Impact of attentional issues on map use performance

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Keywords. ASRS, attention, map, performance

Extended abstract

Background. Differences in attention properties might have a major impact on the performance related with map use. Cognitive processes related with attention properties are crucial in the interpretation of maps (Wolbers and Hegarty, 2010; Griffin and Fabrikant, 2012). There are important differences in the cognitive interpretation between 2-dimensional and 3-dimensional maps. Edler et al found that spatial visual memory is affected according to 2- and 3- dimensional representations (Edler et al, 2015). The aim of the present work was to study the link between self-reported attentional problems and map use performance. Both 2-dimensional and 3-dimensional maps were used.

Methods. Twenty-four students (Land Surveying B.Sc., 21-26 years; mean: 22.7, SEM: 0.3) participated in the study after informed consent. The Adult ADHD Self-Report Scale (ASRS) Symptom Checklist was used to evaluate attention-related problems (Kessler et al, 2005; Kessler et al, 2007). This self-reported checklist consists of 18 items, 9 related to attention problems, and 9 related to hyperactivity/impulsivity problems. The Hungarian version was also validated (van de Glind et al, 2013). Only the number of attention problems was considered. The data source of the maps was the Hungarian Earthquake Catalogue with information about location, magnitude, and energy of earthquakes from 456 B.C till present days (Pődör and Kiszely,

ICA European Symposium on CARTOGRAPHY
VIENNA, 10–12 NOVEMBER 2015

Published in "Proceedings of the 1st ICA European Symposium on Cartography", edited by Georg Gartner and Haosheng Huang, EuroCarto 2015, 10-12 November 2015, Vienna, Austria

2014). Sample maps were presented in Fig. 1 and 2, respectively. The participants conducted the tasks in a computer lab. The maps were prepared in ArcGIS at 1 : 2 million scale.

Statistica 7.0 program package was used to analyze the link between map performance and the number attention problems. Spearman's correlations were run between symptom checklist and map performance variables. The level of significance was set at p=0.05.

Results. In the overall map performance, the maximum score was 40 out of 48 points, the minimum was 24, the mean was 34.9 points. From the maximum scores, students reached 76.0±2.4 percent on the 2-dimensional maps, while 68.1±2.9 percent on the 3-dimensional maps. In the population studied, the number of attention problems was 3.3±0.4 (mean±SEM).

The number of attention problems showed a significant inverse correlation with the map performance in the case of 2-dimensional maps (Spearman R=-0.60, p=0.002), but not in the case of 3-dimensional maps (Spearman R=-0.03, p=0.9).

Conclusions. In our setting, the number of self-reported inattention symptoms was inversely correlated with the test performance in 2-dimensional maps, while this effect was not observed in the map performance related to 3-dimensional maps. Our preliminary results indicate that this effect might have a major importance in the interpretation of different map types.

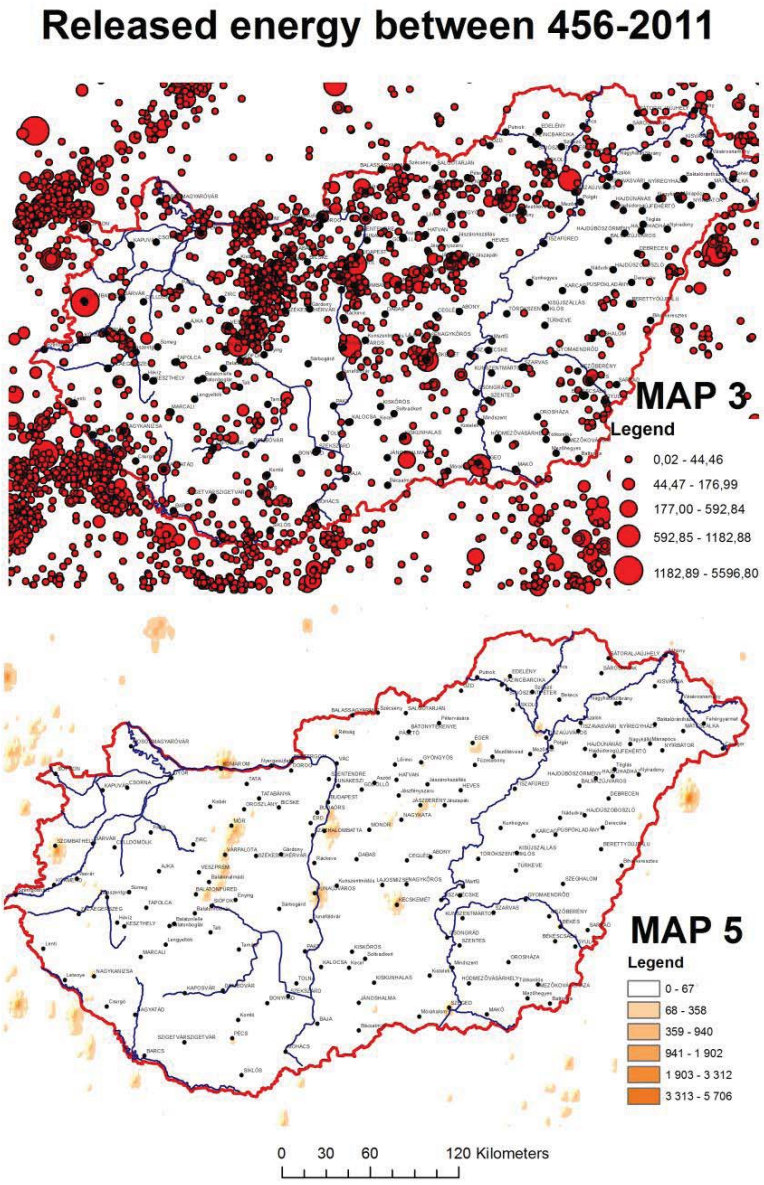

Figure 1. Maps used in the present study - 2-dimensional test maps

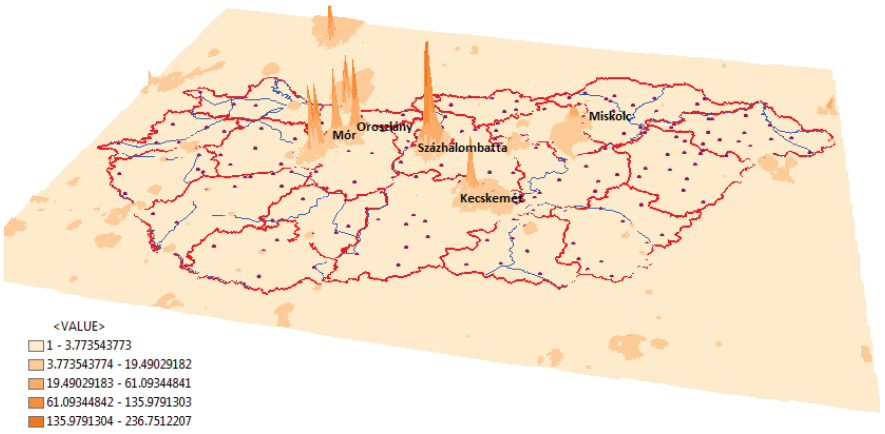

Figure 2. Map used in the present study -3-dimensional test maps.

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