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How to Measure Motivation: A Guide for the Experimental Social Psychologist

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Abstract

This article examines cognitive, affective, and behavioral measures of motivation and reviews their use throughout the discipline of experimental social psychology. We distinguish between two dimensions of motivation (outcome-focused motivation and process-focused motivation). We discuss circumstances under which measures may help distinguish between different dimensions of motivation, as well as circumstances under which measures may capture different dimensions of motivation in similar ways. Furthermore, we examine situations in which various measures may capture fluctuations in non-motivational factors, such as learning or physiological depletion. This analysis seeks to advance research in experimental social psychology by highlighting the need for caution when selecting measures of motivation and when interpreting fluctuations captured by these measures.

Motivation – the psychological force that enables action – has long been the object of scientific inquiry (Carver & Scheier, 1998; Festinger, 1957; Fishbein & Ajzen, 1974; Hull, 1932; Kruglanski, 1996; Lewin, 1935; Miller, Galanter, & Pribram, 1960; Mischel, Shoda, & Rodriguez, 1989; Zeigarnik, 1927). Because motivation is a psychological construct that cannot be observed or recorded directly, studying it raises an important question: how to measure motivation? Researchers measure motivation in terms of observable cognitive (e.g., recall, perception), affective (e.g., subjective experience), behavioral (e.g., performance), and physiological (e.g., brain activation) responses and using self-reports. Furthermore, motivation is measured in relative terms: compared to previous or subsequent levels of motivation or to motivation in a different goal state (e.g., salient versus non-salient goal). For example, following exposure to a health-goal prime (e.g., gym membership card), an individual might be more motivated to exercise now than she was 20 minutes ago (before exposure to the prime), or than another person who was not exposed to the same prime.

An important aspect of determining how to measure motivation is understanding what type of motivation one is attempting to capture. Thus, in exploring the measures of motivation, the present article takes into account different dimensions of motivation. In particular, we highlight the distinction between the *outcome-focused* motivation to complete a goal (Brehm & Self, 1989; Locke & Latham, 1990; Powers, 1973) and the *process-focused* motivation to attend to elements related to the process of goal pursuit – with less emphasis on the outcome. Process-related elements may include using "proper" means during goal pursuit (*means-focused* motivation; Higgins, Idson, Freitas, Spiegel, & Molden, 2003; Touré-Tillery & Fishbach, 2012) and enjoying the experience of goal pursuit (*intrinsic motivation*; Deci & Ryan, 1985; Fishbach & Choi, 2012; Sansone & Harackiewicz, 1996; Shah & Kruglanski, 2000). In some cases, particular measures of motivation may help distinguish between these different dimensions of motivation, whereas other measures may not. For example, the measured speed at which a person works on a task can have several interpretations.

Working slowly could mean (a) that the individual's motivation to complete the task is low (outcome-focused motivation); or (b) that her motivation to engage in the task is high such that she is "savoring" the task (intrinsic motivation); or (c) that her motivation to "do it right" and use proper means is high such that she is applying herself (means-focused motivation); or even (d) that she is tired (diminished physiological resources). In this case, additional measures (e.g., accuracy in performance) and manipulations (e.g., task difficulty) may help tease apart these various potential interpretations. Thus, experimental researchers must exercise caution when selecting measures of motivation and when interpreting the fluctuations captured by these measures.

This review provides a guide for how to measure fluctuations in motivation in experimental settings. One approach is to ask people to rate their motivation (i.e., "how motivated are you?"). However, such an approach is limited to people's conscious understanding of their own psychological states and can further be biased by social desirability concerns; hence, research in experimental social psychology developed a variety of cognitive and behavioral paradigms to assess motivation without relying on self-reports. We focus on these objective measures of situational fluctuations in motivation. We note that other fields of psychological research commonly use physiological measures (e.g., brain activation, skin conductance), self-report measures (i.e., motivation scales), or measure motivation as a stable trait. These physiological, self-report, and trait measures of motivation are beyond the scope our review.

