Mental Energy: Assessing the Motivation Dimension
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INTRODUCTION

This paper applies the model of mental energy to its implications for measuring motivation. The three-dimensional model of mental energy includes motivation, cognition, and mood. The model is applied to four approaches to studying motivation, which include content theories, process theories, decision-making theories, and sustained-effort theories. Implications for measuring motivation from each approach are discussed in application to mental energy.

Mental energy has received increased attention in the past few years, spawned primarily by a widespread increase in marketing claims for herbal supplements and food, beverage, and drug products designed to increase mental energy. An increasing number of mental energy claims have appeared in the marketplace, increasing the need for scientific specificity.1 Empirical research is necessary to substantiate most mental energy claims, but has been hampered by the lack of an operational construct and measure.

Through efforts sponsored by the North American Branch of the International Life Sciences Institute (ILSI NA), mental energy has begun to evolve into a more parsimonious construct that will benefit from increased research attention. After an initial investigation with research scientists in April 2000,2 and after conducting qualitative consumer research,3 the committee operationalized mental energy to guide future scientific research. These efforts have led to a model of mental energy that has evolved in the past four years into a three-dimensional construct consisting of motivation (determination and enthusiasm), cognition (attention and speed of information processing), and mood of energy (transient feelings about the presence of fatigue or energy).4 The mental energy model features the most advanced thinking on the construct.4 Motivation provides the driving force or ambition for mental energy.5 Cognition examines the state of mental aptitude for mental energy.6 Mood examines the state of attitude related to mental energy.7 The three dimensions collectively capture effort, performance, and attitude.

To advance the field’s understanding of mental energy and to develop a battery of scientific claims related to it, measures of these dimensions are necessary. This paper examines the measurement implications of motivation for mental energy.

FOUR APPROACHES TO STUDYING MOTIVATION

Barbuto5 reviewed the motivation field and identified four broad approaches to studying the concept. The four approaches—content-based theories, process-based theories, decision-based theories, and sustained effort-based theories—carry with them different methodological implications, which are discussed next.

Content Theories

Content theories of motivation are those that identify sources of human motivation. These theories ask, “what are the sources of human motivation?” Barbuto5 reviewed the field and concluded that a meta-theory of motivation offers a parsimonious general theory for describing and measuring content-based motivation. The meta-theory of motivation was extended and operationalized for research with the development and validation of subscales.8 The measure generally demonstrated good internal reliability, with coefficients ranging from 0.7 to 0.91. Predictive validity was also evident from the wide variety of variables that relate to motives measured by this inventory.

Processed-Based Theories

The purpose of most process-based motivation theories was to describe the motivation-inducement process. Process theories describe the motivation process and attempt to prescribe general interventions to induce hu-
man motivation. Ryan\(^9\) provided the foundations for most work on goal-setting theory, with work in the theory of intentional behavior. According to the theory, intentional behavior consists of four interrelated sequential causes of behavior. The research on goal-setting theory has been rigorous and has demonstrated through a plethora of studies that the beneficial effect of goal setting on task performance is one of the most robust and replicable findings in the psychological literature.\(^10\) Barbuto\(^5\) indicated that goal-setting theory appears to be valid and salient for understanding employee’s performance levels. However, its general use may be limited to organizational settings, since the variables, tenets, and findings all focus on these. The role of goal setting in other contexts has received less attention in the literature.

**Decision-Making Theories**

Decision-making theories are those that present the cognitive process behind motivation. These theories are process models that cognitively map the decision to exert or sustain effort. Vroom\(^11\) was among the earliest scholars to popularize cognitive choice theories of motivation, with the Valence-Instrumentality-Expectancy (VIE) theory. In VIE theory, motivation was described as a conscious choice among alternatives, with choices (behaviors) systematically related to psychological processes, particularly perception and the formation of beliefs and attitudes. Porter and Lawler\(^12\) extended Vroom’s model by including several additional variables. Their theory proposed that employee effort was determined by two key factors: the value placed on certain outcomes and the degree to which effort was believed to lead to the attainment of these rewards. Ilgen et al.\(^13\) have come perhaps the closest to empirical validation of such measures of VIE theory concepts. They included multiple effort, performance, and outcome measures of expectancy and instrumentality and compared these against traditional measures. Although many studies have been conducted with the intention of testing VIE theory and its validity, few have been free of the methodological and conceptual errors necessary to do so. It appears that VIE theory is a valid model that explains how people form behavior-related intentions.

