

From Mental Chronometry to Chronopsychophysiology: The Marriage of Mental Chronometry and Event-Related Potential

Shulan Hsieh^{1,2}

¹Department of Psychology, National Cheng Kung University

²Institute of Allied Health Sciences, National Cheng Kung University

The use of reaction time as a measure of psychological processes has enjoyed a long history in cognitive psychology and has been coined as “mental chronometry.” However, because reaction time is measured as the time between the onset of an event (a stimulus) and the occurrence of a response, the total response time includes the time to sense the stimulus, the time to contract the muscles to make the response, and the time, which is of the main interest to cognitive psychologists, for all the non-motor processes in between. Given the possible contamination from motor stage processing times while inferring non-motor stage processing times by means of reaction time measures, another research approach, chronopsychophysiology, which measures the brain’s psychophysiological (electrophysiological) responses to infer mental processes, has been borrowed from neuroscience and has become the more advantageous research approach in cognitive psychology since the late 20th century. There are several advantages to studying cognition by means of psychophysiological measures, particularly those of the event-related potentials, which can serve as markers for psychological processes (as “windows” on cognition) as well as markers of physiological processes (as “windows” on the brain). This paper aims to provide an overview of how and why such a research transformation occurred in cognitive psychology and to explore the benefits of a marriage between cognitive psychology and psychophysiology. In particular, this paper synthesizes various laboratories’ studies conducted in Taiwan using electrophysiological data to infer mental processes. It is expected to document research approach developments in cognitive psychology, from behavioral to brain potential, in modern Taiwan. This paper was written for the purpose of appreciating the pioneering contributions from Dr. In-Mao Liu to the development of cognitive psychology in Taiwan.

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