In the sections that follow, we start with a discussion of measures researchers commonly use to capture motivation. We review cognitive measures such as memory accessibility, evaluations, and perceptions of goal-relevant objects, as well as affective measures such as subjective experience. Next, we examine the use of behavioral measures such as speed, performance, and choice to capture fluctuations in motivational strength. In the third section, we discuss the outcome- and process-focused dimensions of motivation and examine specific measures of process-focused motivation, including measures of intrinsic motivation and means-focused motivation. We then discuss how different measures may help distinguish between the outcome- and process-focused dimensions. In the final section, we explore circumstances under which measures may capture fluctuations in learning and physiological resources, rather than changes in motivation. We conclude with some implications of this analysis for the measurement and study of motivation.

Cognitive and Affective Measures of Motivation

Experimental social psychologists conceptualize a goal as the cognitive representation of a desired end state (Fishbach & Ferguson, 2007; Kruglanski, 1996). According to this view, goals are organized in associative memory networks connecting each goal to corresponding constructs. Goal-relevant constructs could be activities or objects that contribute to goal attainment (i.e., means; Kruglanski et al., 2002), as well as activities or objects that hinder goal attainment (i.e., temptations; Fishbach, Friedman, & Kruglanski, 2003). For example, the goal to eat healthily may be associated with constructs such as apple, doctor (facilitating means), or French fries (hindering temptation). Cognitive and affective measures of motivation include the activation, evaluation, and perception of these goal-related constructs and the subjective experience they evoke.

Goal activation: Memory, accessibility, and inhibition of goal-related constructs

Constructs related to a goal can activate or prime the pursuit of that goal. For example, the presence of one's study partner or the word "exam" in a game of scrabble can activate a student's academic goal and hence increase her motivation to study. Once a goal is active,

the motivational system prepares the individual for action by activating goal-relevant information (Bargh & Barndollar, 1996; Gollwitzer, 1996; Kruglanski, 1996). Thus, motivation manifests itself in terms of how easily goal-related constructs are brought to mind (i.e., accessibility; Aarts, Dijksterhuis, & De Vries, 2001; Higgins & King, 1981; Wyer & Srull, 1986). The activation and subsequent pursuit of a goal can be conscious, such that one is aware of the cues that led to goal-related judgments and behaviors. This activation can also be non-conscious, such that a one is unaware of the goal prime or that one is even exhibiting goal-related judgments and behaviors. Whether goals are conscious or non-conscious, a fundamental characteristic of goal-driven processes is the persistence of the accessibility of goal-related constructs for as long as the goal is active or until an individual disengages from the goal (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001; Goschke & Kuhl, 1993). Upon goal completion, motivation diminishes and accessibility is inhibited (Liberman & Förster, 2000; Marsh, Hicks, & Bink, 1998). This active reduction in accessibility allows individuals to direct their cognitive resources to other tasks at hand without being distracted by thoughts of a completed goal.

Thus, motivation can be measured by the degree to which goal-related concepts are accessible in memory. Specifically, the greater the motivation to pursue/achieve a goal, the more likely individuals are to remember, notice, or recognize concepts, objects, or persons related to that goal. For example, in a classic study, Zeigarnik (1927) instructed participants to perform 20 short tasks, ten of which they did not get a chance to finish because the experimenter interrupted them. At the end of the study, Zeigarnik inferred the strength of motivation by asking participants to recall as many of the tasks as possible. Consistent with the notion that unfulfilled goals are associated with heightened motivational states, whereas fulfilled goals inhibit motivation, the results show that participants recalled more uncompleted tasks (i.e., unfulfilled goals) than completed tasks (i.e., fulfilled goals; the *Zeigarnik effect*). More recently, Förster, Liberman, and Higgins (2005) replicated these findings; inferring motivation from performance on a lexical decision task. Their study assessed the speed of recognizing – i.e., identifying as words versus non-words – words related to a focal goal prior to (versus after) completing that goal.

