



The Relevance of the Concept of Motivation to Human Performance Technology

Peter Dams, Ph.D.

2001

Contact: Peter Dams, Ph.D. | pdams@damsandassociates.com | (269) 501-3000
Visit our website at www.damsandassociates.com

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Abstract

This paper suggests that motivational problems are performance problems and can be addressed with current performance improvement tools. Traditionally, motivation is a construct about events located inside the person, and its presence (or absence) must be inferred from the same behavior it is supposed to explain. This introduces unnecessary circular reasoning because motivation refers to nothing special other than the causes of behavior. Behavior analysis avoids problems related to inferred concepts and constructs by explaining behavior and performance as a function of directly observable and measurable environmental events. Its principles contributed to the theoretical foundation of Human Performance Technology (HPT) and the development of effective performance tools.

Readers are encouraged to ask the following questions the next time they encounter a performance problem that someone classifies a motivational problem:

- Is this motivational problem different from a performance problems?
- Does the concept of motivation add to my understanding of this problem or can I troubleshoot and resolve it with existing HPT tools?
- If the performance variables such as guidance, feedback, and incentives are managed effectively does a motivational problem remain?

Introduction

"There is more nonsense, superstition, and plain self-deception about the subject of motivation than about any other topic. . . . It seems to me that the whole issue of motivation needs to be aired." Gilbert made this statement over twenty years ago in the first edition of Human Competence (see Gilbert, 1996, p. 308). The topic of motivation continues to be aired regularly by many different writers. For example, Katzell and Thompson (1990) observed that work motivation has received more attention in journals and textbooks of organizational behavior than any other subject. Pinder (1998) noted that motivation has become a "buzzword" in virtually all work settings and educational institutions. Examples of this continued attention within the current HPT literature are Clark's (1998) and Keller's (1999) models of motivation.

This paper is based on the classical and current theories of work motivation listed in Table 1 and on the following comprehensive reviews of the motivational literature (Ford, 1992; Kanfer, 1990; Muchinsky, 1997; Pinder, 1998; Steers & Porter, 1991). It proposes that the concept of motivation, an inferred internal construct, does not aid the effective practice of HPT. This viewpoint with respect to the causes of behavior is not new (e.g., Bolles, 1975; Chiesa, 1994; Dewsbury, 1978), yet it has not been advanced from the perspective of human performance technology.

Table 1: Some Characteristics of Theories of Motivation

Theory	What Is The Theory's Purpose?	Where Is Motivation Located?	What Are The Theory's Basic Assumptions?	What Variables Affect Motivation?	How Does Motivation Affect Performance?	What Are Tools For Improving Motivation?
ADAMS Equity Theory (1963, 1965)	Predict affect, motivation, and behavior based on exchange processes (267) social control (297) Explanation of dissatisfaction and low morale (296)	Internal (perception of inequity)	"perceptions of work environment causes people to form beliefs and attitudes These cognitions, in turn, instigate and direct various work-related behaviors. . . . (Pinder, 1998, 365)	Motivation is a function of how a person sees self in comparison to other people. Feelings of inequity cause tension, which Person will become motivated to reduce The greater the inequity, the greater the tension and the greater the motivation to reduce it	How hard a person is willing to work is a function of comparisons to the effort of others. Based on the result of the comparison a person may either work harder, less hard, or maintain performance	Reduce situation that may lead to inequity
CLARK CANE Model (1998)	Unifies all previous cognitive models of motivation into one approach	Internal (performance process)	Motivation consists of two processes: Commitment and mental effort	Motivation is a function of task assessment, emotion, and values	Performance is a function of motivation (i.e., commitment and mental effort) and knowledge	Convince people to improve task-assessment, mood, or value problems.
FORD Motivational systems theory (1992)	Influence human behavior or facilitating competence development, including their own." (15)	Internal psychological phenomenon	Motivation plays a major role in producing variability and change in behavior patterns (53)	Motivation is a function of goals, emotions, and personal agency beliefs	Motivation initiates and maintains activity until the goal directing the episode is attained	17 Principles for motivating humans that can alter problematic motivational patterns and promote the development and use of more adaptive pattern

