

# Motivation Science

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## Abstract

Traditionally, research on the psychology of motivation has addressed two separate questions: the *What* of motivation and the *How* of motivation. The former concerns the *nature* of the various motives that propel human behavior, and the latter the general *process* whereby any motive exerts its effects. This essay reviews historical and contemporary research in each of the foregoing categories. We highlight cutting edge concepts and findings in motivation science and identify emerging trends and future challenges.

## INTRODUCTION

Following a relative lull during the 1970s and 1980s (Higgins, 2012) research on motivation appears once again to be commanding attention from psychological researchers. Traditionally, the topic of motivation has been a mainstay of the science of psychology. It has played a major role in early dynamic models of the mind (including psychoanalytic theory), and it was fundamental to behaviorist theories of learning and action. The advent of the cognitive revolution in the 1960s and 1970s largely eclipsed the emphasis on motivation, but in the past two decades, motivational research has been making a forceful comeback. These days, motivational analyses of affect, cognition, and behavior are ubiquitous across various psychological literatures. Motivational research not only has conceptual implications for understanding mind and behavior, but also has direct and pragmatic implications for daily self-regulation, addiction, substance abuse, mental health, life at home and the workplace, consumer behavior, and other areas of application as well. Motivation is not just a “passing fancy” on the contemporary scene; rather, it is firmly entrenched as a foundational issue in scientific psychology.

## THE *WHAT* AND THE *HOW* OF MOTIVATION

Generally speaking, motivational research in psychology has been of two general kinds, addressing what one might call the *What* and the *How* of

motivation. Research in the *What* category concerns the contents of motivation, including taxonomies of basic motives or needs and investigations focused on singular motives/needs of particular interest. In contrast, the *How* of motivation addresses general processes and structures that apply to any motive whatsoever, irrespective of contents.

## HISTORIC WORK

### THE “WHAT” OF MOTIVATION

The prototypical sense in which people in general understand the problem of “motivation” concerns the “What” category. Raising the question of motivation (why did X commit Y?) inquires essentially into *what* specific motive accounts for a given behavior. In this vein, widely known are Freud’s (1920) distinction between the life (*eros*) and death (*thanatos*) drives, McDougall’s (1932) list of 18 instincts, Murray’s (1938) list of 24 psychogenic needs, and Maslow’s (1943) need hierarchy.

Beyond general taxonomies, a variety of specific needs singled out by psychological researchers also belong in the motivational “What” category. Historically, the most extensively researched needs have been the three highlighted in the work of McClelland (1961): the need for achievement (Atkinson, 1964), for power (McClelland, 1961), and for affiliation (McClelland, 1961).

### THE “HOW” OF MOTIVATION

In contrast to the emphasis on motivational *contents*, a great deal of research effort was invested in clarifying the *workings of motives* in general—defining the *How* of motivation. In this vein, McDougall (1932) saw any instinct as having three fundamental components (*perceptual, behavioral, and emotional*), and Freud (1938) viewed “instincts” or “drives” as innate, universal, and constantly felt. Similarly, Murray described a need as a “potentiality or readiness to respond in a certain way under given conditions” (1938, p. 61).

Theoretical and empirical work on the *How* of motivation has been carried out by theorists of the neo-behaviorist school, in particular Hull (1951) and Spence (1937, 1956). The two central motivational constructs within the Hull-Spence approach were *Drive* and *Incentive*. Primary drives were assumed to originate in physiological needs and secondary drives were assumed to derive from primary drives through conditioning. Incentives were assumed to be environmental stimuli (e.g., food in the goal box) capable of contributing to motivational readiness.

The Hull-Spence formulation was articulated as a multiplicative model in which habit (H) multiplies drive (D) and incentive (K) to produce the readiness to act. Tolman (1955) in an early anticipation of the cognitive revolution in psychology, has implied that the history of reinforcement (i.e., habit) actually represents an *expectancy* that a given behavior will result in drive satisfaction. In this interpretation, then, “habit” acquires a strictly motivational flavor. The expectancy construct figured prominently in the work of Atkinson (1964); he too put forth a multiplicative model ( $T_{r,g} = M_g \times E_{r,g} \times I_g$ ), in which  $T_{r,g}$  is a tendency to enact the response aimed at attaining a goal,  $M_g$  is a stable motive to attain goals in a given class, and  $E_{r,g}$  is the expectancy that a response will lead to goal attainment.