A related measure of motivation is the inhibition of conflicting constructs. In contexts where goal pursuit is faced with conflicting desires that may interfere with the focal goal, the motivation to pursue the goal can express itself through the inhibition of constructs related to these conflicting goals (Shah, Friedman, & Kruglanski, 2002). Functionally, this inhibition allows individuals to purse the focal goal without being distracted by thoughts related to other goals.

Evaluation, devaluation, and perception

Motivational states influence the evaluation of goal-related objects, and these evaluative processes in turn promote successful goal pursuit consciously and non-consciously. Specifically, the evaluation of goal-relevant objects is more positive for active goals than for inactive ones (Brendl & Higgins, 1996; Ferguson & Bargh, 2004; Herek, 1987; Markman & Brendl, 2000; Tesser & Martin, 1996). Thus, motivation can be measured by the degree to which a goal-relevant object is evaluated positively, using explicit measures (e.g., willingness to pay, liking) or implicit measures such as the evaluative priming task (Fazio, Sanbonmatsu, Powell, & Kardes, 1986) and the implicit association test (Greenwald, McGhee, & Schwartz, 1998). For example, using an evaluative priming task, Ferguson and Bargh (2004) showed that participants with an unfulfilled achievement goal were faster at identifying positive adjectives (e.g., excellent) compared to negative ones (e.g., disgusting) following achievement-related words (e.g., compete).

By contrast, participants who had just fulfilled the goal and those without a goal did not respond significantly faster to positive versus negative adjectives.

The devaluation of conflicting constructs, including objects that compete with or hinder the goal, can also serve as a measure of motivation. For example, Brendl, Markman, and Messner (2003) showed that hungry consumers – with an active eating goal – expressed lower evaluation of products that serve unrelated goals (e.g., shampoo) compared to consumers who were not hungry and hence did not have an active eating goal. Relatedly, counteractive self-control theory posits that self-control involves an asymmetric shift in the subjective valuation of goal-relevant stimuli, such that individuals faced with a self-control dilemma not only increase their valuation of goal-consistent stimuli but also decrease that of temptation-related stimuli (Fishbach & Trope, 2005; Trope & Fishbach, 2000).

Researchers have also measured how fast participants act to move positive and negative stimuli toward and away from them to assess people's basic motivation to approach good things and avoid bad things (Markman & Brendl, 2005). Because goal-relevant objects are naturally valenced, people have automatic tendencies to approach goal-congruent objects (which they evaluate positively) and avoid objects that might interfere with successful goal pursuit (which they evaluate negatively). For example, Fishbach and Shah (2006) found that, in self-control dilemmas, participants exhibited faster pushing responses for temptation-related stimuli, but faster pulling responses for goal-related stimuli.

Experience

Researchers have also measured motivation by assessing an individual's subjective experience while pursuing a goal-related activity (Aarts, Custers, & Holland, 2007; Aarts, Custers, & Veltkamp, 2008; Fishbach, Shah, & Kruglanski, 2004; Koo & Fishbach, 2010). For example, the Intrinsic Motivation Inventory measures intrinsic motivation by assessing an individual's degree of interest/enjoyment, perceived competence, effort, value/usefulness, felt pressure and tension, and perceived choice while performing a given activity (Ryan, 1982; Ryan, Koestner, & Deci, 1991).

Perceptual biases

Motivational states can also alter something as fundamental as visual perception. Thus, Bruner and Goodman (1947) showed that children from lower socio-economic backgrounds – and who presumably have a strong motivation to acquire money – estimated coin sizes as larger than their wealthier counterparts did. Similarly, Balcetis and Dunning (2006) found research participants automatically identified an ambiguous figure (e.g., I3) as the letter B or the number 13 depending on whether seeing a letter or a number lead to a positive outcome within the experimental context. Finally, Proffitt and his colleagues showed that fear – which is associated with a basic avoidance motivation – increases judgment of the steepness of a hill or the height of a building (Stefanucci, Proffitt, Clore, & Parekh, 2008; Teachman, Stefanucci, Clerkin, Cody, & Proffitt, 2008). Although these studies explored perceptual distortions as a consequence of motivation, these distortions can also serve as measures of motivational strength.

