

## **Mental picture is the key to perception of the external world**

Mental rotation in dysgraphic and non-dysgraphic children

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The development of spatial perception is indispensable for the human cognition of the external world. The key to this process is the mental picture that comes into existence by way of imagination. The present paper deals with a special kind of mental picture transformation, called mental rotation. According to the literature these inner representations are bound to two reference frames, the egocentric and allocentric spaces, respectively. In normal cases when both reference frames work well in the subject, the process of mental rotation remains undisturbed. In contrast, partial mental disabilities, especially dysgraphia, are characterized by unformed mental images, the consequences of which are difficulties of spatial orientation and wrong judgments of left and right directions in particular.

The present research analyzes the relationship between orientation difficulties and the reference frames typical to dysgraphia, according to the hypothesis of Karádi *et al.* (2001). In this study 40 children have participated: 16 „writing-weak” - dysgraphic (average age: 9,3 years) and 24 non-dysgraphic (average age: 9,2 years) ones. First, a dictation task was carried out on the subject for appropriate evaluation of the characteristic symptoms and measures of his/her dysgraphia, if any. This was followed by the egocentric Hand Mental Rotation Test (HMRT), in which the subject had to distinguish between right and left hands that were shown as pictures at rotation angles of 0, 50, 90 and 180 degrees. The number of committed mistakes and performance time were recorded for each subject to assess the differences between the two groups.

The achieved results clearly support the hypothesis that “writing-weak”, dysgraphic children exhibit a higher number of mistakes than the control group. On the other hand, as opposed to *a priori* assumptions, the performance time of the two groups did not differ from each other significantly. As a consequence, the dysgraphia disorder pre-determines directional judgment mistakes in spatial perception in the course of mental rotation; however, it does not lengthen its performance time compared to that of healthy subjects in the control group.

**Keywords:** mental rotation, egocentric reference frame, Hand Mental Rotation Test (HMRT), dysgraphia