

1. INTRODUCTION

Everyday life consists of numerous situations in which two tasks are performed simultaneously. For example, you might be cooking dinner while simultaneously talking to a friend, or you might be climbing the stairs to reach your apartment while already starting to read a postcard that you have just picked up from the mail box on the ground floor. In the second example, one of the tasks is a sensorimotor task (climbing the stairs) whereas the other is a cognitive task (reading the postcard), which is in need of some attentional resources. Performing these two tasks concurrently is not always easy, and one might have to stop walking if the text on the postcard is rather small or difficult to read. Alternatively, one might stop reading if there are other people approaching and it becomes important to watch out for one's step. It is unlikely that these two tasks can be performed concurrently at all when climbing these particular stairs is not a well-practiced and fairly automatized task.

During the last decade there has been a rekindling awareness among lifespan developmentalists about the relevance of cognitive resources and intelligence for all kinds of behaviors, including sensorimotor functioning. It is assumed that there are age differences in the amount of cognitive resources that have to be invested into sensorimotor functioning. These differences lead to more pronounced performance decrements in children and older adults as compared to young adults when a cognitive and a sensorimotor task are performed concurrently. Furthermore, older adults tend to prioritize their sensorimotor functioning, potentially to protect themselves from physical harm, leading to more pronounced performance reductions in the cognitive domain.

Little is known about children's preferred modes of resource allocation in dual-task situations that combine a cognitive and a sensorimotor task. As a working hypothesis for the present study, it is assumed that children tend to prioritize the sensorimotor task if they are faced with a demanding dual-task situation in which their body's equilibrium is challenged. Potential underlying reasons for such a behavior pattern could be that children have fewer resources available to them in the first place, and that their sensorimotor functioning is in a higher need of cognitive resources or cognitive control than in young adults. If the situation is demanding and children are already operating closer to their stability boundaries than young adults, they are expected to prioritize their sensorimotor performance at the expense of their cognitive performance. Young adults, on the other hand, are assumed to be able to deal with performance decrements in both task domains. In addition, children are expected to be less

successful than young adults in shifting their attention flexibly from one task to the other, and to have specific problems to “neglect” the sensorimotor domain, even when they are instructed to focus more on the cognitive task.

To test the assumptions, 9- and 11-year old children and young adults were tested in the present study. The tasks that were used should have some relevance for everyday functioning, while at the same time be measurable in the laboratory. The sensorimotor task consisted of balancing on a special balance device, the so-called ankle-disc board. In some conditions, task difficulty was increased by placing the board on a moving instead of a stable surface. It is argued that balancing on the board really challenges people’s equilibrium, and requires to constantly focus on the task. Two different cognitive tasks were used in the present study, an episodic memory task and a working memory task. The underlying cognitive abilities to perform the tasks, namely episodic memory and working memory capacity, were expected to be relevant in many different everyday situations for people in all age groups. An everyday analogy of the laboratory dual-task situation of the present study might be to keep an upright posture on a moving bus while concurrently trying to remember the shopping list, or while concurrently trying to keep track of the order of all the bus stops along the way.