Behavioral Measures of Motivation

Ultimately, motivation enables goal-directed behavior and is evident through action. However, behavior is not merely the outcome of motivation; researchers often use behavior to infer motivation and capture the strength of motivation by the extent to which one's

actions are consistent with a focal goal. Indeed, when describing an individual's degree of motivation, researchers (and lay people) often refer to the goal congruence of the individual's behavior. Engaging in goal-congruent behavior requires some form of mental, physical, or psychological effort. Measures such as choice, speed, performance, or persistence exerted in the course of goal pursuit capture the goal congruence of behavior and can thus assess the strength of one's motivation to pursue the goal.

Speed

In many cases, motivation can manifest itself in terms of the amount of time it takes an individual to act in the pursuit of a goal. This duration measure (i.e., *speed*) can be applied to various aspects of behavior to measure the strength of motivation. Behavioral measures of speed include how fast an individual completes a task or how fast she moves from one task to the next. For example, participants in a study by Kivetz, Urminsky, and Zheng (2006) rated songs online for reward certificates. These researchers assessed motivation to obtain the reward by measuring the frequency of participants' visits to the rating site (inter-visit times) as they progressed toward earning the reward. The results showed that participants moved progressively faster from one step to the next as they got closer to obtaining the reward. This well-documented effect – labeled the goal-gradient or "goal looms larger" effect – suggests motivation increases with proximity to the goal (Brown, 1948; Förster, Higgins, & Idson, 1998; Heath, Larrick, & Wu, 1999; Hull, 1932; Kivetz et al., 2006; Nunes & Dreze, 2006). Because the speed of completing sequential tasks can be influenced by learning (practice), researchers interested in measuring motivation through speed often control for these factors (e.g., providing practice trials, using well-practiced tasks), or use experimental tasks and behaviors for which such factors would be irrelevant (e.g., purchase frequency).

Performance

Motivation can also be measured in terms of level of performance at a goal-related task – especially if performance is variable and integral to the goal. Performance measures include accuracy, amount (i.e., how much has been done), and highest level of achievement. For example, to demonstrate the effect of priming on motivation, Bargh et al. (2001) measured motivation through participants' performance at five word search puzzles and showed that participants primed with achievement found more words than did control participants, that is, they were more motivated to achieve. To show that proximal (sub)goals are more motivating than distal goals, Bandura and Schunk (1981) measured children's mathematical achievement motivation through their performance on a set of subtraction problems. The results showed that children induced to set proximal goals during a preceding preparation period (e.g., complete six pages in each of seven preparation sessions) solved more problems accurately than those who set distal goals (e.g., completing the entire 42 pages of instructional items by the end of seven sessions).

Another aspect of performance is persistence, or the extent to which an individual continues steadfastly in the pursuit of a goal in spite of inherent difficulties. For example, a highly motivated student might spend hours studying for an exam despite being tired or tempted by more exciting activities. Persistence may be expressed in terms of the length of time an individual spends on goal-related activities, in terms of the number of goal-related tasks an individual completes, or in terms of the extent to which the individual continues to engage in the goal (rather than abandoning the goal; Carver & Scheier, 1998; Reed & Aspinwall, 1998).

Accordingly, in the song rating study described previously, Kivetz et al. (2006) captured participants' motivation to obtain a reward by examining whether participants abandoned or continued to engage in the song rating task and found that participants were less likely to abandon the task (i.e., more motivated) as they got closer to obtaining the reward – a pattern consistent with the goal-gradient effect. Similarly, researchers have used the "unsolvable task" paradigm to infer the strength of motivation by the amount of time participants persist on an unsolvable task – which they believe is solvable (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Fishbach, Dhar, & Zhang, 2006).