Neobehaviorist theorists assumed that motivations ultimately derive from physiological needs (which represent primary drives) and their derivatives acquired via conditioning (representing secondary drives, such as conditioned fear); McClelland (1987), Atkinson (1964), and their colleagues postulated purely psychogenic needs, universal across the human species; Lewin (1938), on the other hand, postulated an open array of quasi-needs that could be specific to a given psychological situation. Within his topographic approach to personality Lewin (1938) further postulated that a need gives rise to a state of tension that could spill over to neighboring regions of one’s life space (e.g., a hungry person may also experience a degree of thirst).

## CONTEMPORARY MOTIVATIONAL RESEARCH

The distinction between the *What* and the *How* of motivation is represented also in contemporary motivational research. In the *What* category belong general classifications of basic motives proposed by Deci and Ryan (2000), Fiske (2003), and Higgins (2012). A variety of singular needs or motives also fall into this category, including the need for cognition (Cacioppo & Petty, 1982) the need to belong (Baumeister & Leary, 1995), the need for closure (Kruglanski, 2004), mortality salience (Solomon, Greenberg, & Pyszczynski, 1991), promotion and prevention orientations (Higgins, 2012), and locomotion and assessment modes (Kruglanski, Pierro, Mannetti, & Higgins, 2013).

Work on the *How* of motivation includes research on goal-activation (see Fishbach & Ferguson, 2007, for review), on the structure of goal-means relations (Kruglanski *et al.*, 2002), and on motivational energetics and the dynamics of effort expenditure (Baumeister & Vohs, 2007; Brehm & Self, 1989; Wright, 2008; Kruglanski *et al.*, 2012). We now briefly touch on cutting edge research in each of these categories.

## THE “WHAT” OF MOTIVATION: GENERAL TAXONOMIES

*A BUCET of Fundamental Motives.* Fiske’s (2003) BUCET classification of social motives (Belonging, Understanding, Controlling, Enhancing, and Trusting) is a classification that covers most, if not all, of the social motives that psychologists have found of interest. It seems plausible to view the BUCET classification as a universally relevant taxonomy reflecting the way motivational functions of social significance are hard wired in humans across time and culture. For that reason the BUCET taxonomy has been influential, and has been cited often in the work of motivational theorists (e.g., Hogg, 2000).

*Truth, Value, and Control.* Another motivational taxonomy with a universalistic intent is Higgins’ (2012) classification of basic human needs into those for *Truth, Value, and Control*. The *Truth* motivation has to do with the desire to have an accurate grasp on reality, the motivation for *Value*—with the quest for good *outcomes*, and that for *Control*—with feeling personally effective, being the “origin” of one’s attainments. A unique feature of Higgins’ (2012) work is the discussion of how Truth, Value, and Control motivations interact. First, activation can spread from one element in the truth-value-control structure to the remaining elements. Second, separate elements in this overarching structure can support one another; for example, truth can be changed to support value and control, and value can be changed to support truth. Finally, the truth-value-control framework allows individuals to place varying levels of emphasis (either low or high) on each of these three motives. As such, there is much potential here for future research to examine how these three ways of “being effective” (Higgins, 2012, p. 47) combine to create motivational patterns that are more than the sums of their parts.

*Self Determination Theory.* Of the different classifications of social motives, Deci and Ryan’s (2000) Self Determination Theory (SDT) has engendered the greatest amount of empirical research. The SDT identifies three primary human needs: *autonomy, competence* and *relatedness*. Three cutting edge research domains in which recent SDT work has been carried out are: (i) work on autonomy and mindfulness, demonstrating that various defensive effects do not apply to people who are mindful and autonomous (e.g., Niemiec *et al.*, 2010), (ii) differentiation between eudaimonic (based in satisfaction of the three fundamental motives) and hedonic (pleasure-oriented) well-being, showing that the former is more conducive to welfare and happiness (Ryan, Huta, & Deci, 2008), and (iii) cross-cultural research on the three SDT motives, demonstrating their universality (e.g., Chirkov, Ryan, Kim, & Kaplan, 2003).

## THE “WHAT” OF MOTIVATION: SPECIFIC MOTIVATIONS

Beyond general taxonomies, considerable motivational research has focused on specific motivations.

*Regulatory Focus.* Regulatory focus theory distinguishes between a promotion focus (concerned with advancement, growth, and accomplishment) and a prevention focus (concerned with responsibility, safety, and security); these concerns can stem from chronic individual differences or can be situationally induced (Higgins, 1998).

