

Finding your way in the world: on the neurocognitive basis of spatial memory and orientation in humans

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Abstract Finding your way home, remembering where you left the car keys or directing someone to the nearest hospital are examples of highly complex cognitive tasks based on spatial memory and orientation. Without these functions, navigating through daily life would be impossible. Our ability to construct spatial representations of the outside world, and to store them in our memory is likely to underlie many other higher cognitive functions in humans, such as decision-making and planning. Many other animals possess the ability to navigate around their environment but there are certain higher-order features of the human system, such as the ability to communicate spatial information verbally or the ability to switch perspectives, which are uniquely human. This symposium will address how the variety of spatial memory processes is implemented in the human brain, and how it is characterized by differences across species, and within the human species (such as in gender, age and clinical populations). We will start with sketching an evolutionary taxonomy of spatial memory and spatial representations. Next, we will discuss how (certain) spatial abilities might develop during the

human ontogeny. An important question of course is how the human brain carries out mental activities such as navigation and perspective taking. We will illustrate this by examples of recent neuroimaging studies on allocentric spatial representations and perspective switches. More insight in to how the human brain deals with spatial information processing can be gathered from neurological cases in which spatial neurological circuits are affected. Another way to understand how spatial representations of the surrounding world are created comes from studying situations in which the sensory input channels are limited, such as in the case of blindness. This sheds light on the supposed supramodality of spatial representations. Finally, the versatility of the human spatial memory system will be illustrated by a closer look at individual differences in humans: how do men and women differ in spatial memory ability?. This symposium derives from a EU funded NEST PATHFINDER research initiative (see <http://www.wayfinding.fss.uu.nl/>).

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