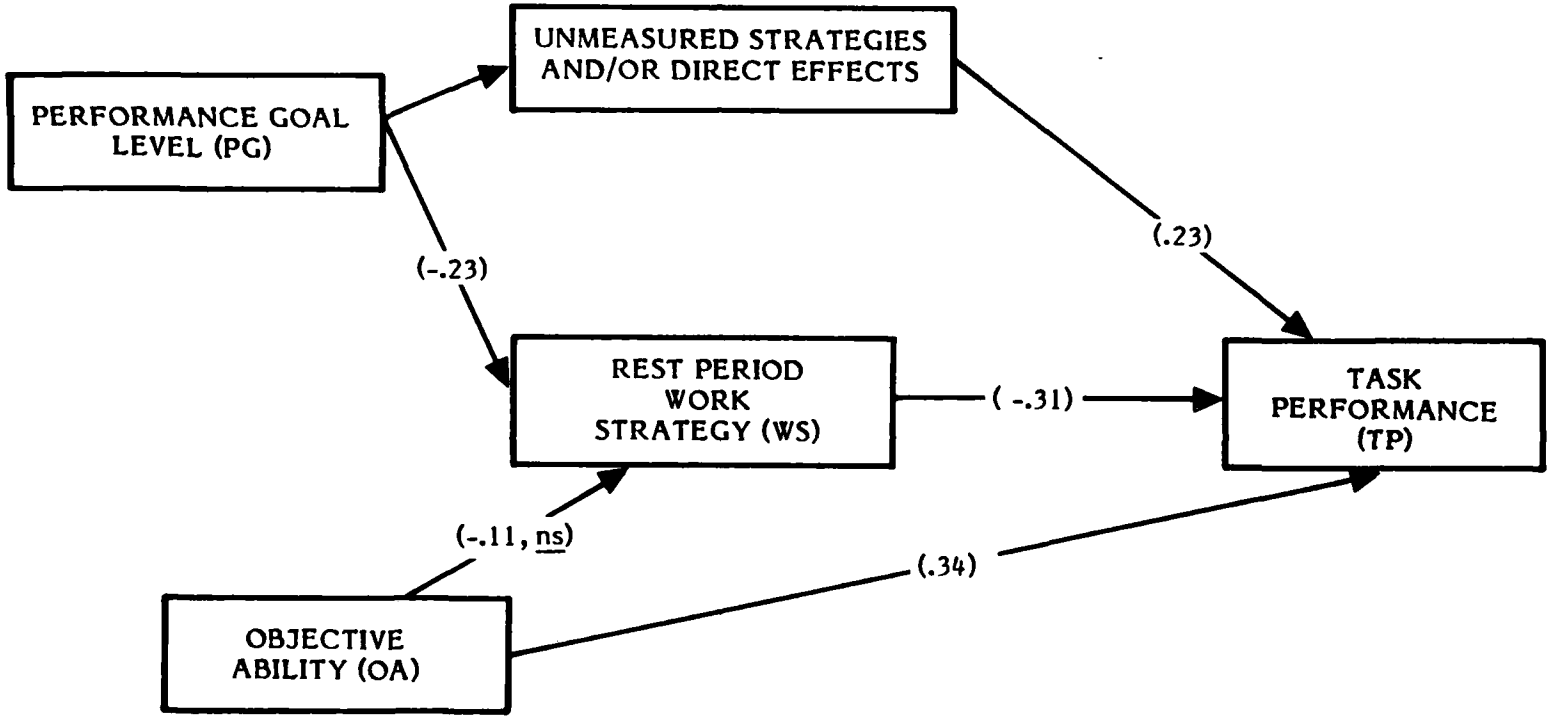

Figure 3. Obtained path model showing the relationships between goals, ability, work strategy, and task performance.

The second objective was the creation of a path analysis that showed the relationship of work strategy (rest periods) to performance goals, objective ability, and task performance. This path analysis showed that the relationship between performance goals and task performance was mediated, as expected, by rest periods (i.e., those workers who set higher goals took fewer rest breaks). Contrary to expectation, the path analysis failed to showed that the relationship between ability and performance was mediated by rest periods (i.e., higher ability workers were more productive in this study, but this fact was unrelated to rest periods).

