

Chapter 3

Space Representation and Gender Differences

ABSTRACT

Scientific literature highlighted gender differences in spatial orientation. In particular, men and women differ in terms of the navigational processes they use in daily life. Scientific literature highlighted that women use analytical strategies while men tend to use holistic strategies. According to classical studies, males show a net advantage at least in the two categories of mental rotation and spatial perception. Subsequently, brain-imaging studies have shown a difference between males and females in the activity of brain regions involved in spatial cognition tasks. What we can say with certainty is that, given the complex nature of the subprocesses involved in what we call spatial cognition, the gender differences recorded by numerous scientific studies conducted in this field are closely related to specific measured abilities. The evidence that emerges with certainty from diverse studies is, however, that of a huge variety of strategies that differ according to sex, context, purpose to reach, education, age, and profession. In the study presented here, the gender and age-related tests show a significant sex-based difference perspective-taking tasks, but there is no gender-based difference in the mental rotation task.

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GENDER DIFFERENCES: A POPULAR TOPIC

Numerous data in the literature provide evidence for gender differences in spatial orientation. (Lambrey & Berthoz, 2007)

Gender differences have been a popular topic in social sciences for many years.

Regarding the specific field of spatial cognition, it should be specified that both common belief and scientific literature claim that men and women differ in spatial abilities.

The 1974 seminal study by Maccoby and Jacklin, in which spatial cognition was considered a unitary capacity in which males excelled in comparison to females, marrying well with common beliefs, gave rise to the commonplace of a supposed male greater ability which is feeding itself by metabolizing results from specific studies.

What we can say with certainty is that, given the complex nature of the subprocesses involved in what we call spatial cognition, the gender differences recorded by numerous scientific studies conducted in this field are closely related to specific measured abilities. Moreover, given once again the peculiar nature of the field of study, the choice of instruments used for measurements is not at all neutral. Specifically, the differences relate to paper-and-pencil test based studies compared to those that take into account the ecological variable and are based on tasks performed in real or virtual spaces

A 1985 study by Linn and Petersen (Linn & Petersen, 1985) classified spatial tests, distinguishing the three categories of mental rotation, spatial perception, and spatial visualization. According to classical studies (Benton, Varney, & deS Hamsher, 1978; Inhelder & Piaget, 1958; Shepard & Metzler, 1971) quoted in de Goede (de Goede, 2009), males show a net advantage at least in the two categories of mental rotation and spatial perception. Subsequently, brain-imaging studies have shown a difference between males and females in the activity of brain regions involved in spatial cognition tasks.

A brain imaging study by Grön, Wunderlich, Spitzer, Tomczak, and Riepe (2000) have shown that males and females recruit different brain regions in navigation. They found that men primarily engaged the left hippocampal region. In women on the other hand the right parietal and right prefrontal areas were activated. These differences might reflect typical gender differences in navigational approaches, that is a strong reliance in females on landmarks and

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