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HERZBERG et al. Two-Factor Theory (1967, 1993)	Individual: greater happiness and greater self-realization Organization: increased productivity, decreased turnover, decreased absenteeism, and smoother working relations. Community: decreased bill for psychological casualties, increase in productive capacity of our industrial plant and in proper utilization of human resources.	Internal	Only job-related factors affect motivation and job satisfaction	Hygiene factors and motivators affect job satisfaction which in turn affects motivation	Job satisfaction improves motivation which in turn improves performance 1993: performance leads to satisfaction p. 134: interesting work is often the cue to a higher level of motivation.	Jobs have to be set up in such a way that, interest or not, the individual who carries them out can find that their operations lead to increased motivation. Matching people to jobs Supervision
KELLER ARCS Model (1998)	Stimulate and sustain optimal levels of productivity	Internal, but strongly affected by environment	Motivation can be influenced by external events	Systematic design and implementation can predictably and measurably influence motivation	Motivation is one of three general influences on performance. The other two are capability and opportunity.	Environmental manipulation of attention, relevance, confidence, and satisfaction (ARCS)
LOCKE & LATHAM Theory of Goal Setting and Task Performance (1990)	Explain why some people worked harder than others or perform better than others independently of their ability and knowledge Predict direction of behavior and level of performance.	Motivation is something within an individual, it can only be observed directly within ourselves	Humans possess the capacity for reason Human action is directed by conscious goals and intentions. Goals influence people's choice of task and task performance.	Goals are the basis for motivation and direct behavior, provide guidelines	Two conditions must be met before goals can positively influence performance: 1. Person must be aware of goal and know what must be accomplished 2. Individual must accept the goal as something worth willing to work.	Goals have to be accepted (basic premise) Goals should be difficult and specific Goal setting Feedback Hard goals lead to greater effort and persistence than easy goals, assuming that goals are accepted
MASLOW Needs Hierarchy Theory (1952, 70)	To formulate a positive theory of motivation	Internal (innate needs)	Humans have innate hierarchical needs Lower-order needs (e.g., air, water, food and shelter) dominate human behavior until they are satisfied.	Unmet needs create psychological tension that energizes and motivates behavior that will fill those needs	?	No practical tools (O'Brien & Dickinson, 1982, p. 10)
McGREGOR Theory X & Theory Y (1960)	Predict and control behavior	?	People don't inherently dislike work People exercise self-direction and self-control Human beings learn to accept and seek responsibility	Management's methods of organization and control	Need to recheck	Establish short-term and long-term goals, provide frequent feedback on progress; assessment and changes of goals, appraise results

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SKINNER Behavior Analysis (e.g., 1953) and other authors	To predict and control behavior	Person's history and current environment	Behavior is function of environmental contingencies of reinforcement (e.g., Skinner, 1953)	Establishing operations such as deprivation or satiation (e.g., Michael, 1993)	Establishing operations and past consequences determine the direction, effort, and persistence of behavior	Behavior Engineering Model (e.g., Binder, 1998; Gilbert, 1996) Functional analysis/A-B-C analysis (e.g., Daniels, 1989) Total Performance System (Brethower, 1972, 1982, 1995)
VROOM Expectancy Theory (1964)	Explain work behavior (not the control of it) Identify variables determining work behavior	?	Each person is assumed to be a rational decision maker who will expend effort on activities that will lead to desired rewards Individuals are expected to know what they want from work and understand that their performance determines whether they will get the desired rewards	Person must believe that there is a relation between performance and valued outcomes (Instrumentality) People must see a relationship between how hard they try and quality of performance (Expectancy)	The perceived Outcomes, Valence, Instrumentality, and Expectancy generate a force to exert different levels of effort in performance	Establish a contingent relationship between performance and desired consequences.

The present argument is organized around the following questions:

- What is motivation?
- The ultimate subject matter: Motivation or behavior?
- The ultimate goal: The improvement of motivation or the improvement of performance?

The second part of the paper introduces behavior analysis as a theory that deals with the motivation of behavior without reliance on inferred internal constructs. Behavior analysis contributes to the theoretical foundation of HPT and provides the conceptual framework for some of its most effective tools, such as the Behavior Engineering Model (Gilbert, 1982, 1996).

What is Motivation?

Any discussion of motivation should begin with the definition of its subject matter. One may expect the motivational theories to be the perfect place to look for a generally agreed upon definition. The inquisitive reader will find, however, that the field of motivation is characterized by an abundance of different theoretical frameworks and models that make it difficult, if not impossible, to identify similarities and differences (Campbell, Dunnette, Lawler, & Weick, 1970; Chiesa, 1994; Madsen 1961). For example, in 1961, Madsen summarized 20 theories of motivation; in 1992, Ford analyzed 32 major theories. Kanfer (1990) surveyed over 30 theories specific to work motivation; and recently, Clark (1998) reviewed over 40 research-based theories of motivation.