*Regulatory Mode.* Two general orientations toward actions referred to as regulatory modes have received appreciable amount of research attention in the last decade (see Kruglanski *et al.*, 2013, for a review). *Locomotion* is the tendency to move in the psychological sense, and *assessment* the tendency to carefully evaluate the importance of specific goals and means.

*Specific Needs.* The following specific needs have received considerable amount of research attention: (i) *Need for Closure* (Kruglanski, 2004), (ii) *Need for Cognition* (Cacioppo, Petty, Feinstein, & Jarvis, 1996), (iii) *Need to Belong* (Baumeister & Leary, 1995), and (iv) *Fear of Death* (Solomon, Greenberg, & Pyszczynski, 1991).

## THE “HOW” OF MOTIVATION

Recently, burgeoning research on the *How* of motivation has been proceeding apace at numerous psychological laboratories. Cutting-edge work of this kind has been carried out on phenomena of (i) goal activation, (ii) self-control, (iii) the neuroscience of motivation, (iv) the structure of motivation, (v) motivationally relevant mindsets, and (vi) issues of energy and effort.

*Goal Activation.* About quarter of a century ago (cf. Bargh, 1990), a fresh movement changed researchers' approach to motivation and goal-directed behavior. This movement emphasized the cognitive perspective on motivation, whereby goals are mental representations of desirable end states that can be consciously or unconsciously activated from memory (Bargh, 1990; Kruglanski, 1996).

*Self-Control.* The idea that goals can be unconsciously activated and pursued challenges the notion of free will and voluntary control of behavior.

The latter issue, the ability to resist sacrificing superordinate concerns for momentary temptations, has defined the recently thriving domain of self-control research. The underlying principle is that of limited resources. Thus, the greater the investment in pursuing a given goal, the fewer resources should be available for alternative goals or means (Gailliot *et al.*, 2007; Kruglanski *et al.*, 2012; Muraven, Tice, & Baumeister, 1998).

Baumeister and Vohs (2007) suggest that *ego depletion* results from effortful attempts to exercise self-control, with detrimental consequences for subsequent cognitive activities. Recent research has investigated how such depletion is affected by factors ranging from autonomy of choice to implicit theories of willpower (Job, Dweck, & Walton, 2010; Moller, Deci, & Ryan, 2006). From the perspective of Cognitive Energetics Theory (Kruglanski *et al.*, 2012) resource depletion may be counteracted by increased goal importance. However, if resources are completely depleted, no amount of motivation can improve performance (cf. Vohs, Baumeister, & Schmeichel, 2012).

To deal with a limited resource pool, individuals have to allocate resources strategically, in proportion to goal saliency and importance (Kopetz, Faber, Fishbach, & Kruglanski, 2011). Negative consequences of privileging momentary temptation at expense of more important goals may prompt people to develop strategies to refrain from doing so. Specifically, individuals may learn to automatically activate higher order goals (e.g., keeping a healthy diet) in the presence of momentary allurements (e.g., the sight of an appetizing chocolate cake; Fishbach, Friedman, & Kruglanski, 2003). They may attempt to find multifinal means capable of satisfying multiple goals simultaneously (Kopetz *et al.*, 2011), and may learn how to harmoniously integrate their multiple goals (Belanger, Lafreniere, Vallerand, & Kruglanski, 2013).

*Structural Effects: The Architecture of Goal Systems.* The cognitive approach to motivational phenomena views goals as mentally represented schemes including configurations of goals linked to their means of attainment as well as other goals (Kruglanski *et al.*, 2002). Fundamental goal-means configurations are those of *equifinality*, in which a single goal is connected to several means, and *multifinality*, in which a single means is connected to several goals (Kopetz *et al.*, 2011).

Of interest also is the relation between the *number* of links between goals and means and their *strength*. Zhang, Fishbach, and Kruglanski (2007) proposed the *dilution* model, whereby the reduced link strength in multifinal (containing multiple links) versus unifinal structures is construed as *lowered instrumentality* of each means with respect to the goal. A similar dilution effect was demonstrated in equifinal structures, in which the number of

means to the goal was negatively related to each means' perceived instrumentality. Relatedly, the number of means to a goal was negatively related to the commitment of the actor to each of those means (Kruglanski, Pierro, & Sheveland, 2011).

