Jingle-Jangle Fallacies in Motivation Science

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Jingle-Jangle Fallacies in Motivation Science:

Toward a Definition of Core Motivation

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Abstract

The term ‘motivation’ is used in a myriad of different ways. This is unfortunate, because divergent use of words can lead to misunderstandings and confusion. Nevertheless, despite differences in the range of processes considered, there seems be a common denominator of usages of the term. According to this denominator, motivation denotes mental processes that shape the goal direction, intensity, and persistence of behavior. The nature of these processes is left undefined in this usage of the concept. To provide a more concrete definition, I propose to consider mental representations of desired states and actions, combined with the feeling of desire, as core to motivation. In closing, I discuss implications of this concept of core motivation for motivation science and practice.

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Psychological terms are often used in a myriad of different ways, both in everyday life and in science. This is unfortunate, because divergent use of words can lead to misunderstandings and confusion. Moreover, different definitions prompt researchers to develop diverging measures of the same construct, which makes it difficult to compare and integrate findings across studies and derive evidence-based recommendations for practice. Terms for motivational constructs, and the term motivation itself, are no exception. More specifically, there are often two problems involved, captured in the phrase "jingle-jangle fallacy" (first coined by Kelley, 1927). The first problem is that the same term might be used for different constructs (jingle fallacy), and the second that different terms might be used to denote the same construct (jangle fallacy).

Jingle-Jangle Fallacies in Motivation Science

An example is use of the term self-efficacy (see Marsh et al., 2019). As originally introduced by Bandura (1977), the term denoted an expectation to be able to successfully perform a given action. Defined this way, self-efficacy was specific; it referred to an expectation to perform a single action at a given point in time. For example, under this definition, a student's expectation to be able to solve a mathematical task (e.g, $15 + 4x = 27$, what is x?) when confronted with the task is considered an instance of self-efficacy. However, later the term self-efficacy was used to also denote expectations that are generalized over time and tasks (Bandura, 1997; Schwarzer & Jerusalem, 1995). An example is a student's belief to generally be able to solve problems in arithmetic. Today, it is no longer clear what is meant when an author uses the term self-efficacy (a jingle fallacy), unless the term is further specified (e.g., by denoting specific self-efficacy as self-efficacy expectation, and generalized self-efficacy as self-efficacy belief).

In conjunction with related terms, self-efficacy is also an example for jangle fallacies. Prior to Bandura's introduction of the term, other concepts were already in use to denote

expectations to be able to successfully perform actions. For example, achievement motivation researchers called the expectation to successfully perform a given task, such as an arithmetic task as depicted above, expectancy of success (e.g., Atkinson, 1957). Generalized expectations to be able to be successful in a given domain were called self-concept of ability, or academic self-concept in education (Marsh & Shavelson, 1985). As such, seen in combination with related terms like expectancy of success and self-concept, the term self-efficacy is also involved in jangle fallacies. As a consequence, measures of self-efficacy, success expectancy, and self-concept that purportedly assess different constructs often use items with the same semantic contents and render similar scores, which makes them empirically indistinguishable (Marsh et al., 2019; Wigfield & Eccles, 2020).

Similarly, there are jingle-jangle fallacies with the term motivation. First, motivation is often used to denote a broad range of internal factors that influence behavior – motivational cognitions, such as wishes and intentions to perform the behavior; underlying expectancies and values; activation of behavioral schemata from long-term memory; sensitization to specific stimuli ("priming;" e.g., Weingarten et al., 2016); physiological processes; etc. This jingle fallacy implies that it is often not clear what is meant by motivation, except if the motivational factor that is addressed is specified in more detail. In addition, there are also jangle fallacies with the term motivation. For example, motivation researchers would certainly agree that fear can be a strong motivation to act in specific ways, such as a student not wanting to take an exam when being afraid of the exam and possible failure. However, emotion researchers might insist that fear is an emotion in the first place, despite having motivational properties – a classical jangle fallacy (see Pekrun, 2021).

Important drivers of jangle fallacies in motivation research, and psychological science more generally, are the quality standards used to decide about manuscript submissions, research budgets, promotions, and awards. Although the need for replication research is

increasingly acknowledged, innovation remains a prime criterion. Researchers are compelled to build a career on being innovative and may thus be motivated to invent new constructs. As such, instead of using established concepts, additional constructs may be introduced that reproduce existing conceptions, but come with new labels.

This strategy has two unfortunate consequences. First, there is an increase in the number of jangle fallacies, which impedes communication both within the scientific community and with practitioners. Second, if a "new" construct is successful, then often a research tradition is built around the construct, with authors within the tradition using a common language, organizing specialized conferences, publishing in specialized journals, and employing similar measurements instruments, but disregarding progress in related fields that investigate the same phenomena using different terms and instruments. As such, jangle fallacies contribute to the fragmentation of the field and hinder development of a cumulative motivation science.