However, the number of proposed definitions by far surpasses the number of theories. For example, Kleinginna and Kleinginna (1981) listed 98 definitions of motivation from which they synthesized their own physiological definition with emphasis "on process-restrictive, vector, and phenomenological aspects" (p. 272). The fact that some theorists fail to define motivation at all contributes to the problem (e.g., Adams, 1963, 1965; Herzberg, Mausner, & Snyderman, 1967, 1993; Keller, 1999; Locke & Latham, 1990; Maslow, 1954, 1970; McGregor, 1960). The large number of different operational definitions can lead to different conclusion about the phenomenon of interest (Kazdin, 1998). Most workers in the field of motivation define motivation in their own terms. As a result, individual research efforts overlap only little. Although viewing a particular phenomenon from many different perspectives may not be a drawback by itself, in the case of motivation research the point can be made that much of the research effort has not resulted in an increased understanding of motivated behavior.

Within the work motivation literature we can find some general definitions. For example, Vroom (1964) proposed that the concept of motivation has to do with the "choices made by persons or lower organisms among alternative forms of voluntary activity" (p. 6). Pinder (1998) views the motivation to work as

A set of energetic forces that originate both within as well as beyond an individual's being, to initiate work-related behavior, and to determine its form, direction, intensity, and duration (p. 11)

Other motivational theorists also operationalize motivation as the direction, effort, and persistence of behavior, including Clark (1998), Ford (1992), Locke and Latham (1990), Madsen (1961), and Steers and Porter (1991).

Brethower (1999a) summarizes the fundamental question of motivation from a practitioner's viewpoint as follows:

How do individuals channel energy? Researchers are interested in how everything from amoeba, rodents, birds, farm animals, children, executives, and any one of us channels energy. You and I, as practitioners, don't care how farm animals and amoeba channel energy and aren't excited about comparing mechanisms for channeling energy that are available to amoeba with those available to birds or college sophomores. The more practical question for us is: How can I channel my energy effectively? And How can I assure that others channel their energies toward organizational goals?

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In summary, despite the large number of theories and definitions of motivation no universally agreed upon definition exists. To focus the present discussion, we will view motivation as a person's channeling of energy, expressed in the direction, effort, and persistence of behavior (Table 2).

Table 2: A working definition of Motivation	
Question	Answer
What is motivation?	The channeling of energy.
How is motivation measured?	Most motivational theorists agree that motivation has three dimensions: Direction Effort Persistence
What are some examples?	Completing a 1000-piece puzzle Getting married, making it work, staying together Accepting an assignment (direction), using resources required to complete task (effort), and complete task (persistence) As member of a task force: Going to all meetings (direction), contributing and doing assignments (effort), staying on task force until goal is achieved (persistence).
What is similar to motivation but not motivation?	Channel surfing on TV (requires effort, is sometimes persistent, but lacks direction) Beginning a graduate program (direction), completing the required course work (effort), but dropping out before finishing the dissertation (lacks persistence) Conducting a training class (direction) for the assigned time (persistence), but merely reading off the overheads (lacks effort) Beginning an important task (direction) but allowing ourselves to be distracted by less important work or personal business (lacks effort and persistence)

The Ultimate Subject Matter: Motivation or Performance?

Circular Explanations

A difficulty in the study of motivation, and a possible reason for the large number of theories and definitions, is the difficulty to directly observe and measure motivation. This problem can lead to circular explanations of behavior that depend to a large degree on its author's theoretical and philosophical preferences rather than empirical facts. The following example from the early motivational literature illustrates the problem:

"This experiment . . . compared the level of performance achieved by the same group of ten female workers in a candy factory under hourly, bonus, and piece-rate methods of pay. When the girls were changed from the hourly system of payment to a competitive bonus method, production increased markedly. A further increase occurred later when the girls were placed on a piece-rate system. Apparently, these increases were due to changes in the degree of motivation of the girls." (Wyatt, 1934; quoted in Vroom, 1964, p. 201; emphasis added)

This brief illustration shows that explaining the changes in performance as changes in motivation is problematic because the existence of motivation had to be "inferred from the very behavior that they were supposed to explain" (Michael, 1993, p. 191). In this case, Wyatt argued that performance increased as a result of an increase in motivation. But how do we know that motivation changed? This assumption has to be inferred from the actual changes in the workers' performance. It was this performance that Wyatt was ultimately interested in; the reference to motivation was one possible way to "explain" that performance.