Two questions need to be addressed. The first concerns the lack of support for an optimal rest period. What was found was a steady decline in performance as the time off the task increased. If rest periods have any recuperative value, then one should expect a general leveling of the decline and an increase in performance at some point. Perhaps what occurred was that most of the workers were gaining maximum benefit from their rest periods, and the only way to show declines in performance would be to force each individual to spend more or less time on rest breaks. It should be noted that compulsory rest periods may be desirable to demonstrate the value of an optimal rest period, but discretionary rest periods are more appropriate if rest periods are used as an index of work strategy. If one is primarily interested in work strategy, as we are here, then it makes more sense to allow the workers to schedule their own rest periods so we can examine the influence of other variables on their choices. The demonstration of an optimal rest period will have to wait for a different research arrangement.

The second question concerns the lack of relationship between ability and work strategy in this study. The answer may be that one should not expect a relationship between them as they are defined in this report. In this study, strategy was defined in terms of rest periods, and it may be that variations in ability just do not relate to this strategy, although ability could relate to some other strategy.

Our goal was to present a model of work strategy which showed various relationships between strategy and other variables operating within the work environment. It is hoped that the model developed will serve as a heuristic device and will help to generate more research in the area of work strategy. The empirical investigation of rest periods illustrates the kind of research that the model can stimulate. It is hoped that future research will continue to investigate rest periods as well as examine other forms of work strategy such as pace, time and resource management, and the seeking of feedback.

RECOMMENDATIONS

Based upon the findings of this research, the following recommendations are made:

1. Efforts should continue to refine and develop a work strategy model.

2. Wage incentive and goal setting programs should be implemented in a variety of organizations so that their effects on work strategy and productivity can be better understood.

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APPENDIX

QUESTIONNAIRE COMPLETED BY SUBJECTS EMPLOYED TO PERFORM A DATA CODING TASK IN A SIMULATED WORK ENVIRONMENT

DEPARTMENT OF THE NAVY
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER
SAN DIEGO, CALIFORNIA 92152

1. Introduction

The Navy Personnel Research and Development Center (NPRDC) is conducting research on personal opinions and preferences of workers in different work situations. As contractors for the S.D.S.U Foundation, we are interested in how you view your job.

2. Privacy Act Statement

The information obtained in this study will help us to understand how to improve jobs. Your individual comments will be kept in strict confidence by NPRDC and will not be reported to anyone except in the form of grouped statistical summaries which maintain your individual anonymity. We are requesting your identity through your employee number only to allow us to make comparisons between responses at different times. Your participation in this study is voluntary and if you decide not to participate it will not be held against you. You are encouraged to participate, however, because we feel that the study will be more accurate and have greater impact upon improving work if more people participate.

Please do not skip any items. If you have any questions please feel free to ask.

Thank you for your help.

DELBERT NEBEKER JAMES A. RIEDEL

CONFIDENTIAL

Employee Number: _____

Attractiveness of Job Factor

People differ in how attracted they are to different things about their jobs. For example, some people feel pleasant working conditions are very important and therefore working at a pleasant place is very attractive to them. For others working in a pleasant place means little or nothing, so good working conditions are neither attractive nor unattractive.

We would like to know how attractive you would find different things about your job. On the next few pages, we describe some of these things. After every description we ask you to describe how attractive you feel the item described is to you. See the example below.

EXAMPLE:

	Attractiveness Rating				
	Very Unattractive -10	Somewhat Unattractive -5	Neither Attractive Nor Unattractive 0	Somewhat Attractive 5	Very Attractive 10
How attractive is it to you to get a small pay raise	-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 +1 +2 **(+3)** +4 +5 +6 +7 +8 +9 +10				
How attractive is it to you to get a large pay raise	-10 -9 -9 -7 -6 -5 -4 -3 -2 -1 0 +1 +2 +3 +4 +5 +6 +7 +8 +9 **(+10)**				

Note the person in this example feels a "small pay raise" is attractive to a small degree but not as attractive as what he or she would call "somewhat attractive." On the other hand, the person feels "a large pay raise" is very attractive.

Please turn the page and complete all ratings by circling what you feel best describes your feelings.

Circle the appropriate number for each item listed below.

1. Informal Supervisor Recognition: Having your supervisor tell you how he feels about your work. This can be praise for a good job such as a simple "pat on the back" or simply saying "good job." It also might be criticism for a bad job.

	Very Unattractive -10				Somewhat Unattractive -5				Neither Attractive Nor Unattractive 0				Somewhat Attractive +5				Very Attractive +10
How attractive is it to you to get:																	
Quite a bit of criticism from your supervisor	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Some criticism from your supervisor	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Neither criticism nor praise from your supervisor	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Some praise from your supervisor	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
A very high amount of praise from your supervisor	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10

2. Sense of Accomplishment: The feeling of self satisfaction you get from having done a good job. This can be a positive feeling when you have done well or a negative feeling of disappointment if you know you've done a poor job.