Strategies to Define Concepts

How could we reduce the jingle-jangle fallacies in motivation science, achieve clearer definitions of terms (including the term motivation itself), and reduce the gaps between different research traditions? These are five major options (see Pekrun, 2019). Importantly, whereas the first and the subsequent four options are mutually exclusive, the latter four options can be combined.

Option 1: Dropping terms. Given conceptual confusion about a term, it is possible to drop it from scientific discourse. One variant is to stop using the term altogether. This solution makes sense if the phenomenon denoted by the term does not exist. For example, in 17th century physics, ether was considered as a medium carrying the effects of light and gravitation across distances in space. The concept was dropped when it became clear that it is not suited to explain light and gravitation. In contrast, for existing phenomena, this solution is

not sensible – to make progress in investigating a phenomenon, one needs to communicate about it. Alternatively, a second variant is to replace existing terms with new terms. An example is substituting motivation by terms such as reinforcement and reward, as practiced in behaviorism early in the 20th century and in affective neuroscience today. However, as long as a new term is not defined more clearly than the old one, no progress is made with this variant either. Reinforcement and reward are fuzzy concepts as well – what exactly is a "reward"? Defining reward by referring to a subsequent increase in the frequency of behavior does not help as it involves a circular argumentation – the behavior is displayed more frequently because it was rewarded, and a reward is anything that increased the frequency of the behavior.

Option 2: Definition by common denominator. Scientific terms serve communication. To enable smooth communication and avoid misunderstandings, it is often best to simply use the common denominator of typical usages of a term to define it (Pekrun, 1988). The added value of this approach is that resulting definitions are often less complex and clearer than existing ones. For example, "personality" has been defined in a multitude of ways, with many definitions including a broad range of components that diverge across authors (Feist et al., 2018). When using the common denominator, it is easy to derive a consensual and less complex definition. According to this definition, "personality" denotes the set of human characteristics that (a) can vary between persons and (b) are relatively stable over time (Guilford, 1959; Pekrun, 1988). No more than these two features are needed to conceptualize personality in a precise and efficient way. Similarly, it should be possible to derive a parsimonious definition of motivation by using the common denominator principle. Importantly, the principle can be used to synthesize existing definitions regardless of how they are constructed (e.g., based on components, causes, effects, prototypes, or lists of category members as described in options 3-5).

Option 3: Definition by components, causes, and effects. If phenomena comprise more than one single, unitary element, it can be useful to define them by denoting these elements and depicting their status within the definition (e.g., some elements may be required to define membership in a category, whereas others are optional, or required only for prototypical cases). In addition, categories can be defined based on common causes of phenomena, such as diseases being defined not only by their symptoms but also their etiology, or by their common effects.

However, to make such definitions effective, it is important to assemble components in non-arbitrary ways. As suggested early on by Allport (1937), it makes sense to define psychological concepts based on structural and functional covariation of elements. This also makes it possible to empirically scrutinize the usefulness of adding specific components, thus making definitions in part amenable to empirical investigation. An example cited by Pekrun (2019) is the definition of curiosity. There is agreement that curiosity involves a discrepancy between current knowledge and desired knowledge (i.e., an information gap that one wants to see closed). However, there is disagreement if curiosity is emotionally pleasant or unpleasant. If we consider the perception of an information gap as a necessary constituent of curiosity and an unpleasant experience of deprivation as a possible additional component that could be included in the definition, then it is possible to examine the usefulness of this addition by examining co-occurrence of information gaps and a sense of deprivation.

Option 4: Definition by prototype. It is often useful to acknowledge that some members of a category are conceptually more representative of the category than others, and to use these exemplars to describe the category. For example, goals, wishes, and intentions are motivational states that are at the core of the category "motivation." Other states may be less representative although still regarded as members of the family. Epistemic feelings such as curiosity or confusion are a case in point. Given strong cognitive and emotional connotations,

these states can be classified as cognition or emotion, but given their potential to drive action, they can also be considered motivation (Brun et al., 2008; Pekrun & Stephens, 2012).

Option 5: Definition by listing variants. Related to the prototype approach, it is possible to define categories by denoting specimens that make up the category. One version of this strategy is to create summative lists of members of the category. The various lists of human needs that have been proposed by motivation researchers are an example for this strategy. However, this may be less satisfying than defining a conceptual core of different members and then defining variants that differ in terms of additional components.

Implications: How Should we Define Motivation?

Which of these options should we use? As argued above, the first option (dropping the term) is likely not the best way to promote scientific communication. Instead, I propose to use the common denominator approach. Fortunately, as the concept is used in motivation research, there seems be a common denominator across the various usages of the term motivation. According to this common denominator, motivation denotes the mental processes that shape the goal direction, intensity, and persistence of behavior (see, e.g., Elliot, 2021; Heckhausen, 1991; Pekrun, 1988; Reeve, 2018).