Mystery

This by no means atypical example of circular reasoning is a consequence of the traditional view that motivation is some event, or thing, located inside a person (Table 1). We tend to mystify those things in our world that we cannot directly explain, and the concept of motivation is no exception (Muchinsky, 1997). Locke and Latham (1990) even noted:

The problem of how to manage employees so they come to be and/or remain concerned with the productivity has puzzled and frustrated managers for generations. One reason the problem has seemed difficult, if not mysterious, is that motivation ultimately comes from within and therefore cannot be observed directly. (p. 269)

Again, the practitioner's real interest is in the productivity, or performance, of people in the workplace.

Inferred Mechanisms and Processes

The notion of motivation as something internal and unobservable led not only to the view of motivation as a mysterious problem but also encouraged the invention of internal mechanisms and processes. For example, expectancy theory (e.g., Vroom, 1964) states that motivation is a force inside a person that is the result of expectancies, outcome valences, and instrumentality. This force determines the performance of a person. More recently, Ford (1992) suggested that

motivation is . . . the organized patterning of [personal goals, emotional arousal processes, and personal agency beliefs] functioning as an interdependent triumvirate, influencing and being influenced by the instrumental troops who receive their instructions from motivational headquarters. (pp. 78-79; emphasis added)

According to Ford, these elements of motivational systems theory are relevant to almost anyone "interested in influencing human behavior" (Ford, 1992, p. 15). The focus, again, remains on the behavior of humans.

Observation and Measurement of Behavior

Circular explanations, mystification, inferences, and the large number of definitions are the common results of several interrelated problems that arise from the notion that motivation is an internal event. First, motivation is not directly observable (e.g., Kanfer, 1990; Locke & Latham, 1990). Second, as a consequence, motivation is difficult to measure with "any degree of precision" (Vroom, 1964). For example, the variables in Maslow's hierarchy of needs have not been empirically validated (e.g., Wahba & Bridwell, 1975). Other motivational models have been found to be "too complex to be tested" (Kanfer, 1990).

Typically, theorists address this problem of dealing with an internal event indirectly: they measure a person's overt behavior and from it deduce the status of the internal variable, in this case, motivation. It is a general procedure in psychology to observe a person's actual performance when dealing with inferred psychological constructs such as intelligence and memory.

Treating a person's behavior as the indicator of motivation is acceptable to motivational theorists because they agree that motivation influences behavior--despite their other differences in theory and definition. This position is a sine qua non for cognitive theorists because the shared purpose of most theories is the prediction and control of human behavior (see Table 1).

Motivation is often expressed as the direction, effort, and persistence of behavior (e.g., Clark, 1998; Ford, 1992; Locke & Latham, 1990). Table 2 gives examples and nonexamples of motivational dimensions.

In summary, motivational mechanisms and processes are constructed with the purpose to explain certain internal events that determine the direction, effort, and persistence of behavior. The interest in motivation results from an immediate interest in human performance at the workplace, and in human behavior in general. In fact, it can be argued that the interest in motivation refers to nothing other than the interest in the causes of behavior (Chiesa, 1994).

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This interest in behavior is expressed through the goals and applications of motivational research. The following section shows that the goals and interventions of motivational practitioners do not differ markedly from the goals and interventions of HPT practitioners

The Ultimate Goal: The Improvement of Motivation or the Improvement of Performance?

Motivation and Performance: Same Goals

The ultimate goal of HPT is to benefit society by improving human performance at the workplace (e.g., Kaufman, 1998). According to Stolovitch and Keeps (1999), improved human performance can lead to "dramatic increases in productivity, greater satisfaction among workers, and an enhanced world community" (p. 20). These benefits of improving performance are the same as the benefits attributed to improving work motivation. For example, Herzberg, Mausner, and Snyderman (1957, 1993) and Katzell and Thompson (1990) argue that understanding work motivation enables us to contribute to a more productive and happier society. Flanagan (1967) suggested that there are few problems of more basic importance to our culture than understanding the motivation to work.