	Very Unattractive -10				Somewhat Unattractive -5				Neither Attractive Nor Unattractive 0				Somewhat Attractive +5				Very Attractive +10
How attractive is it to you to feel:																	
Quite a bit of disappointment with your performance	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Some disappointment with your performance	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Neither disappointment nor a sense of accomplishment for your performance	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Some sense of accomplishment for your performance	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
A strong sense of accomplishment for your performance	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10

Circle the appropriate number for each item listed below.

3. **Your Pay:** The amount of money you get paid for your work.

	Very Unattractive			Somewhat Unattractive			Neither Attractive Nor Unattractive			Somewhat Attractive			Very Attractive
How attractive is it to you to get:	-10			-5			0			+5			+10
Paid $4.40 per hour	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Paid $5.40 per hour	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Paid $6.40 per hour	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Paid $7.40 per hour	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Paid $8.40 per hour	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Paid $9.40 per hour	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10

4. **Friendship and admiration from co-workers:** The extent to which your co-workers are friendly and admire you.

	Very Unattractive			Somewhat Unattractive			Neither Attractive Nor Unattractive			Somewhat Attractive			Very Attractive
How attractive to you is it to have:	-10			-5			0			+5			+10
Co-workers who resent you and are very unfriendly	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Co-workers who dislike you and are somewhat unfriendly	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Co-workers who are neither friendly nor unfriendly	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Co-workers who like you and are somewhat friendly	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Co-workers who admire you greatly and are very friendly	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10

Circle the appropriate number for each item listed below.

5. **All job Factors:** Comparing some of the levels for the job factors together

How attractive would it be to you to:	Very Unattractive -10			Somewhat Unattractive -5				Neither Attractive Nor Unattractive 0				Somewhat Attractive +5				Very Attractive +10		
Get paid $9.40 per hour.	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Have co-workers who admire you greatly and are very friendly.	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Get a very high amount of praise from your supervisor	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
Feel a strong sense of accomplishment for your performance	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10

Consequences of Work

Different things can happen as a result of how we do our jobs. In the next set of questions we are interested in what you feel are the consequences of doing different amounts of work.

For <u>each</u> of the performance levels listed (that is, completing a certain number of questionnaires per hour), indicate which one of the outcomes (A, B, C, etc.) you believe is most likely to happen to you. That is, in a given set of boxes you would make one check in each row, checking the outcome you think is most likely to happen.

Example: If I completed on the average. . . at the end of the day, I would. . .

	Feel Very Tired	Feel Somewhat Tired	Feel Neither Tired nor Fresh	Feel Somewhat Fresh	Feel Very Fresh
3 or less					✓
4 per hour					✓
5 per hour				✓	
6 per hour				✓	
7 per hour			✓		
8 per hour			✓		
9 per hour		✓			
10 per hour		✓			
11 or more per hour	✓				

In this example the first row says: "If I completed 3 or less questionnaires per hour at the end of the day I would feel very fresh." That is, completing 3 questionnaires per hour would leave the individual very fresh at the end of the day. Between 4 and 5 he/she would be somewhat fresh. At 6 or 7 he/she is neither tired nor fresh. Above 10 per hour all levels would be very tiring. Note: <u>Every row is to be checked</u>.

Please turn page and complete each of the following Tables being sure to check each row.

Please make <u>one</u> check in each row of the following table.

1. Amount of criticism or praise received from supervisor for performing at the level indicated.

If I completed on the average. . .	I would receive. . . Quite a bit of Criticism	Some Criticism	Neither Praise nor Criticism	Some Praise	A Very High Amount of Praise
3 or less per hour					
4 per hour					
5 per hour					
6 per hour					
7 per hour					
8 per hour					
9 per hour					
10 per hour					
11 or more per hour					

Please make <u>one</u> check in each row of the following table.

2. Feeling you get from performing at the level indicated.

If I completed on the average . . . I would feel . . .

	Quite a bit of Disappointment	Some Disappointment	Neither Disappointment nor a sense of Accomplishment	Some sense of Accomplishment	A Strong a Sense of Accomplishment
3 or less per hour					
4 per hour					
5 per hour					
6 per hour					
7 per hour					
8 per hour					
9 per hour					
10 per hour					
11 or more per hour					

Please make <u>one</u> check in each row of the following table.

