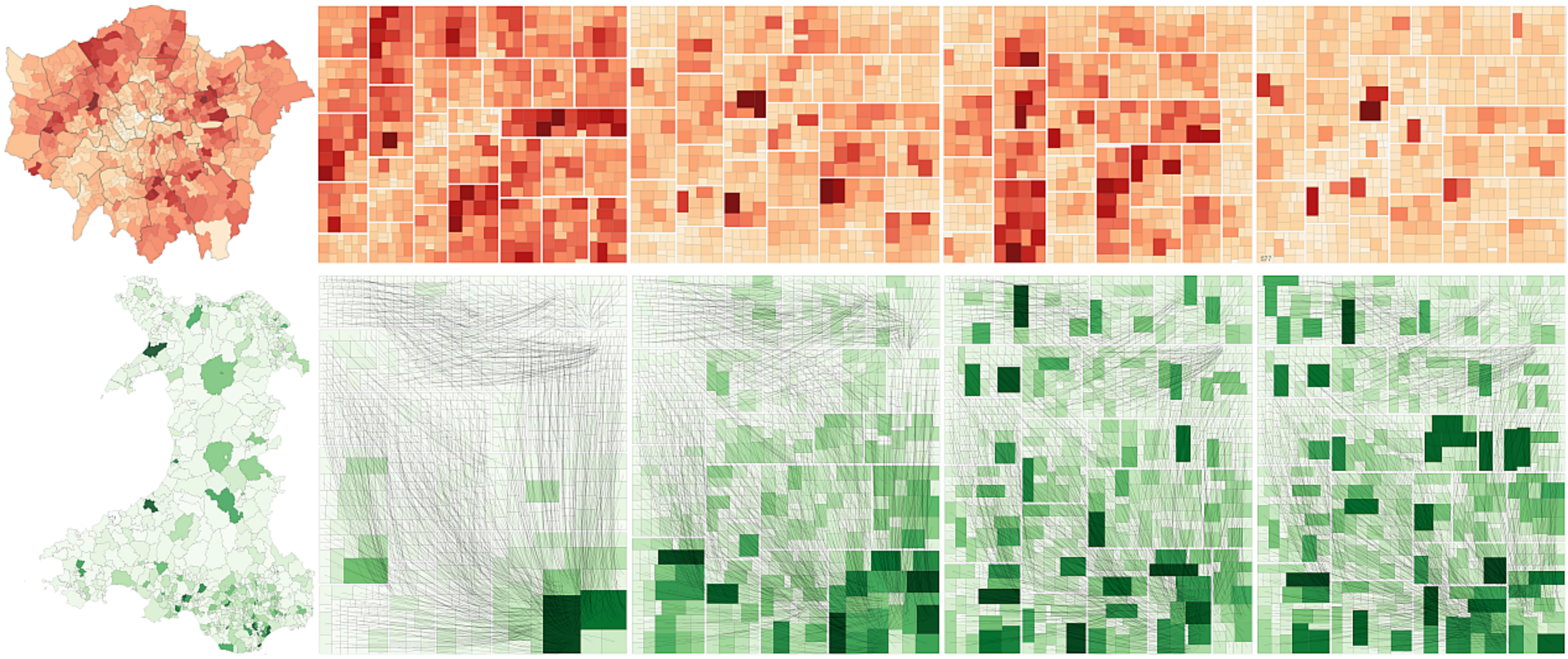
Framework for Studying Spatially Ordered Treemaps

Ali Ramathan, Jason Dykes, Jo Wood - giCentre, City University London

1) To what extent are people able to interpret data and geography in a spatially ordered treemap (SOT) by performing complex graphical perception tasks?

Which of the 4 maps to the right shows the geographic distribution of the map to the left?



Objective 1

To investigate whether people are able to make sense of SOTs & to identify the kinds of inference tasks that are suitable for such a technique.