Motivation and Performance: Same Interventions

At a practical level, interventions for improving motivation and interventions for improving performance virtually converge. For example, goal setting theory's (Locke & Latham, 1990) main motivational strategy consists of goal setting and feedback, two widely used performance improvement tools. According to Keller (1999), motivational systems involve participative management, self-managed teams, just-in-time training, and pay contingent on performance, all of which are performance improvement interventions. The following cases illustrate in detail how motivation improvement interventions are virtually indistinguishable from performance improvement interventions.

Motivational Imperatives

Katzell and Thompson (1990) organized work motivation theories into "endogenous" theories and "exogenous" theories. Endogenous theories propose that motivational variables such as expectancies or attitudes are only indirectly modifiable. The category of endogenous theories includes arousal/activation theories, expectancy-valence theory, equity theory, attitude theory, intention/goal theory, and attribution/self-efficacy theory. Exogenous theories, according to Katzell and Thompson, are more practical than endogenous theories because they propose action levers that allow us to change work motivation through direct manipulation of the environment. The category of exogenous motivation theories encompasses motive/need theory, incentive/reward theory, reinforcement theory, goal theory, personal and material resource theory, group and norm theory, and sociotechnical systems theory. If these seem like a wide range of theories, remember that they share a common goal: the betterment of society through understanding and influencing human behavior.

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Table 3 list seven motivational "imperatives," or principles, Katzell and Thompson developed based on their analysis of exogenous theories.

Table 3: Seven Motivational Imperatives (According to Katzell & Thompson, 1990)	
Motivational Imperative	Examples of practical intervention
Workers' motives and values must be appropriate for their jobs in which they are placed	personnel selection job preview
Make jobs consistent with workers' motives and values so they are attractive, interesting, and satisfying	financial compensation promotion benefits flexible hours
Effective performance must be positively reinforced, but not ineffective performance	financial incentive plans praise and criticism self-management
Work goals must be clear, challenging, attainable, and attractive	goal setting appraisal and feedback modeling quality circles
Provide needed resources and eliminate constraints to performance	training and development equipment technology supervision
Interpersonal and group processes must support goal attainment	division of labor team development leadership
Personal, social and technological parameters must be harmonious	quality of worklife programs organizational development Scanlon plan

Clearly, Katzell and Thompson's examples of practical interventions are already part of many HP technologists' toolbox. Attentive readers will notice that the first six imperatives address the same variables as Gilbert's (1982, 1996) Behavior Engineering Model. The seventh imperative integrates all six principles into one comprehensive system, suggesting a "systems thinking" approach to motivation (Brethower & Dams, 1999; Ford, 1992).

Motivational Guidelines

Another example of the correspondence between motivational and performance interventions are Capozzoli's (1997) eight conditions for creating a "motivating environment" at work. These conditions are (1) high standards, (2) clear objectives, (3) adequate training, (4) adequate management contact, (5) adequate feedback, (6) rewards that employees value, (7) adequate working conditions, and (8) effective leadership.

Capozzoli states that that the purpose of these conditions is to create a "motivating environment [that encourages] every member of an organization to motivate themselves to contribute his/her best

effort to their jobs at all times." (p. 16) We make this message clearer by eliminating the reference to motivation: "These eight conditions create environments that support people's best performance at all times." This translation illustrates that the concept of motivation as a mediating mechanism between the environment and behavior does not add much to our efforts to improve human performance.

Factors similar to Katzell and Thompson's imperatives and Capozzoli's conditions have also been proposed to lead to psychological states of optimal experience, called "flow states" (Csikszentmihalyi, 1975, 1990). At work, persons experiencing flow states can consistently produce high levels of accomplishments.

The above examples are not isolated illustrations of the similarity between motivational and performance strategies. Other writers also equate improved motivation with improved performance (e.g., McCoy, 1992; Nelson; 1997; Wexley & Yukl, 1975, p. 2). The Behavior Engineering Model was mentioned to show that this model captures the practical insights of motivational theories without being overly simplistic. It also provides a tool to analyze motivational strategies and translate them into a performance improvement framework.

Motivational Problems are Performance Problems

HP technologists deal with "motivational problems" the same way they deal with any performance problem: by asking intelligent questions about the "differences between what someone is expected to do and is actually doing" and developing interventions based on the answers (Mager & Pipe, 1997, p. 10). Problems typically considered motivational are "won't do" performance problems while other performance problems are "can't do" problems. Although these type of performance "disconnects" (Brethower, 1998) may require different solutions, they both are nothing other than performance problems. As we have seen earlier, motivational problems are only inferred from directly observed performance problems.