Choice

We use the term choice broadly to describe the act of selecting between objects (e.g., apple versus cookie) and courses of action (e.g., donating, exercising). Because of their binary nature, choice measures often seem merely indicative of the direction rather than the strength of motivation. However, a choice can also indicate the strength of motivation. For example, when an individual chooses between conflicting goals (e.g., a student chooses to socialize with friends rather than study for an exam), we can infer that her motivation for the chosen (socializing) goal is stronger than her motivation for the (academic) goal that was not selected. Furthermore, in repeated sequential-choice paradigms, researchers can measure the number/frequency of goal-consistent choices and hence infer the strength of motivation.

Research on self-control often relies on choice measures to assess motivation. For example, to demonstrate that simultaneous (versus sequential) choices increases the motivation to adhere to long-term (intellectual) goals, Read, Loewenstein, and Kalyanaraman (1999) measured motivation by whether participants chose highbrow movies (goal congruent) over lowbrow movies (goal incongruent). They found that participants who made a simultaneous choice (i.e., selecting three movies on the first day) chose more highbrow movies than those who made a sequential choice (i.e., selecting each movie on the day when they would watch it). In another study, Fishbach and Zhang (2008) measured motivation by whether participants chose a healthy snack (carrots), from a choice set comprised of carrot sticks and chocolates.

Different Dimensions of Motivation

There are different types of goals: Some have clearly defined beginning and end states (e.g., a ten-task project), whereas others represent an ongoing motivational state with no specific end point (e.g., eating healthily). In the pursuit of these various types of goals, different dimensions of motivation arise to drive cognitions and behaviors. Often, more than one dimension of motivation is present during the pursuit of a single goal. Furthermore, these dimensions of motivation may drive cognitions and behaviors in similar or different ways and hence influence the measures of motivation reviewed above similarly or differently. For example, consider the classic speed and accuracy trade-off: When performing many skills, the accuracy of an action will influence the speed of the action such that accuracy motivation will reduce speed, whereas motivation to be quick will reduce accuracy (Fitts, 1954; Magill, 2011).

Many tasks have both speed and accuracy requirements (e.g., lexical decision task), so speed and accuracy measures might capture the same motivation to complete the tasks successfully. However, for other tasks, speed and accuracy may capture different motivations. In studies in which participants' goal is to complete a series of anagram with no time pressure, speed of completion might measure the motivation to finish the task (outcome-focused motivation), whereas accuracy might measure the motivation to do it well (means-focused motivation). Furthermore, completing the anagram task without cheating when the opportunity presents itself might also measure the motivation to do it well and pose a

trade-off with speed of completion. In addition, whereas speed might capture the motivation to complete the task and receive external benefits (e.g., monetary compensation), persisting on the task might measure the motivation to engage in the internally rewarding process of solving anagrams (intrinsic motivation). Therefore, it is important for researchers to be aware of the dimensions of motivation that might arise within an experimental paradigm and ensure the use of paradigms and measures that can help capture the specific motivation(s) under investigation.

Outcome-focused motivation: "getting it done"

Outcome-focused or extrinsic motivation describes the motivation to attain the desired end state of a goal, such as completing ten out of ten tasks, being healthy, or making money (Brehm & Self, 1989; Locke & Latham, 1990; Miller et al., 1960; Powers, 1973). This dimension of motivation stems from the external benefits (or rewards) associated with achieving a goal and targets the outcomes or consequences of goal-related actions. As outcome-focused motivation increases, cognitions and behaviors become more congruent with the goal (Table 1). Outcome-focused motivation can be captured using many of the measures reviewed in the previous section. For example, compared to a less motivated dieter, a highly motivated dieter would evaluate carrot sticks more positively and choose a salmon salad over a cheeseburger for lunch. Similarly, an employee working on a project would have project-related concepts more accessible in her memory if her motivation is high (versus low).