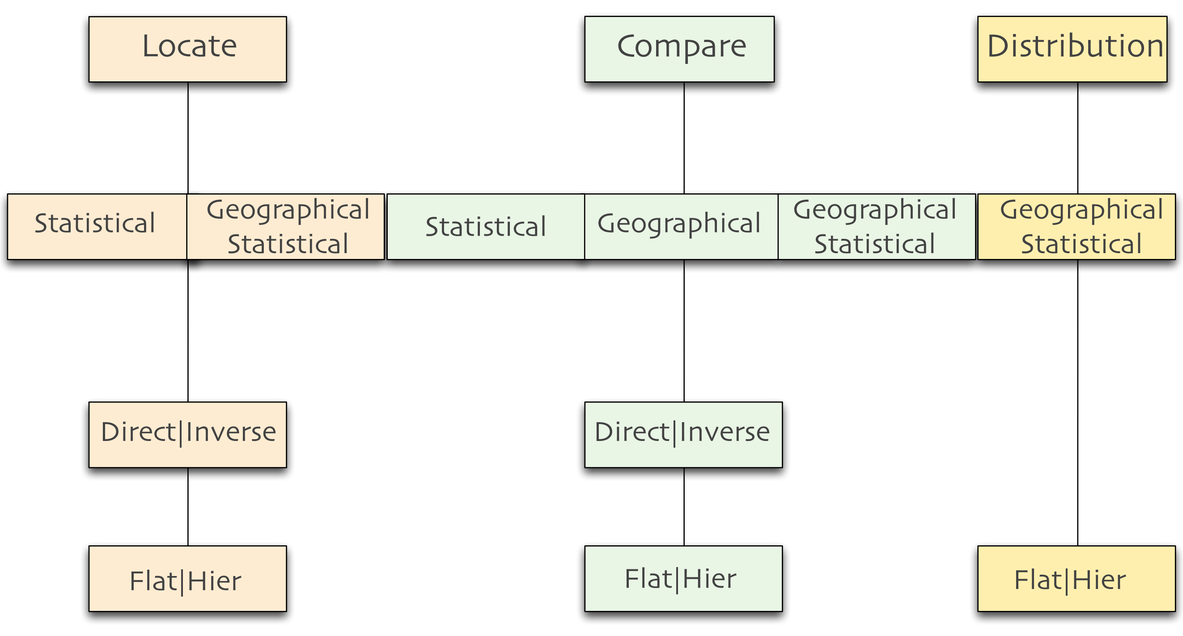
Objective 2

To investigate and identify what kind of support mechanisms & metaphors (visual indicators or morphing) are useful in supporting the process of spatial problem solving & decision making when using SOTs.

Objective 3

To investigate the effects of spatial ability; that is to examine how task performance and support mechanisms are modulated by spatial ability with respect to SOTs.

2) Tasks



There are three geographic tasks: distribution, compare and locate [2].Where appropriate each task is further divided into statistical, geographical and statistical geographical tasks. We then use the concept of direct & inverse [1] to ensure the questions are not biased towards a single way of asking. Each of the tasks are further divided to test single level maps (Flat) and/or multiple level hierarchical (Hier) tasks.

3) Hypotheses

HYPOTHESIS ONE: Statistical tasks
Ho: Choropleth(CHO) maps will perform better than SOT on statistical tasks;
H1: SOT will perform better than CHO on statistical tasks.

HYPOTHESIS TWO: Geographical tasks
Ho: CHO maps will perform better than SOT on geographical tasks;
H1: SOT will perform better than CHO on geographical tasks.

HYPOTHESIS THREE: Statistical Geographical tasks
Ho: CHO maps will perform better than SOT on statistical geographical tasks;
H1: SOT will perform better than CHO on statistical geographical tasks.

HYPOTHESIS FOUR: Hierarchical tasks
Ho: CHO maps will perform better than SOT on hierarchical tasks;
H1: SOT will perform better than CHO on hierarchical tasks.

HYPOTHESIS FIVE: Effects of spatial ability
Ho: Subjects with better scores in the spatial ability test will outperform subjects with poor scores in the spatial ability test in the perceptual tasks;
H1: Spatial ability has no effect on perceptual tasks.

References

[1] Andrienko, N., and Andrienko, G. Exploratory Analysis of Spatial and Temporal Data Systematic Approach. Berin: Springer, 2006.
[2] Bertin, J. Smiologie Graphique Paris: Edition Gauthier-Villars, 1967.

Contact: alir@soi.city.ac.uk

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