Towards appropriate representations of quantitative data in virtual environments
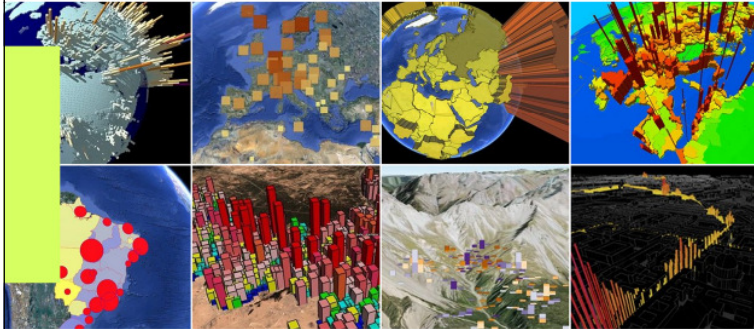
Susanne Bleisch

10th March 2011, GeoViz, Hamburg

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proportional symbols in 3D
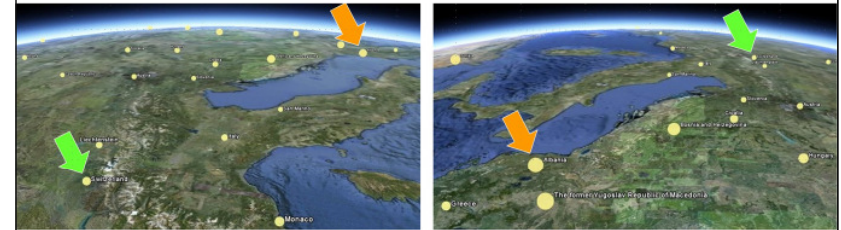
child mortality (children < 5 years) in Switzerland and Albania

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values (child mortality per country) as circular symbols in the virtual environment Google Earth (created with Thematic Mapping Engine), green arrow = Switzerland, orange arrow= Albania; both displays show the same data but from two different viewpoints

Which circle is bigger? How much bigger? Any precise estimations possible?

2
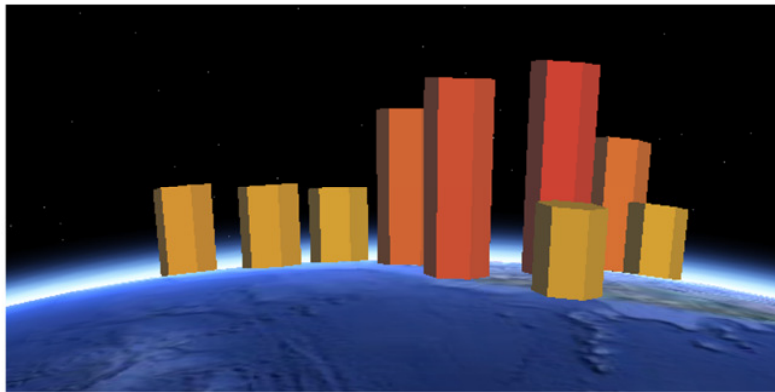
exemplary data set (Brasilia, created with GE-Graph)

quantitative values are represented through the length of hexagonal three-dimensional bars