The following part of this paper suggests that HPT does not require the concept of motivation to understand the causes of performance problems and to engineer effective performance.

Behavior Analysis: An Empirical Theory of the Causes of Behavior and Performance

Dean (1997a) notes that HPT's multidisciplinary research base consists of several complementary theories, including communications theory, human development theory, learning theory, management theory, sociological theory, and systems theory. Within this research base, Stolovitch and Keeps (1999) consider behavior analysis one of the theoretical foundations of HPT.

Behavior analysis influenced many performance improvement pioneers (Day, 1997), including Dale Brethower, Paul Brown, Bill Deterline, Tom Gilbert, Joe Harless, Ogden Lindsley, Susan Markle, Beth Sulzer-Azaroff, and Don Tosti. Day (1997) notes further that behavior analysis is also the theoretical and conceptual framework for many performance improvement models. For example, Gilbert's (1982, 1996) Behavior Engineering Model is wholly based on the principles of behavior analysis. Today, this model is one of the basic tools of HPT that applies to a variety of performance problems and environments (Austin & Garnier, 1998; Binder, 1998; Dean, 1997b). Daniels (1989, 1994) described extensively how the research base in applied behavior analysis has direct relevance to improving motivation and performance.

Because of this continuing impact of behavior analysis on human performance technology, we will review its basic premises with respect to the motivation of behavior. A detailed example will illustrate how a behavioral analysis of motivation focuses on environmental determinants of performance.

A Behavioral Analysis of Motivation

Behavior analysis sets itself apart from traditional cognitive theories of motivation in that it explains the causes of behavior without relying on unobservable hypothetical constructs. Instead, it focuses strictly on observable events and behavior.

Establishing Operations

Behavior analysts postulate that behavior is motivated by establishing operations such as satiation, deprivation, and aversive stimulation (e.g., Keller & Schoenfeld, 1950; Michael, 1993; Skinner, 1953). These establishing operations have a motivative function in that they increase the effectiveness of a behavioral consequence as a reinforcer (or punisher) and evoke those behaviors that in the past produced those reinforcers (or avoided those punishers). For example, food deprivation increases the effectiveness of food as a reinforcer and evokes those types of behavior that in the past produced food. In other words, we are "motivated" to eat when we have not eaten in a while, and we behave in ways that in the past have led to food: microwaving a TV dinner, ordering food at the diner, or raiding Mom's kitchen.

Most organizations today do not use food deprivation or aversive stimulation to motivate their employees. Establishing operations in organizational settings include goal setting, management support of new programs or initiatives, and career development (Agnew, 1998). According to Agnew, goals increase the reinforcing value of supervisor recognition of performance relative to those goals; in the absence of a goal, supervisory feedback may not be as valuable. As a second function, a goal evokes performance that in the past produced supervisor praise, such as higher productivity or compliance with safety rules.

Consequences

The second determinant of human behavior is the consequences that result from our actions. In other words, the consequences of our behavior determine if in the future we repeat a specific behavior in a specific environment. HPT practitioners know that "performance will continue if and only if it leads to something valued by the performer" (Brethower, 1995, p. 30; Komaki & Collins, 1982; Komaki, Desselles, & Bowman, 1989). For example, if your boss rewards your recommendations for a new project with praise or approval, you are more likely to make similar recommendations in the future than if your suggestions were followed by disapproval.

The consequences that maintain or increase performance are called reinforcers (e.g., Daniels, 1989, 1994; Gilbert, 1996; Hopkins & Sears, 1982; Komaki, 1986; O'Brien, Dickinson, & Rosow, 1982). Positive reinforcers used for rewarding good performance include feedback or public announcements about progress toward goals, promotion, pay raises, cash, or perks such frequent flyer coupons (Komaki, Coombs, & Schepman, 1991).

The analysis of the consequences of behavior is an important component of performance troubleshooting tools such as Mager and Pipe's Performance Analysis Flow Diagram (Mager & Pipe,

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1997) and Gilbert's Behavior Engineering Model (Gilbert, 1982, 1996). The following example shows how understanding the motivating role of environmental events such as performance feedback and incentive pay allows us to explain performance without reference to inferred internal constructs.