Process-focused motivation: "doing it happily" or "doing it right"

Process-focused motivation refers to dimensions of motivation concerned with elements related to the process of goal pursuit and stems from the internal benefits (enjoyment, boost to self-image) associated with pursuing a goal – with less emphasis on goal completion. We review two types of process-focused motivations: intrinsic motivation and means-focused motivation. Intrinsic motivation focuses on enjoyment and interest during the process of goal pursuit (Deci & Ryan 1985; Sansone & Harackiewicz 1996; Shah & Kruglanski 2000). For example, an employee might be driven by the desire to have a fulfilling experience while working on her project, rather than by the desire to finish the project.

Means-focused motivation refers to people's desire to use "proper" means in the process of goal pursuit (Kruglanski et al., 2000; Merton, 1957; Touré-Tillery & Fishbach, 2011). Specifically, means-focused motivation is concerned with "how" actions are performed and emphasizes adherence to the rules, principles, and standards set by the self, relevant others, or society (e.g., completing ten tasks accurately, making money honestly). This motivation can arise for a variety of reasons. Individuals might focus on the means of goal pursuit because they want to learn or master goal-related tasks (Ames & Archer, 1988; Dweck & Leggett, 1988). In this context, the outcome might be secondary to the learning process. For example, a student in a painting class might prioritize learning the correct techniques and mastering the tools over creating a Monet-like piece. Another reason why individuals might focus on the means is that "doing it right" might allow them to maintain a positive self-concept or signal something good to themselves about themselves (i.e., self-signaling; Bodner & Prelec, 1996; Prelec & Bodner, 2003). Indeed, individuals are continually motivated to maintain a positive self-concept (Gao, Wheeler, & Shiv, 2009; Schlenker, 1985; Steele, 1988). Thus, an employee will apply herself at each task of a project because it will make her feel "competent."

Table 1. A summary of the measures of motivation.

	Outcome-focused motivation	Process-focused motivation
Cognitive and affective measures		
Accessibility and inhibition of goal-related constructs	Higher accessibility and better memory for goal-congruent constructs (means, objects, persons) Lower accessibility and worse memory of goal-incongruent and goal-unrelated constructs (temptations)	(Not typically used to measure process-focused dimensions of motivation)
Evaluation and devaluation (conscious and non-conscious)	Positive evaluation of goal-congruent constructs (means, objects, persons) Negative evaluation of goal-incongruent and goal-unrelated constructs (temptations, distractions)	Positive evaluation of the process
Experience	(Not typically not used to measure outcome-focused motivation)	Positive experience from process
Perceptual biases	Visual/perceptual biases congruent with active goals	(Not typically used to measure process-focused dimensions of motivation)
Behavioral measures		
Speed	Higher speed on goal-related tasks (short duration) Higher speed when moving from one goal-related task to the next (short duration)	Lower speed on goal-related tasks (long duration and greater persistence)
Performance	Higher accuracy Higher amount of work done Higher level of achievement	Higher accuracy Higher amount of work done Higher level of achievement
Choice	Increased selection of goal-congruent objects and actions	Increased selection of objects and actions congruent with the process

Process- versus outcome-focused motivation

An increase in process-focused motivation produces judgments, experiences, and behaviors congruent with an emphasis on process rather than outcome (e.g., doing it happily, doing it right; Table 1). For example, intrinsic motivation can be captured by an individual's subjective experience with respect a goal-related activity (e.g., energized, satisfied). Behaviorally, intrinsic motivation can be measured by the amount of time an individual spends on task, such that an intrinsically motivated employee might spend more time on her project overall because she find this process fulfilling. A casual observer might misconstrue this increase in time spent on the task as evidence of low outcome-focused motivation (e.g., the employee procrastinates), whereas it represents high intrinsic motivation (i.e., the employee enjoys the process).