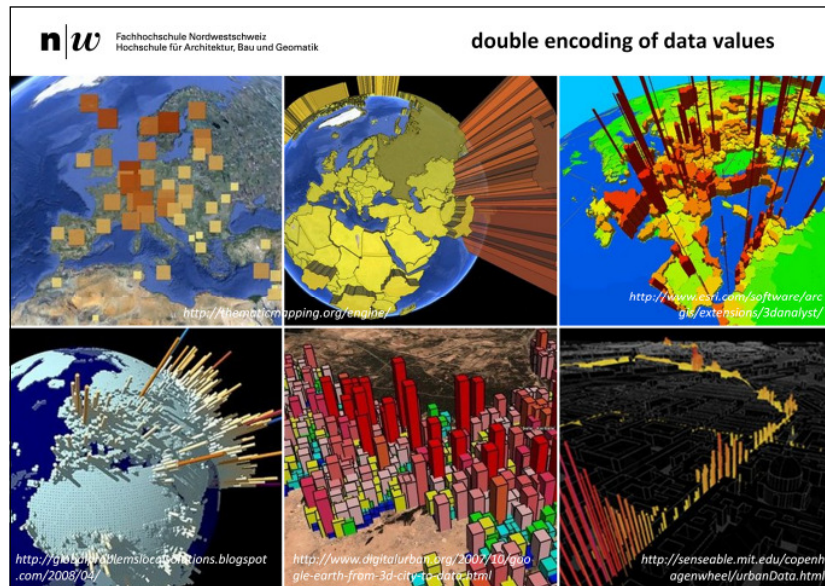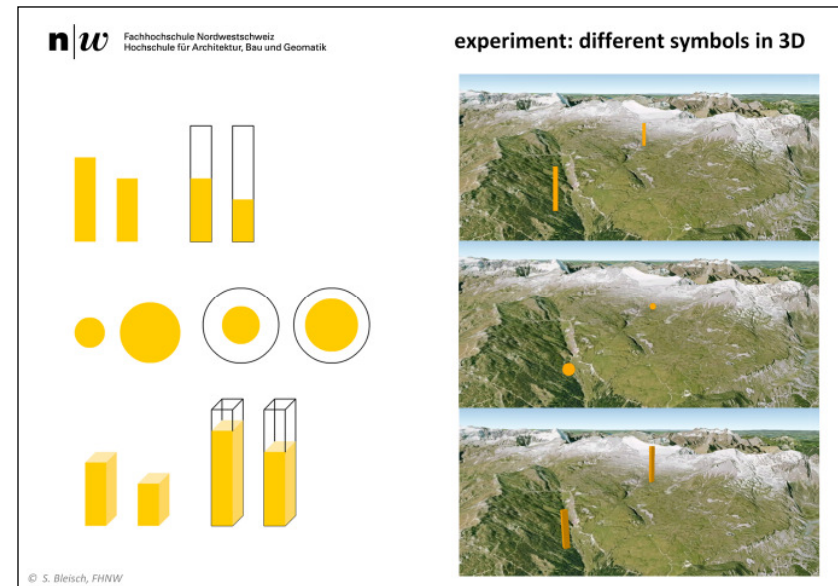Can you compare them? Are they better than circular symbols?

same data visualisation from a top view

now colour is needed to differentiate the values -> double encoding

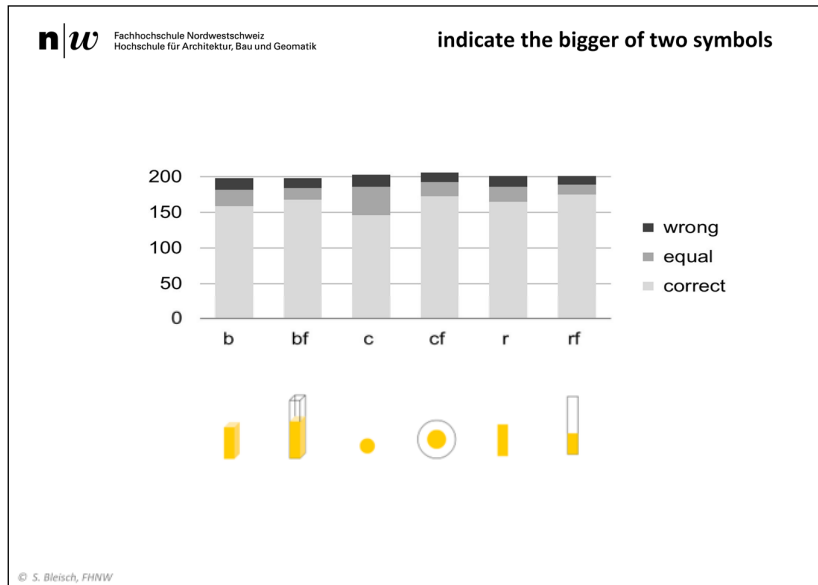double encoding is often used for displaying quantitative values in virtual globes / virtual environments;