**Sustained-Effort Theories**

Sustained-effort theories are those that equate human motivation with exertion of effort. Typically, sources of motivation are less important in this operationalization; instead the sustained-effort perspective focuses on measuring the intensity or endurance of effort. The most common sustained-effort theory is described in intrinsic motivation research and other general works that use motivation and effort synonymously. Deci\(^14\) described intrinsic motivation as the motive for which behavior is performed for its own sake rather than for the purpose of acquiring material or social rewards. However, in many instances, intrinsic motivation was operationalized as performance levels (i.e., time spent on task) during experiments, and the payment of contingent external rewards combined to increase overall levels of performance.\(^15\) The measure for this approach has experimentally been direct observation of sustained effort on a task; in nonexperimental work it has been single-item responses to questions such as “I would work on this project for ____ hours.” Barbuto\(^5\) recommended that for general use, a measure of sustained effort may be useful to test observed motivation, particularly when the sources or processes of motivation are less relevant.

**Implications of Motivation**

**Approaches to Studying Changes in Mental Energy**

**Content-Based Approaches**

Studying changes in mental energy using a content approach to human motivation can be achieved using the Motivation Sources Inventory.\(^8,16\) The research design would be experimental with placebo groups, incorporating pre- and post-testing. Analysis of motivation change would feature a gap analysis. Gap analyses compare an individual’s sources of motivation to the extent to which these sources of motivation are satisfied. A successful intervention is one that reduces the “gap” between the strength of the motive and the extent that it is tapped. This approach may be most useful when working with diverse populations with varied motivation profiles. By examining motivation with the proposed level of rigor, many confounding effects may be controlled.

**Process-Based Approaches**

Studying changes in mental energy using a process-based approach to human motivation can be achieved using goal-setting theory.\(^10\) The research design would feature the extent to which challenging and clearly articulated goals are best met while participating in interventions versus not participating in interventions. This may be most useful when testing motivation to follow prescribed health regimens such as quitting smoking, losing weight, improving diet, wearing sunscreen, etc. The research design would be experimental with placebo groups to determine whether interventions led to greater motivation and performance.
Decision-Making Approaches

Studying changes in mental energy using a decision-making approach to human motivation can be achieved using VIE theory and measure. The research design would be experimental with placebo groups to determine whether interventions led to changes in either effort to performance expectancy (confidence in one’s ability to perform), instrumentality (belief that results will occur), and/or valence (desire for results and outcomes). For example, if a person was considering going on a weight-loss program, he or she would start with preconceived expectations (can they do the diet?), instrumentality (belief that weight loss will result from adhering to the diet), and valence (how badly weight loss is desired). The experiment would be designed to see if interventions changed these factors. If an intervention consistently changes one or more, then it will increase motivational force.

Sustained-Effort Approaches

Studying changes in mental energy using a sustained-effort approach to human motivation can be achieved using the operationalization of reported attitude and measured effort. The research design would be experimental with placebo groups to determine whether interventions change expected effort and/or measured effort (i.e., time on task, perseverance). This may be most useful for applied studies for exact claims, such as swimming endurance, workout regime adherence, and exam studying endurance. This design could test competing interventions to ascertain which one more favorably affects motivation.

SUMMARY

Content-based theories of motivation may best utilize the meta-theory of work motivation. Process-based theories may benefit most from adopting Locke and Latham’s goal-setting approaches and measures. Decision-making theories should utilize the measurement approach operationalized by Ilgen et al. Sustained effort theories should utilize similar approaches to those used in numerous studies of intrinsic motivation, but the measurement of which is typically observational or attitudinal.

This paper explored the implications of the four approaches to studying motivation on the newly established model of mental energy. The approach taken for examining motivation informs the measurement of mental energy. Specific recommendations for each approach were developed and provided. As a result of these efforts, it will now be possible to diagnose, measure, and experimentally test for changes in human motivation, which is one of the three major components of mental energy.

REFERENCES