*The Neuroscience of Motivation.* Affective neuroscience has played a growing role in recent motivational research, shedding light on many areas of interest to the scientific study of motivation. These have including research on the difference between *wanting* versus *liking* (Berridge, Robinson, & Aldridge, 2009) and on the difference between *value* and *motivation* (Roesch & Olson, 2004).

Researchers have come to believe that *dopamine*, a neurotransmitter in the catecholamine and phenethylamine families, is critical to motivated behavior (e.g., Wickens, Horvitz, Costa, & Killcross, 2007; Di Chiara & Bassareo, 2007). In this domain, Wise (2004) distinguishes between "reinforcement" as a retroactive effect on learning and "reward" (or incentive) as a proactive drive-like effect on behavior. Dopamine presumably plays a role in reinforcement-based learning, but not in reward-based learning.

*Mindsets.* Dweck's (2006, 2012) work on fixed versus growth mindsets has inspired considerable motivational research in recent years. A fixed mindset entails believing that things are as they are because of their immutable essence. A growth mindset, in contrast, is premised on the assumption that things are malleable and capable of amelioration. In general terms, a growth mindset (but not a fixed mindset) induces an *expectancy* that a goal of improvement can be attained, thus augmenting the motivation to strive for desired outcomes.

*Action Phases and Implementation Intentions.* Heckhausen & Gollwitzer (1987) proposed an influential model of action phases. These include the *deliberation phase*, in which goals are decided and prioritized, and the *implementation phase*, in which goals are actually pursued. The latter phase gave rise to a fruitful research program on implementation intentions. An implementation intention is an *if-then* plan which specifies *when*, *where*, and *how* an individual will strive toward a particular goal (Gollwitzer, 1999). Forming implementation intentions has been shown to increase rates of goal achievement (Gollwitzer & Sheeran, 2006); much of the emerging research on implementation intentions has focused on how that effect may be moderated by other variables. For instance, individual differences in perfectionism have been shown to lessen the effect of implementation intentions on goal progress (Powers,

Koestner, & Topciu, 2005). The strength of the goal in question matters as well: implementation intentions benefit goal attainment more when the goal strength is high (as compared to low; Sheeran, Webb, & Gollwitzer, 2005). Finally, the formation of implementation intentions can help overcome the effects of ego depletion (Webb & Sheeran, 2003).

*Energy and Effort.* Another emerging trend in motivation research is the emphasis on energy and effort as variables of motivational significance. Two conceptual contributions in this arena have been Motivation Intensity Theory (Brehm & Self, 1989) and Cognitive Energetics Theory (Kruglanski *et al.*, 2012). Both theories identify factors which impact the mobilization of resources toward motivated behavior.

*Motivation Intensity Theory (MIT).* Brehm and Self's (1989) MIT distinguishes between potential and actual motivation. *Potential* motivation concerns the amount of effort, determined by motive strength, that an individual is prepared to exert in service of that motive. *Actual* motivation describes the actual amount of effort expended by an individual in order to attain a goal. Degree of effort expenditure is determined by the difficulty of the behavior necessary to satisfy the motive, but only as long as success is viewed as both possible and worth the difficulty involved. Predictions from the MIT have led to empirical findings on the relationship between effort (operationalized as cardiovascular reactivity), task difficulty, and the justifiability of effort (cf. Gendolla, Wright, & Richter, 2012).

*Cognitive Energetics Theory (CET).* The CET (Kruglanski *et al.*, 2012) is a force-field theory of motivated cognition which, similar to the MIT, describes the distinction between potential and actual motivation. In the CET, purposeful cognitive activity is propelled by a *driving force* and opposed by a *restraining force*. The *potential driving force* is a product of goal importance and the pool of available mental resources. The *restraining force* (that must be matched by the *effective driving force*) is an additive function of the individual's general tendency to conserve cognitive resources, the energy demands of the activity, and possible competing goals. To keep an activity going, an increase in the restraining force (e.g., task demands) must be met by a proportionate increase in the driving force (for instance, resource availability or goal importance). CET's predictions have received support in recent research on *motivated reasoning* (Belanger, Kruglanski, Chen, & Orehek, 2014) and *retrieval induced forgetting* (Pica, Pierro, & Kruglanski, 2014).



