

Assessing Cardiovascular Baselines (for Reactivity or Other Studies)

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Definition

Baselines are data collected during one period of time that are then compared to a second period of time during which the person is more active - performing a task, experiencing a stressor. Baselines, analogous to a control or comparison conditions, are ubiquitous in research, but are particularly prominent in cardiovascular behavioral medicine. Statistical comparisons with a baseline necessarily confer as much importance on the data from the baseline as on the data from the active period. Design of baselines should require as much care as the design of the active periods.

Measurement

Baseline measurement must use the same techniques/instruments as the measurement of active periods. Care should be taken to ensure that all conditions other than the variable of interest are identical between baseline and active periods, e.g., posture, environment. As reviewed in Jennings et al. (1992), alternative views of the nature of baselines exist. For some a baseline captures a particular psychophysiological state, resting. The definition of resting operationally can vary from a few minutes in a chair in quiet surroundings to a sample from deep sleep under controlled metabolic conditions. The alternate view suggests that the baseline is a comparison for the active period. All factors, including the current behavioral state of the participant, should be identical to the active period except for the variable of interest, e.g., engagement of hostility. Operationally, this could mean that a period of doing mental arithmetic would be a baseline for a period of doing mental arithmetic with harassment designed to engage hostility. In practice, a number of studies focused on cardiovascular reactivity have used a 'vanilla baseline' task that engaged participants in a task designed to be similar to reactivity tasks but with little cognitive/affective demand (Jennings et al., 1992). This baseline does not consistently yield better resting state indices, i.e., evidence of less activation, than unfilled baseline periods, but it may provide a better comparison for assessing degree of task engagement within the participant. Choice of baseline should depend on the comparison required by the study design.

Physiological Mechanisms

Physiological factors that are relevant to baselines are implied in the discussion of alternatives above. Bodily restorative factors, such as sleep and building metabolic reserves, would be expected to be active during a truly resting period. Assessment of these factors may be important to the purpose of the research. Baselines that are designed to mimic the active period in contrast would be designed to activate, though minimally, the same biological processes as those active in the active period, i.e., measure the processes in the idle, but present state.

Areas of Application to Mind-Body Science

As noted initially, the design of a baseline/comparison condition is central to good experimental design and as such central to research in mind-body medicine in all of its applications.

Reference

Jennings JR, Kamarck T, Stewart C, Eddy M, Johnson P: Alternate cardiovascular baseline assessment techniques: Vanilla or resting baseline? *Psychophysiology* 29: 742-750, 1992.