3. The degree to which your co-workers are friendly and admire you if you performed at the levels indicated.

If I completed on the average. . . My co-workers would. . .

	Resent me and be very Unfriendly	Dislike me and be somewhat Unfriendly	Be Neither Friendly nor Unfriendly	Like me and be Somewhat Friendly	Admire me greatly and be very friendly
3 or less per hour					
4 per hour					
5 per hour					
6 per hour					
7 per hour					
8 per hour					
9 per hour					
10 per hour					
11 or more per hour					

4. For each of the production rates listed below please give what you expect your pay would be if you performed at that rate.

Production Rate	Expected pay per hour
If I completed:	I would earn:
3 questionnaires per hour or less	$_____
4 questionnaires per hour	$_____
5 questionnaires per hour	$_____
6 questionnaires per hour	$_____
7 questionnaires per hour	$_____
8 questionnaires per hour	$_____
9 questionnaires per hour	$_____
10 questionnaires per hour	$_____
11 questionnaires per hour or more	$_____

No one can operate at their fastest pace all the time, nor do we operate at the same pace continually. We speed up or slow down because of things like energy and fatigue, interest and boredom, problems or delays, etc. During a regular work day we may go at our fastest pace for a while and at other times we slow down and even stop for a break once in a while.

The next questions concern your estimate of what your production rate would be if using present methods you worked at different paces continually.

1. How many questionnaires per hour could you average if you worked at your slowest work pace continually? _____Questionaires per hour.

2. How many questionnaires per hour could you average if you worked at your normal work pace continually? _____Questionnaires per hour.

3. How many questionnaires per hour could you average if you worked at your fastest work pace? _____Questionnaires per hour.

Sometimes people set goals for themselves when they work on a job. For example, some people try for a certain production rate, others try to maintain a certain level of quality, and others try to put in a certain amount of effort. The following questions ask about the goals or objectives you may set. Circle the appropriate answer.

Sometimes people at work set goals or objectives about their production rate on the job.

1. For this job to what extent have you given thought to setting a goal for your own production rate?

   a. To a very great extent

   b. To a great extent

   c. To some extent

   d. To a small extent

   e. Not at all

2. How many questionnaires per hour would you like to complete? (Pick one of the following options as your answer. Be sure to fill in the appropriate number(s) if you pick (a) or (b).)

   a. My goal is to code _____ questionnaires per hour
   (fill in number)

   b. My goal is to code between _____ and _____ questionnaires per hour. (fill in number) (fill in number)

   c. My goal is to be the fastest worker.

   d. My goal is to work faster than the average worker.

   e. My goal is to work as fast as the average worker.

   f. My goal is to work slightly faster than the slowest worker.

   g. My only goal is to do as many questionnaires per hour as I can.

   h. Other: My goal is _____

   _____.

Sometimes people at work set goals or objectives about the quality of their performance on the job.

3. For this job to what extent have you given thought to setting a goal for your own error rate?

a. To a very great extent

b. To a great extent

c. To some extent

d. To a small extent

e. Not at all

4. What error rate per shift would you like to achieve? (Pick one of the following options as your answer. Be sure to fill in the appropriate percentage if you pick (a) or (b)).

a. My goal is to have an error rate of _____% per day.
(Fill in percentage)

b. My goal is to have an error rate between _____% and
(Fill in percentage)
_____% per day.
(Fill in percentage)

c. My goal is to have the fewest errors of all workers.

d. My goal is to have fewer errors than the average worker.

e. My goal is to have an average number of errors.

f. My goal is to have fewer errors than the worst worker.

g. My only goal is to make as few errors as I can.

h. Other: My goal is_____

_____.

Sometimes people at work set goals or objectives about how hard or at what pace to work on their job.

5. For this job to what extent have you given thought to setting a goal about how hard to work.

a. To a very great extent

b. To a great extent

c. To some extent

d. To a small extent

e. Not at all

6. How hard would you like to work? (Pick one of the following options as your answer)

a. My goal is to continually work as hard as I possibly can, regardless of what others do.

b. My goal is to work moderately hard regardless of what others do.

c. My goal is to work hard enough to maintain my average pace regardless of what others do.

d. My goal is to work at a comfortable relaxed pace for me regardless of what others do.

e. My goal is to work harder than any other worker.

f. My goal is to work harder than the average worker.

g. My goal is to work as hard as the average worker.

h. My goal is to work harder than the laziest worker.

i. My only goal is to work as hard as I can.

j. Other: My goal is _____

_____.

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