This general definition has several important implications. First, according to this definition, motivation is a mental phenomenon. There may be many different mental processes that influence direction and intensity of behavior and, therefore, can qualify as motivation, including various types of perceptions (e.g., interoceptive sensations of thirst and hunger), feelings, and cognitions. According to the common denominator, motivation is a broad umbrella term that remains abstract rather than specifying single mental processes. Second, according to this definition, non-mental factors that influence behavior are not considered part of motivation. For example, activation of behavior-related brain areas, one's level of neuro-hormonal transmitters in these areas, or arousal of the sympathetic nervous

system are not motivation, although they can influence motivation. Third, because mental processes can be conscious or unconscious, motivation also does not need to be conscious. Finally, in terms of this definition, motivation is a process. Static factors, such as behavioral schemata stored in long-term memory, are part of motivation only when they are activated and become part of current processing (however, such factors can be part of trait motivation; Pekrun, 1988).

Core Motivation

To make the concept more concrete, it is useful to employ the prototype approach and more narrowly circumscribe those mental processes that best qualify as motivation (Figure 1). I suggest calling these mental processes *core motivation*, similar to the term core affect that has been proposed to be core to mood and emotions (Russell & Barrett, 1999). I propose we use the term core motivation to denote those mental processes that most directly influence goal direction, intensity, and persistence, thus acting as immediate, proximal mental determinants of behavior. Prime candidates are (a) feelings of desire and (b) cognitive representations of desired states and actions. In most motivation episodes, these feelings and cognitions are combined (see also Pekrun, 2021). From this perspective, core motivation includes cognitive representations of states and actions, combined with a feeling of desire. As such, core motivation is not about "cold" cognition; it includes an affective component that transforms cold cognition into "hot" cognition (Pintrich et al., 1993).

Mental representations of desired states include *goals and wishes*. An example is achievement goals, defined as the aims of competence-relevant behavior (Elliot, 2005). Mental representations of desired actions include *intentions* to perform specific actions. The distinction between desired states and actions makes it possible to consider both motivation for goal-directed behavior driven by the wish to attain a desired state, and motivation underlying actions that do not serve any instrumental purposes but are performed for their

own sake ("intrinsic" motivation; Ryan & Deci, 2017). In the latter case, the desired activity is performed regardless of any outcomes.

Implications for Motivation Theory and Practice

If core motivation is a proximal determinant of behavior, then other motivational processes may influence behavior by generating core motivation in the first place. As such, core motivation functions as a mediator in the effects of more distal motivation variables. This may be true for distal perceptual, cognitive, and emotional variables alike. For example, interoceptive sensations like thirst, hunger, and pain do not influence behavior directly. They need to be transformed into desires to act, such as the urge to drink or eat, in order to trigger behavior. If one wants to lose weight and interprets hunger as a signal that one is on the right track and has not over-eaten, then hunger may reinforce motivation *not* to eat instead of looking for food. From this perspective, interoception needs to generate a desire to act (i.e., core motivation) to impact behavior; the desire mediates the effects of interoception on behavior.

For cognitive and emotional variables, similar principles hold. For example, in expectancy-value theories of motivation and expected utility theories of decision making, expectancies and values are considered drivers of decisions and actions (e.g., Eccles & Wigfield, 2020). Using the proposed prototype perspective, expectancies and values influence core motivation, which, in turn, determines direction, intensity, and persistence of behavior. From this perspective, desires mediate the effects of expectancies and values on decisions and actions. Similarly, in emotion science, emotional feelings have been considered as triggering behavior, such as feelings of anger and fear prompting fight or flight, respectively. From the perspective of core motivation, emotional feelings generate a desire to act which, in turn, shapes behavior, suggesting that motivation mediates effects of emotional feelings on behavior (see also Pekrun, 2021).

The proposed definitions also have important consequences for understanding motivational practice. They imply that interventions to change motivation can either target more distal motivational factors or core motivation itself. Interventions that address more distal variables include treatments that have been denoted as motivation interventions by their originators (e.g., attributional retraining, Perry et al., 2014; utility value intervention, Lazowski & Hulleman, 2016), but also interventions targeting other mental processes that influence direction and intensity of behavior, such as emotions (e.g., test anxiety therapy; Putwain & von der Embse, 2021). These interventions influence core motivation by changing antecedent processes. In addition, there are interventions that directly address core motivation. Such *core motivation interventions* directly change feelings of desire and mental representations of desired states and actions. Examples are meditation, mindfulness interventions, and interventions targeting individuals' goals and intentions, such as mental contrasting which strengthens intentions by making desired states more salient (Gollwitzer & Oettingen, 2012).

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Figure 1

Motivation: General Definition and Core Motivation