

# Cross-cultural differences in topographic map design perception

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It is common knowledge that the visual appearance of a map makes a significant contribution to its quality and functionality. But do we perceive it differently at the scale of cultures? Are there any group behavioural patterns in cognitive performance whilst communicating a map?

Prominent studies in the field of cartography [1], cultural [2], and cognitive psychology [3] have shown the influence of an individual cognitive style on the visual information processing, judgement, and reasoning. Thus, how individuals with different cultural mindsets perceive, read, and interpret the map itself is defined by our cognitive abilities which are shaped under the cultural circumstances.

## OBJECTIVE

The purpose of this thesis is to investigate to what extent a cultural background influences the process of interaction (perception, attention, learning, and interpretation of the cartographic information) with a specific topographic map design.

## RESEARCH QUESTIONS

1. Do people perceive and process this information differently? Is there a presence of cross-cultural diversity? If yes, how and to what extent does cultural background influence cognitive abilities, and style?
2. What role does the topographic map design have in the process of map reading and information extraction?

## METHODOLOGY & WORKFLOW

A hybrid (qualitative and quantitative) approach was applied to address the research objectives and questions in a sensitive manner.

| Cultural and environmental determinants                    | Culture enculturation | Western (Group 1) | Asian (Group 2) |
|--|-----------------------|-------------------|-----------------|
| Psychological constructs                                   | Self-dependence       | Individualism     | Collectivism    |
|  | Cognitive style       | Analytic          | Holistic        |
| Hofstede's cultural dimensions model at the national level |                       |                   |                 |

Fig. 2 Research model used for user group division (adapted from Lacko et al.[1] and modified).

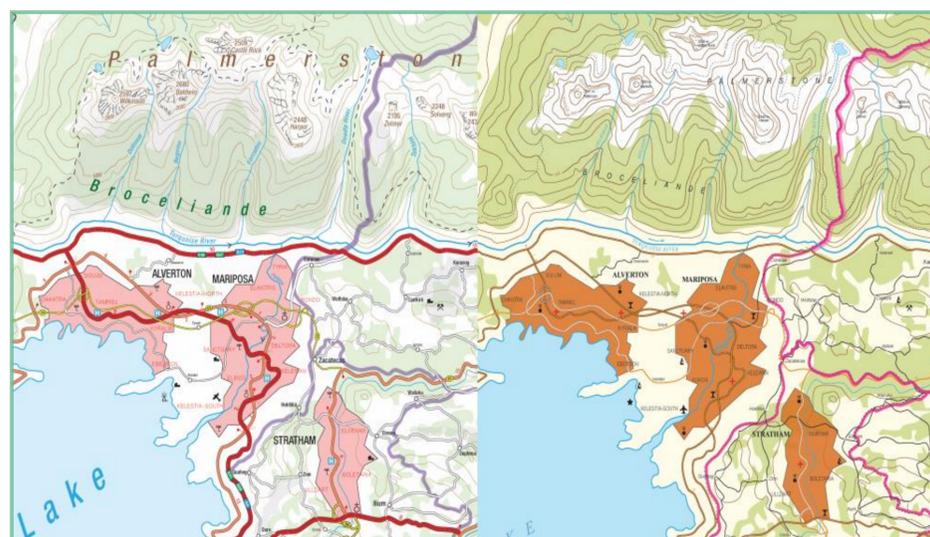


Fig. 1 Map samples (Map I and Map II) used in the experiment.

The quantitative method was aimed to convey the map-reading tasks in finding a labelled place and record the time spent on each of them. The qualitative measurements were intended to examine the aesthetic appeal of two distinct map samples and subsequently answer open-ended questions. Ad hoc map samples (see Fig. 1) whose design style was following the design guidelines of Austrian (Map I) and Kazakhstan (Map II) topographic maps were created from scratch in Adobe Illustrator. Afterwards, 50 think-aloud interviews were conducted among participants from the European and Central Asian countries. Here, the map-reading tasks and the assessment of design components were executed.

## USER GROUP

The interviewees were divided into two groups based on their background determined by cultural, environmental dimensions, and psychological constructs as illustrated in Fig.2. The first group was comprised of 25 participants from the European, and Group 2 – 25 participants from Central Asian countries.

## RESULTS

The quantitative method has revealed the significant difference in solving the map-reading tasks between Group 1 and Group 2 (overall  $t=4280$  sec and  $t=5705$  sec on Map II, respectively). No evidence was found for the hypothesis that Group 1 would perform better on Map I and Group 2 on Map II. The qualitative method results were interpreted by using a category-based content analysis involving inductive and deductive approaches. Group 1's ranking and feedback outcomes corroborate with the hypothesis that the users would highly assess and like Map I based on their experience and familiarity. Group 2 have shown contradictory results: the ranking procedure partially supported the main theory for 67% whereas the feedback procedure reported that they find Map II more attractive and „correct“.

## CONCLUSIONS

The findings serve as evidence of cross-cultural differences in map design perception. Particularly, the assessment by Group 1 highlighted the importance of cultural background whilst communicating the map. The outcomes of the qualitative data also have revealed the presence of psychological phenomena, namely, *the mere exposure, perceptual fluency, and modified two-factor model*. According to this, our experience creates and shapes our world-view. Since the content acquired from the surrounding setting (input) varies from culture to culture, we assume that “how we perceive” to some extent is influenced by cultural circumstances.

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## KEYWORDS

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## REFERENCES

- [1] Lacko, D., Šašinka, Č., Cenek, J., Stachoň, Z., & Lu, W.-L. (2020). Cross-Cultural Differences in Cognitive Style, Individualism/Collectivism and Map Reading between Central European and East Asian University Students. *Studia Psychologica*, 62(1):23-43. <https://doi.org/d7rr>.
- [2] Oyserman, D., & Lee, S. W. S. (2008). Does Culture Influence What and How We Think? Effects of Priming Individualism and Collectivism. *Psychological Bulletin*, 134(2)(311-42). <https://doi.org/ctgvpm>.
- [3] Varnum, M. E. W., Grossmann, I., Kitayama, S., & Nisbett, R. (2010). The Origin of Cultural Differences in Cognition: The Social Orientation Hypothesis. *Current Directions in Psychological Science*, 19(1)(9-13). <https://doi.org/cks2h8>.