

Title: Systems factorial technology: Theory and applications

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Abstract:

Researchers have been interested in how human beings process information for decision-making since the development of experimental psychology in the late nineteenth century and then its renaissance in cognitive science in the 1960s. Recently, an increasing number of researchers are interested in studying multiple-signal processing because a correct decision usually requires human to process multiple sources of information. Therefore, the issue of parallel-serial processing of multiple signals has been investigated for several decades and it is still a hot issue in cognitive science.

With the development of methodology, researchers are able to make a deeper investigation on the properties of multiple-signal processing, which cannot be diagnosed by the conventional measures, e.g., accuracy, mean reaction time (RT). Systems factorial technology (SFT) is an extension of the Saul Sternberg's (1966) additive factors method. SFT is regarded as a useful and diagnostic tool for strong inferences of several important properties of multiple-signal processing while making decisions, including the mental architecture, stopping rule, processing dependency, and workload capacity (Little, Altieri, Fific, & Yang, 2017; Townsend & Nozawa, 1995). SFT has been applied to study multiple-signal processing in a variety of task contexts, such as cued detection (Yang, Little, & Hsu, 2014), visual search (Fific, Townsend, & Eidels, 2008), change detection (Yang, 2011; Yang, Chang, & Wu, 2013), face perception (Yang, Fific, Chang, & Little, 2017), visual word recognition (Houpt, Townsend, & Donkin, 2014), and audiovisual recognition (Altieri & Yang, 2016; Yang, Altieri, & Little, 2018).

In this talk, I will first briefly introduce the four important properties of multiple-signal processing. Second, the specific design, i.e., double factorial design, that allows for the inferences of multiple-signal processing will be introduced. Third, the data analyses and corresponding inferences will be introduced. Finally, I will give you several examples that apply SFT. Through this talk, you can obtain a basic sense of how to use SFT and the advantages of SFT on the investigation of information processing strategies. This advanced methodology enables researchers to gain new insights of the mechanism of decision-making.