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How User's Visualization Literacy Relates to Their Cognitive Traits

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ABSTRACT

Researchers in the field of Information Visualization have suggested that users' cognitive abilities would likely to affect their understanding of data visualizations and deeper exploration in the visualizations. However, the evidence is still scant to link between user's visualization literacy and their cognitive traits. Thus, the research goal of this study is to explore how user's visualization literacy and their cognitive traits are related. In particular, we focused on two cognitive traits: numeracy and need-for-cognition. In order to achieve the goal, first, we measured visualization literacy, numeracy, and need-for-cognition using existing instruments with 46 Amazon Mechanical Turk workers, and the scores of the three instruments were analyzed. The results showed that a moderate positive relationship between visualization literacy and numeracy (Spearman's rank correlation coefficient = 0.571, p-value=0.000); a moderate positive relationship between visualization literacy and need-for-cognition (Spearman's rank correlation coefficient = 0.403, p-value=0.006). In short, this study provides researchers of visualization literacy understanding of how users' ability to interpret visualization relate their cognitive traits.

KEYWORDS

Information Visualization, visualization literacy, numeracy, need for cognition, cognitive traits