Chapter 7
Transfer of Training between Working Memory Task and Attentional Task

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ABSTRACT

The present studies indicate that training effects in a certain domain may result in the acquired skills being transferred to other domains that require similar abilities. Cognitive training involves structured exercises that are prescribed and undertaken with the purpose of enhancing cognitive abilities, such as attention, memory, and problem solving. In contrast to symptomatic pharmacotherapy, non-pharmacological approaches may further improve patients’ situations. Our aim was to summarize the empirical evidence for the rehabilitation of individuals with cognitive disorders by using training tasks to enhance specific cognitive functions to combat against cognitive degradation and transfer the benefits to other widely used domains.

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INTRODUCTION

1. Working Memory

Working memory (WM) is the ability to store and manipulate information for short periods of time. It is an important predictor of scholastic aptitude and a critical bottleneck underlying higher-order cognitive processes, including controlled attention and reasoning (Au et al., 2015).

Working memory (WM) refers to the temporary storage of information for managing daily functioning and the learning of skills (Baddeley & Hitch, 1974; Bo, Borza, & Seidler, 2009). According to Baddeley (1992), WM is composed of the central executive, the visuospatial sketchpad, and the phonological loop (see other conceptions of Engle, 2002). The central executive performs executive functions, such as updating, manipulating, and coordinating information from the visuospatial sketchpad and the phonological loop (Baddeley, 1996). The phonological loop is responsible for processing speech-related information, whereas the visuospatial sketchpad is used to store and manipulate visuospatial information. The functions of the visuospatial sketchpad and the phonological loop are domain-specific, whereas the executive functions are domain-general (Baddeley, 1992, 1996). The WM in high-level cognitive processes is important; many experiences have demonstrated the importance in reading comprehension, and the acquisition of motor skills (Daneman & Carpenter, 1980; Kane et al., 2004; McNay & Willingham, 1998).

Recently, there have been many interesting studies regarding the prospects of WM training for improving cognition function. The conclusion of these studies is that improvements in WM performance as a function of training may be transferable to other similar mental activities related to WM capacity (Klingberg, 2010; Morrison and Chein, 2011; Buschkuehl et al., 2012).

2. Attention Network

Attention is the ability to attend to some objectives and ignore others. There are three basic concepts in the attention system. First, the attention system is anatomically separate from the processing systems, which handle incoming stimuli, make decisions, and produce outputs. Second, attention utilizes a network of anatomical areas. Third, these anatomical areas perform different functions that can be specified in cognitive terms (Petersen & Posner, 2012).

Some researchers had previously described attention networks in 1990, and they thought that attention networks included three networks. The first is an alerting network that focuses on brain stem arousal systems along with right hemisphere
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