Fishbach and Choi (2012) compared the effects of intrinsic and extrinsic (outcome-focused) motivations on behavior. They measured motivation through persistence and found, for example, that participants spent more time exercising on a treadmill when focusing on their workout experience than when focusing on the goals they can achieve by working out. These results suggest that one way to distinguish between various dimensions of motivation is to create a context that emphasizes

one of these dimensions (e.g., through experimental instructions). Thus, situations or experimental instructions that emphasize the experiential aspects of goal pursuit should increase internal motivation, whereas those that highlight completion or rewards might increase the external or outcome-focused dimension of motivation. Within the same perspective, situations or experimental instructions that underscore rules and personal values (e.g., integrity, accuracy) might increase the means-focused dimension of motivations. Creating such experimental contexts would allow researchers to gain a clearer picture of the dimension of motivation in which they are interested.

In studying the means-focused dimension of motivation, Touré-Tillery and Fishbach (2012) measured motivation through adherence to ethical, religious, and accuracy standards over the course of sequential actions and showed that means-focused motivation is u-shaped – i.e., greater at the beginning and end (versus middle) of goal pursuit – because beginning and end actions are seen as more diagnostic for making self-inferences. In one study, participants completed sequential coloring tasks for credit and had an opportunity to (dishonestly) obtain unearned credit for a task they did not complete. Depending on the condition, this "opportunity" occurred at the beginning, middle, or end of the sequence of tasks. The result showed that a greater number of participants accepted an unearned credit (dishonest behavior) when the experimenter "mistakenly" offered it in the middle (versus beginning or end) of the sequence. Importantly, in this study, a refusal to accept unearned credit captured the motivation to do it right but could not capture the motivation to get it done because honest behavior interfered with goal completion by increasing the number of tasks required to reach the goal.

To capture the differences between means- and outcome-focused motivations, Touré-Tillery and Fishbach (2012), designed an experiment in which they could measure adherence to standards separately from motivation to complete the task. Research participants completed a lexical task consisting of a series of trials. The researchers measured (a) accuracy or the extent to which participants applied themselves on each trial – a measure of means-focused motivation, and (b) inter-trials times or the extent to which participants were eager to move through the trials – a measure of outcome-focused motivation. The results showed that participants were more accurate on the first and last trials than on middle trials, a pattern consistent with the u-shape of means-focused motivation. Furthermore, inter-trials times decreased as participants moved progressively faster from the first to the last trial – a pattern consistent with the goal-gradient effect on outcome-focused motivation (Förster et al., 1998; Kivetz et al., 2006). Thus, the position of an action in a sequence influences the strength of outcome- and means-focused motivations in different ways.

These results highlight the importance of including several measures to capture the manifestations of various dimensions of motivation. For example to distinguish between outcome-focused motivation to finish a task and means-focused motivation to adhere to standards while working on the task, a researcher might measure how fast participants work (speed) and how well they complete the task (accuracy, performance). The researcher might design the task such that participants can cheat to finish the task faster and measure the degree to which they take advantage of this opportunity (dishonesty). Based on our analysis, high means-focused motivation would manifest itself in the form of high accuracy or performance, and low dishonesty.

Motivation Versus Ability and Capacity

In some cases, changes in the measures reviewed in this article may capture fluctuations unrelated to motivation. Indeed, goal pursuit may change the pursuer by making her more able to perform goal tasks (learning) or less physiologically or physically capable of performing those tasks (depletion). Therefore, when measuring motivation, it is critical to design experiments that keep these non-motivational factors constant across conditions.

Learning and habituation

Theories of learning predict an increase in ability to perform a task over time. Like motivation, learning can manifest itself at the cognitive, behavioral, and physiological levels (Bandura, 1977; Ormrod & Davis, 1999; Pavlov, 1927). Thus, learning can influence the chronic accessibility of constructs, such that a student in medical school might easily recall health-related constructs, without being particularly motivated to adhere to a health goal. Furthermore, the familiarity or habituation that stems from repeated exposure to a stimulus during learning can increase the positive evaluation of such stimulus (mere exposure effect; Zajonc, 1968). For motor tasks where "practice makes perfect," learning can influence precision of movement, thereby increasing speed and performance at well-learned tasks (e.g., typing; Rumelhart & Norman, 1982). In studying the goal-gradient effect – a phenomenon that often produces patterns of behavior similar to learning – researchers often need to show that a linear increase in performance or speed over a sequence of goal-related tasks did not stem from learning/habituation but from progressive increases in motivation. This is often achieved by controlling for learning/habituation through the use of tasks for which such factors would be minimized or irrelevant. For example, researchers have used well-practiced tasks or task for which no learning can occur (e.g., unsolvable puzzle, the frequency with which a consumer in a loyalty program buys from a store).