## MOVING FORWARD IN MOTIVATION SCIENCE: THE CHALLENGES AHEAD

The resurgence of motivational research over the last decades is impressive and encouraging; the range of motivational topics investigated attest to its vitality and holds promise of exciting discoveries in motivation science in years to come. In the last section of this review we identify issues and challenges that motivation science may encounter going forward. Specifically, we suggest that advances in the field may be afforded via a *series of integrations* that lend focus and coherence to the free-wheeling and unwieldy manner of inquiry that has characterized the field of motivation science to date.

### INTEGRATION OF MOTIVATIONAL TAXONOMIES

Concerning the “What” of motivation, it would seem advantageous to integrate the various taxonomies of fundamental motivations (e.g., Deci & Ryan, 2000; Fiske, 2003; Higgins, 2012). Possibly, a broad analysis of the different measures may lead to arrival at a consensual structure of basic human motives analogous to the way in which a similar effort in the field of personality yielded the broadly agreed on Big Five Personality Factors (Costa & McCrae, 1992). It would also be helpful to have a thorough discussion of the origin of fundamental human motivations, addressing the issue of their universality and cross-cultural applicability.

### INTEGRATION WITH HISTORIC MOTIVATION RESEARCH

As noted earlier, contemporary motivational research in the “How” category has been predominantly guided by local, mid-range theoretical frameworks. Yet important broad formulations in this domain of study have been elaborated by past motivational theorists such as Lewin (1951), Hull (1951), Atkinson (1964), McClelland (1987), and others. To avoid “rediscovering the wheel” in motivation science, it would be useful to re-examine those past formulations in light of the vast number of motivational findings produced in the last several decades. A cardinal aim of science is the theoretical integration of disparate results; the question, therefore, is how contemporary findings fit within classic motivational frameworks—and whether novel theoretical integrations may be in order (for an attempt at such an integration, see Kruglanski, Chernikova, Rosenzweig, & Kopetz, 2014).

### INTEGRATION ACROSS APPROACHES AND LEVELS OF ANALYSIS

Various subdomains of psychology have approached the study of motivation in different ways; others have largely neglected motivational concepts

altogether and omitted them from their analyses. In regards to the latter, major psychological analyses eschewed the consideration of motivation and went on to assume that *people in general* exhibit certain invariant tendencies and behavior patterns (e.g., are risk-averse for gains, and risk-seeking for losses; Tversky & Kahneman, 1986), or tend to commit statistical errors and neglect base rates (Tversky & Kahneman, 1983). It now appears, however, that people's behavior in these domains may vary in accordance with their motivational states. For instance, recent evidence (Zou, Scholer, & Higgins, 2014) suggests that risks are generally undertaken to advance the satisfaction of a dominant motivation (e.g., regulatory focus) which may differ across persons and situations. In the same vein, it has been demonstrated that the use of heuristics isn't universal, but rather depends on motivational states such as the need for cognitive closure (Pierro, Mannetti, Erb, Spiegel, & Kruglanski, 2005). To reiterate, cognition and behavior are motivated, and motivations vary. No universal generalizations concerning what "people in general" think or do, without considering the motivational states they are in, seem warranted.

#### INTEGRATION ACROSS DISCIPLINES

Motivational concepts are of considerable relevance to a variety of social science disciplines, not only to psychology and neuroscience, but also to economics, business, political science and social philosophy, among others. Behavioral economists, for example, study individuals' decisions and their rationality given the actors' objectives, as well as the effects of framing and the impact of incentives. Political scientists are interested in the behavior of political actors, including insurgents and terrorists. Philosophers study the very *concept of motivation* (Peters, 1958) and its role in the explanation of social phenomena. Thus, motivation defines a general theme that cuts across diverse fields of inquiry in the social and behavioral sciences. It would seem useful to create channels of communication through which those various disciplines could interact and stimulate each other. A recent initiative has been launched to create such mechanisms: the Society for the Study of Motivation (SSM) was established in 2000, and its intent is to broaden the scope of motivational research by reaching out to other disciplines with a motivational interest. In that vein, the Society has recently launched an annual publication, *Advances in Motivation Science*, and a quarterly journal, *Motivation Science*, whose policy aims are interdisciplinary in nature. These constitute potentially significant developments in advancing the science of Motivation and recognizing its crucial role in understanding human action.

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**Arie W. Kruglanski** is a *Distinguished University Professor* at the University of Maryland, College Park. He is recipient of the National Institute of Mental Health Research Scientist Award, the Senior Humboldt Award, the Donald Campbell Award for Outstanding Contributions to Social Psychology from

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