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# Cultural differences in the development of cognitive shifting: East–West comparison

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### ABSTRACT

Prior research has documented that Japanese children's performance on the Dimensional Change Card Sorting (DCCS) task can be influenced by their observation of another person completing the task, which is referred to as social transmission of disinhibition. The current study explored whether Canadian children would also show a social transmission of disinhibition and whether their performance would be comparable to that of Japanese children. In this study, 3- and 4-year-olds in Canada and Japan were given both the standard version and social version of the DCCS. Results indicated that Canadian children displayed the social transmission of disinhibition, but their effects were significantly weaker than those with Japanese children. On the other hand, performance on the standard DCCS was comparable between children in the two countries. We discuss the results in terms of cultural differences in the relationship between self and other.

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### Introduction

Executive function is an important cognitive skill for us to make adaptive changes in our complex physical and social environment. It enables us to plan, execute, and monitor appropriate and relevant

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actions, and to inhibit irrelevant and inappropriate actions, for the attainment of a specific goal (Dempster, 1992; Welsh, Pennington, & Groisser, 1991). Extensive evidence suggests that this ability develops rapidly during the preschool years, which may be subserved by the maturation of the prefrontal cortex (Diamond, 2002; Moriguchi & Hiraki, 2009; Zelazo & Müller, 2002). Recent studies suggest that executive function is not unitary; instead, it consists of several components such as inhibitory control, cognitive shifting, and working memory (Garon, Bryson, & Smith, 2008; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000).

One of the major research foci of executive function has been on the Dimensional Change Card Sort (DCCS) task, which is widely used to assess the development of cognitive shifting (Zelazo, Frye, & Rapus, 1996). In the standard version of the DCCS, children are asked to sort cards that have two dimensions such as color and shape (e.g., red boats, blue rabbits). There are two phases in the task. During the first phase, children are asked to sort the cards according to one dimension (e.g., color) for several trials. During the second phase, children are asked to sort the cards according to the other dimension (e.g., shape) for several trials. Although 3-year-olds are typically able to sort the cards according to the first dimension, they fail to switch the rules during the second phase and perseverate to the first dimension. With increased age, 4- and 5-year-olds do not perseverate and are able to successfully sort the cards according to the second dimension. This developmental pattern has been replicated in several nations, including Austria, Canada, Korea, and Japan (Kirkham, Cruess, & Diamond, 2003; Kloo & Perner, 2005; Moriguchi & Itakura, 2008; Oh & Lewis, 2008; Zelazo et al., 1996).

Although the existing research has focused exclusively on various aspects of executive functioning and how they develop within a child, recent studies have begun to address an intriguing question: whether and how a child's executive functioning can be influenced by another individual's executive actions. It has been proposed that executive functions are not solitary cognitive skills that one possesses independent of others in our social environment; rather, they can be socially transmitted (Lewis & Carpendale, 2009; Moriguchi, Lee, & Itakura, 2007).

Indeed, Moriguchi, Lee, and Itakura (2007) reported such social transmission with the use of a modified DCCS task. In their task (henceforth referred to as the social DCCS), instead of sorting cards themselves during the first phase, preschoolers watched an adult model sorting cards according to one dimension (e.g., shape). After that, during the second phase, preschoolers themselves were asked to sort according to a different dimension (e.g., color). It was found that Japanese 3-year-olds perseverated to the rule the model had used, whereas most 4- and 5-year-olds were able to successfully shift to the new rule. From these results, Moriguchi and colleagues suggested that social observation can lead to perseverative errors in a manner similar to the typical perseverative errors in the standard DCCS task, which was referred to as *social transmission of disinhibition*. This finding has been consistently replicated with Japanese children (Moriguchi, Kanda, Ishiguro, & Itakura, 2010; Moriguchi, Sanefuji, & Itakura, 2007).

However, it is still unclear whether the similar social transmission of disinhibition occurs in other cultures. There is a reason to suspect that children in another culture might not show similar patterns of behavior. According to current cultural psychology theories, in Western cultures such as those in North America people are likely to have a more "independent" view of the self, whereas in Asian cultures such as Japan people tend to have a more "interdependent" view (Markus & Kitayama, 1991). People in the interdependent cultures are expected to see themselves as part of a social relationship and recognize that one's behavior is strongly affected by others' behaviors. Thus, the relationship between self and other is assumed to be closer in the interdependent culture than in the independent culture. On the other hand, people in the independent cultures are expected to be independent from others where each individual expresses one's own unique attributes.

Rothbaum, Pott, Azuma, Miyake, and Weisz (2000) also argued that Japanese people emphasize the symbiotic harmony in relationships between self and other, whereas generative tension plays an important role in the relatedness in North America. This review suggests that these cultural differences may already exist during infancy and early childhood. For example, Japanese mothers show prolonged proximity and contact with their infants and meet their needs before they are expressed, and this may blur the self-other distinction. In contrast, in North America, infants are seen as separate individuals, and the close relationship between mother and child in Japan is often regarded as unhealthy by North Americans (Chen & Miyake, 1986). During early childhood, both Japanese parents and

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