Hawthorne Revisited

In the late 1920s and early 1930s, Harvard researchers Roethlisberger and Dickson (1939) conducted a now classic study on worker performance. At Western Electric's Hawthorne plant in Illinois, they manipulated work place lighting, pay system, work breaks, and number of hours worked to explore their impact on performance. The researchers were puzzled by the fact that performance increased early in the experiment and remained at high levels throughout the 14-months-long experiment. Roethlisberger and Dickson could not determine which variables common to all experimental conditions caused these unexpected results. In the end, they concluded that the unusual level of attention from managers and researchers motivated workers to high performance because it fulfilled the workers' previously unmet social needs. This interpretation was widely accepted; and a similar reliance on internal entities such as needs, beliefs, or attitudes are part of the basic assumptions of a number of theories of motivation (see Table 1).

In 1974, McIlvane Parsons reexamined these studies from a behavior analytic perspective. He showed that changes in the observed performance could be accounted for increases by distinct environmental antecedents and consequences to the workers' behavior. He concluded that performance feedback and pay-for-performance were the specific conditions that increased and maintained the high levels of performance. The "fulfillment of social needs" is not needed to explain the performance changes.

Performance Feedback

The specific Hawthorne experiments that generated the results on which Roethlisberger and Dickson based their conclusion took place in a special room equipped with counters that tracked each worker's half-hourly and total daily output. Such counters were not installed in the rest of the plant. The experimental workers were free to check the counters any time, and at the end of each day supervisors announced both individual and group output. Thus, workers received performance feedback that enabled them to steadily improve their production rate as indicated by comments such as "I'm about 15 relays behind yesterday" and "I made 421 yesterday, and I'm going to make better today" (Parsons, 1974, p. 924).

It was these types of remarks, cited in the original research report, that prompted Parsons to reexamine the Hawthorne studies. He suggested that this performance feedback functioned both as establishing operations and consequences. As an establishing operation, feedback about past performance established goal attainment of assembling more relays as a reinforcer and at the same time generated that type of performance that in the past generated this type of reinforcing consequence. In other words, seeing past production rates established higher output as a reinforcer (i.e., valued consequence) and at the same time strengthened those behaviors that in the past produced high outputs. As a behavioral consequence, feedback immediately strengthened particular performance components when the numbers were high, and punished other performance aspects when the numbers were low.

Pay-for-Performance

The five operators who participated in the experiment continued to receive the same piece-rate bonus pay as the other hundred workers in the plant. This pay was based on overall daily production for both groups. Because the experimental group consisted of only five workers, each subject's contributions to the group's output was equivalent to 20% total group production, compared to only 1% for the factory workers. The experimental operators soon noticed that an increase in their own performance resulted in a notable increase of their group's output. This increase in output resulted in higher wages for each group member. Parsons proposed that this contingent relationship between individual performance and monetary consequences maintained high performance over the long run across otherwise different experimental conditions.

Parsons concluded from these findings that:

The [behavior analysis] interpretation of the response-consequence contingency (i) does not rely on mentalistic constructs that have to be elaborately defined--if they can be--in a cognitive approach involving expectancy, intention, and so forth; (ii) ties the Hawthorne research into a large and growing body of applied research in behavior [analysis]; and (iii) couples the reward system (small-group piecework pay) and the information system (feedback from the recording of performance data) nicely together to explain why the output rate in the principal Hawthorne experiment kept going up. (p. 929)

To summarize, at the practical level, behavior analysis addresses the same issues as the applied motivational literature, namely the improvement of performance. The only difference between these two "camps" is that behavior analysts explain performance based on observable environmental events without giving causal status to hypothetical constructs. According to Brethower (1999b), this focus on improving

the specific performance of specific individuals in specific situations sets behavioral psychology apart, as does the range of validated applications across settings and populations. No other approach can match the breadth and depth of the behaviorist approach. (p. 73)

The Role of the Environment in the Motivation of Behavior

As we have seen, the behavior analytic approach to understanding the causes of behavior does not rely on hypothetical motivational agents. Instead, it postulates that the locus of motivational control lies not inside a person but in the person's environment or, more accurately, in the interaction between the organism and the environment. Unfortunately, this important point of behavior analysis is often lost in motivational theories. Bandura (1997), for example, states incorrectly that behavior analysts deny that people influence their environments.

$$B = f(P, E)$$

Motivational theorist Kurt Lewin (1951) expressed this interaction as the function $B = f(P, E)$: A person's behavior (B) is a function (f) of both a person's behavioral repertoire (P) and of environmental variables (E). This "basic principle of behavior" to performance implies that performance is a function of two types of variables: What we bring to the workplace (e.g., knowledge, skills, attitudes, abilities) and what the workplace provides (e.g., direction, tools, incentives, feedback; Brethower, 1995, p. 30). This interaction principle is the conceptual basis for performance analysis tools such as the Behavior Engineering Model (Gilbert, 1982, 1996) and the Human Performance System (Rummler & Brache, 1995).

