Assessing Recovery in Reactivity Studies (Cardiovascular and Others)

J. Richard Jennings

Definition

Recovery refers to the capability of an individual to return to a resting state following a mental/affective challenge. Recovery is currently of interest in studies of cardiovascular reactivity, but the concept is relevant to psychological state, e.g., degree of rumination, as well as other physiological areas, e.g., cessation of bronchospasm after irritation. If the activated/stressed state is harmful to health, then a person with good recovery experiences the harmful state less than the person with poor recovery.

Measurement

Care must be taken to assess recovery well. Recovery implies change from a prior stress/activated state. Recovery should then be measured immediately after the stressor has disappeared and without intervening events (unless the events are part of the research design). Measurement of recovery furthermore involves information about the resting state of the person, the stressed state, and the nature of the response variable used. Recovery is defined as return to a resting state so a measure of resting state should be available. Ideally this measure should be gathered under conditions identical that of the recovery period. Similarly recovery is defined relative to a stressed state. The individual's reaction to the stress/challenge will define what that person is recovering from. A measure of this stressed state is essential and again this should share all conditions, other than the stressor, with the conditions of the recovery period. Finally, care must be taken in assessing both reactions to a stressor and recovery to know the characteristics of the physiological measure. For example, heart rate can be expected to respond to stress in less than a minute and recover for 10 minutes or so, but cortisol may take 10 minutes or so to show a reaction to a stressor and a longer period to recover. Discussions in the referenced papers address the concept of recovery, but also focus on statistical approaches to its assessment. Choice of statistical approach depends on the goals of the research, consideration of the exact measures employed, as well as pragmatic concerns. Regression approaches controlling for rest and stressed levels can be employed or simpler techniques examining, e.g., time required for a measure to initially return to a value 50% of it resting value (Christenfeld, Glynn, & Gerin, 2000; Hocking Schuler & O'Brien, 1997; Llabre, Sptizer, Siegel, Saab, & Schneiderman, 2004; Neumann, Waldstein, Sellers, Thayer, & Sorking, 2004).

Physiological Mechanisms

Physiological mechanisms of recovery have not been well studied. We know that certain physiological processes promote metabolic repair and recovery and/or oppose changes related stress. For example, vagal activation is known to slow heart rate and

counter the sympathetic activation associated with stress. At a more general level, sleep and hormonal actions to build up metabolic stores are known to be restorative. Conceptually, homeostatic controls, such as exemplified by the baroreceptors, act to restore to a 'normal' value any deviation that is sensed. These homeostatic actions can be conceptualized as one physiological basis for recovery.

Areas of Application in Mind-Body Science

To the extent that stress is central to Mind-Body medicine, recovery should likely be equally as central. Recovery provides a probe that would ideally sample the capability of a person to normalize their physiology after stress. If the research probe generalizes to the person's daily life, then we have an important index of the chronicity of stress reactions in that person. Ambulatory studies might address both this point as well as identify whether the 'resting' state we identified in the individual in the laboratory was truly characteristic of less activated periods in that person's daily life.

References

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