Physiological resource

Goal-related tasks are often effortful and can drain or "deplete" an individual of limited physiological resources over time, thus reducing the individual's capacity to exert more effort subsequently. For example, Baumeister et al. (1998) showed that participants depleted by an initial self-control act of resisting a tempting treat exhibited less persistence on a subsequent puzzle task. Many other studies have found a reduction in self-control following various types of self-regulated responses, including thought suppression, habit breaking, self-presentation under challenging circumstances, difficult choices, and mental/physical endurance (Choi & Fishbach, 2011; Finkel, DeWall, Slotter, Oaten, & Foshee, 2009; Vohs, Baumeister, & Ciarocco, 2005; Vohs et al., 2008; Wegner, Schneider, Carter, & White, 1987). Thus, a decrease in mental or physical effort or a goal-incongruent choice may stem from depletion rather than from a lack of motivation. In these cases, measures of motivation would capture available physiological resources rather than motivation. To minimize the effect of physiological depletion on behavior, researchers interested in measuring motivation often design experimental paradigms relying on minimal-effort tasks, or tasks that are separated enough in time that the depleting effect of a previous task would not influence a subsequent task.

Notably, it is often challenging to distinguish between the depletion of physiological resources and a drop in motivation. In fact, the exact cause of depletion – whether motivational or physiological – is still an unresolved issue. Previous research has suggested that depletion occurs when glucose levels decrease and physiological resource is scarce (Gailliot et al., 2007), but recent research has argued exerting self-control cannot be linked to changes in glucose levels (Molden et al., 2012). More recently, Inzlicht and Schmeichel (2012) concluded that exercising self-control causes temporary shifts in motivation and attention (rather than physiological depletion), which in turn undermines further goal pursuit.

Conclusions

In this article, we examined the cognitive, affective, and behavioral measures of motivation and reviewed their use throughout experimental social psychological research. We distinguished

between the outcome-focused motivation to complete a goal and the process-focused motivation to attend to elements of the process of goal pursuit (using "proper" means, enjoying the experience). We then discussed circumstances under which measures may help distinguish between these different dimensions of motivation, as well as circumstances under which measures may capture different dimensions of motivation in similar ways. Finally, we explored situations in which the measures reviewed in this article may capture fluctuations in non-motivational factors, such as learning and physiological depletion.

Our analysis highlights the need for caution when selecting measure of motivation and when interpreting fluctuations captured by these measures. Specifically, researchers should know what dimension of motivation they wish to measure (what?) and which other dimensions of motivation or non-motivational influences might be present in the experimental paradigm they designed (what else?). Then researcher should design paradigms that minimize or eliminate these interferences, before deciding on the measures of motivation (how?) that best captures their research question. If other motivations and non-motivational factors cannot be minimized, researchers should employ (multiple) measures that can help distinguish between these different motivations and influences. In sum, this article advocates a systematic approach to the measurement of motivation, takes a step toward providing more structure around the measurement of motivation, and leaves the door open for further investigations on this rich topic.

Short Biographies

Maferima Touré-Tillery is an assistant professor at Northwestern University. Her research is on the intersection of motivation and self-perception, with implications for consumer behavior and public policy. Her work has been published in the *Journal of Experimental Psychology: General* and the *Journal of Consumer Psychology*.

Ayelet Fishbach, a professor at the University of Chicago, studies social psychology, with specific emphasis on motivation and decision making. She has published in the major psychology and business journals. Her work on self-control and multiple goal pursuit received several international awards.

Note

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