Cognition

Cognitive theories of motivation, on the other hand, suggest that our experiences generate internal cognitions (such as desires and beliefs). These cognitions, in turn, determine current performance (e.g., Adams, 1963, 1965; Bandura, 1997; Clark, 1998; Ford, 1992; Maslow, 1953; Vroom, 1964). However, the question arises: Where do cognitions come from? They are the results of past interactions with our environment. For these cognitions to be useful, they must relate to the person's environment (Mawhinney, 1975). We call people whose cognitions are not related to their environment, maladjusted, neurotic, or schizophrenic.

We learn from our past experiences that we can successfully perform in some environments and not so successful in others. Behavior analysis postulates that the ultimate sources of our behavior, including verbal statements such as beliefs, wishes, or desires, can ultimately be traced to the consequences of our behavior in (past and) current environments. Cognitions are nothing more than our ability to describe particular reinforcement contingencies of our own behavior based on our own past experiences (Mawhinney & Mawhinney, 1982).

Environment

Recent models of work motivation are addressing the role of the environment as one determinant of behavior. For example, Keller's (1999) Performance Factors Model includes antecedents and consequences as influences on performance. Locke and Latham's (1990) goal setting theory centers around goals as antecedents and feedback as consequences of performance. This focus on empirical events makes goal setting theory one of the more practical cognitive theories of motivation that exists today.

In summary, conceptualizing motivation as an internal construct places the causes of behavior inside the person. The environment provides the backdrop against which motivational mechanisms and processes determine appropriate courses of action. These internal events are difficult to observe and measure which can lead to a number of independent models of the causes of behavior. Furthermore, when behavior or performance does not meet societal or work standards, we tend to assume that something is wrong with the person, rather than looking for deficits in the person's environment.

Behavior analysis attempts to explain behavior and performance by understanding the context in which it occurs. This approach provided Gilbert with the foundation for the Behavior Engineering Model and many others with a framework for the successful improvement of human performance.

Conclusion

Remarkable parallels with respect to their goals and interventions characterize the areas of motivational research and human performance technology. Both motivational theorists and HPT practitioners pursue the goal of improving performance in ways that benefit individuals, organizations, and society in general. We change behavior not by changing an internal mechanism but only by changing a person's environment, whether we attempt to change statements of beliefs or performance at the work place.

The next time you come across performance problem that someone considers a problem of motivation ask yourself:

- Is this motivational problem different from a performance problems?
- Does the concept of motivation add to my understanding of this problem or can I troubleshoot and resolve it with existing HPT tools?
- If the performance variables such as goals, equipment, feedback, and incentives were managed effectively does a motivational problem remain?

To put the practical aspects of motivational theories into a performance context, try to apply the Behavior Engineering Model to the stated motivational problem and to the proposed motivational model and/or solutions. You may find that the strategy is a performance improvement strategy couched in different terms.

Performance improvement practitioners diagnose many aspects of performance before systematically implementing their interventions. In most cases, these interventions change a person's environment or improve his or her knowledge or skill. Special references to improving internal motivation are not needed because problems of motivation are performance problems and, therefore, treated as such.

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Author Notes

The author thanks Professors Dale Brethower, Alyce Dickinson, and Richard Malott for their insightful comments on earlier drafts of this manuscript. Although he may not agree with all points in the manuscript, Professor Richard Clark's extensive and collegial review helped sharpen its focus.

This paper was originally submitted to *Performance Improvement Quarterly*. It was accepted for publication pending revision but as of yet has not been revised from the original submission.

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Contact Information



Contact: Peter Dams, Ph.D.
President

Phone: (269) 501-3000
Fax: (866) 472-0554 toll-free

Email: pdams@damsandassociates.com
Web Site: www.damsandassociates.com

Address: 8449 35th Street South, Scotts, Michigan 49088