

Why Stress Remains an Ambiguous Concept: Reply to McEwen & McEwen (2016) and Cohen et al. (2016)

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Abstract

This reply to the commentaries by Cohen, Giannaros, and Manuck (2016, this issue) and McEwen and McEwen (2016, this issue) acknowledges investigators' reluctance to relinquish the term *stress*, despite the lack of agreement on its meaning and the evidence that is a sign of its presence. This brief reply urges scientists studying the exemplars of this ambiguous concept to search for robust relations that specify the type of event, the properties of the agent, the agent's circumstances, and the behavioral or biological consequences. The accumulation of these relations will reveal that the word *stress* adds little to our understanding.

The thoughtful commentaries by Cohen, Giannaros, and Manuck (CGM; 2016, this issue) and McEwen and McEwen (MM; 2016, this issue) articulate the reasons for writing “An Overly Permissive Extension” (Kagan, 2016, this issue). Both sets of authors agree that all presumably stressful events do not lead to the same interpretation or consequences in all individuals. Therefore, the validity of all claims about stress require specifying the type of event, its interpretation by a particular class of agent, and the consequences of the former pair of conditions. That is why MM differentiate among good, tolerable, and toxic stress. Biologists typically specify the organism and its stage of development before classifying an event as harmful to the organism. A bacterial infection of the respiratory tract during childhood contributes to the tuning of the still immature immune system. A diagnosis of acute lymphoblastic leukemia does not.

Humans have always demanded explanations of salient events, such as changes in the seasons, the formation of an embryo, or the bouts of unhappiness that punctuate all lives. Explanations of the latter phenomena by European and American scholars have favored biological over psychological origins. Candidates include material things, such as black bile, skull shape, or possession of the short allele in the promoter region of the gene for the serotonin transporter. This bias is seen in CGM's decision to call an agent's interpretation of an event a “brain-based appraisal.” Chinese philosophers resisted

the split between matter and mind by nominating energies that affected both body and thought. Psychological origins of distress enjoyed a brief interval of popularity during the first half of the last century due to the influential ideas of Freud and the behaviorists. Selye's introduction of the concept of stress was intended to reclaim this territory for biology.

All natural phenomena consist of cascades whose phases involve distinct entities and processes that require different vocabularies. Although biological events comprise the first phase of all psychological outcomes, different terms are needed to describe the thoughts and emotions that emerge from the cascade. That is why both commentators acknowledge the importance of the agent's interpretation of an event. Biologists are not troubled by the need to use distinctive terms to describe the shape and functions of proteins and the sequences of nucleotides that are their origins.

CGM remind readers that epidemiologists, psychologists, and biologists rely on different sources of evidence when they infer a stressed state. Because the nature of the evidence determines the validity of any claim, it follows that statements about stress in papers written by the

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members of these disciplines vary in their validity. CGM note that psychologists conceptualize stress as a threatening event that cannot be coped with adequately. This definition implies that an adolescent who believes he can cope with the bullying tactics of a peer has not been stressed. Although CGM's stage model makes illness a primary outcome, many illnesses do not require any of the usual candidates for a stressor.

Both CGM and MM remind us that growing up in an economically disadvantaged family places a person at higher risk for a large number of correlated outcomes that include metabolic diseases, academic failure, incarceration, anxiety, depression, and a shorter life span. However, it is also true that the seriousness of the risk varies with the level of income inequality in the community or region, independent of the person's absolute income (Pabayo, Kawachi, & Gilman, 2015). This fact implies that the thoughts and feelings that accompany unfavorable comparisons with others make an important, but still unknown, contribution to these unwanted outcomes.

I agree with CGM and MM that the term *stress* resists exclusion from the parole because it is an easy way to talk about the large number of unwanted events that generate unpleasant feelings. However, the validity of any claim about stress requires more than the sense meaning shared by a majority. It also requires specifying the conditions that represent the referential meaning. The history of science has taught us that major advances followed unpacking abstract concepts to discover the diverse

collection of relations they hide. When geneticists parsed the concept of mutation into its varied instantiations, they found a large number of different kinds of relations between the properties of nucleotides and outcomes.

It is true that the concept of *stress* has spawned important research. But the terms *drive*, *innate*, *freedom reflex*, *Oedipal conflict*, and *habit strength*, which also spawned experiments that illuminated many puzzles, have outlived their utility and appear infrequently in technical papers. The term *stress* is permissible at a party, but not in the laboratory.

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