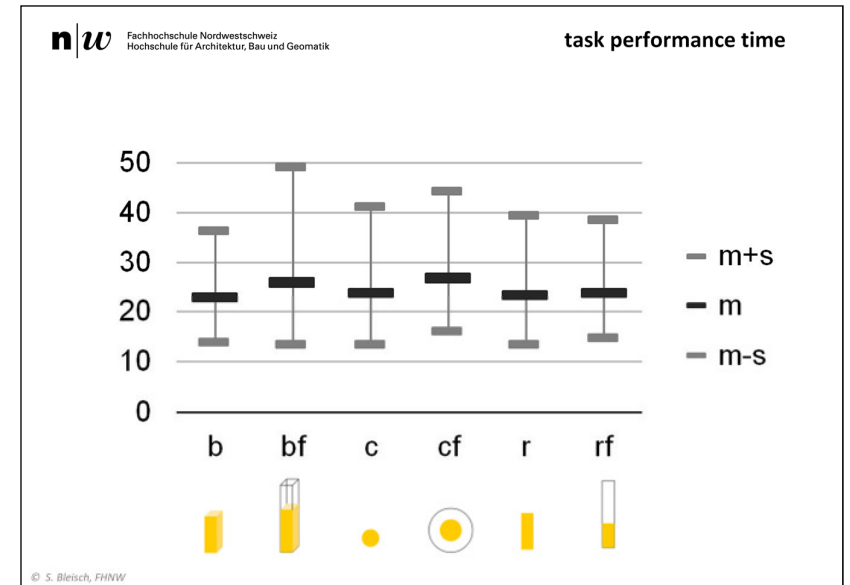-> size is not enough/does not work?

test of three different symbols (2D bars, circles and 3D bars) with and without references frames
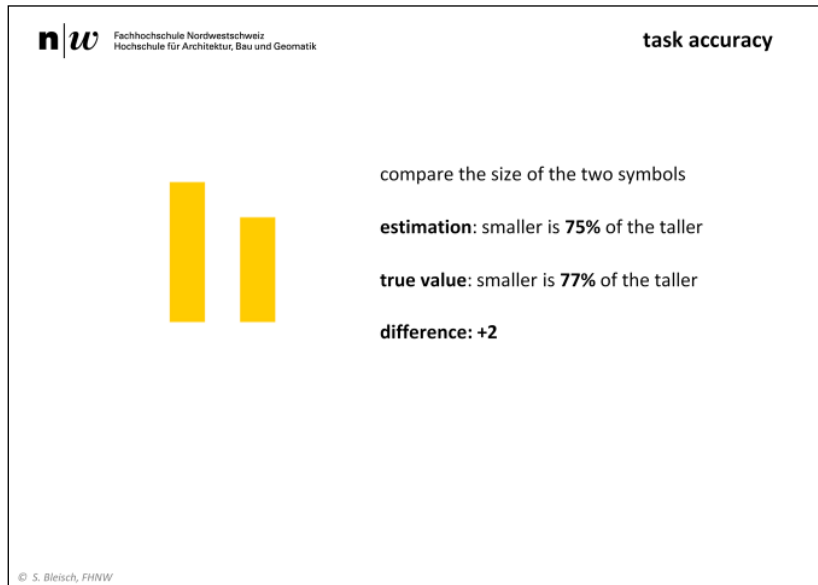
experiment with 2 tasks
- indicate the bigger of the two symbols
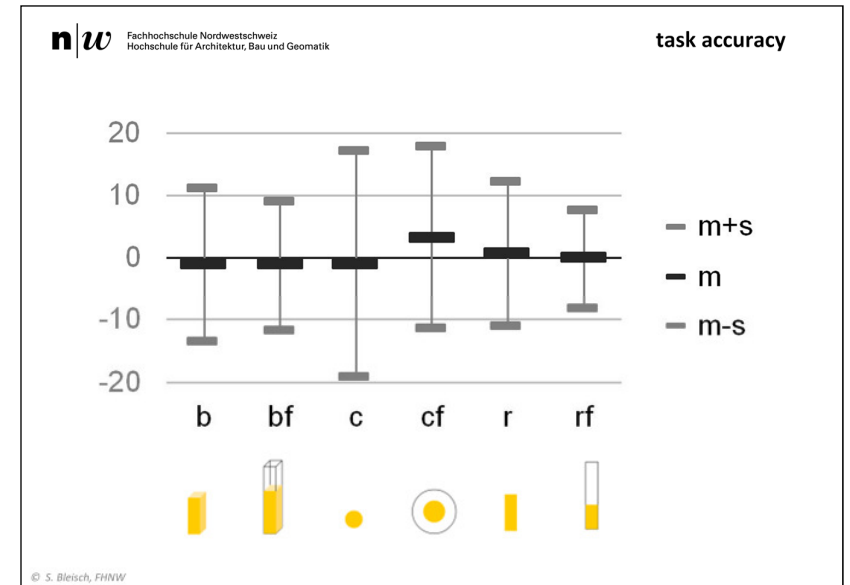- compare the size of the two symbols

circles without frames: least effective for detection of the larger of two symbols
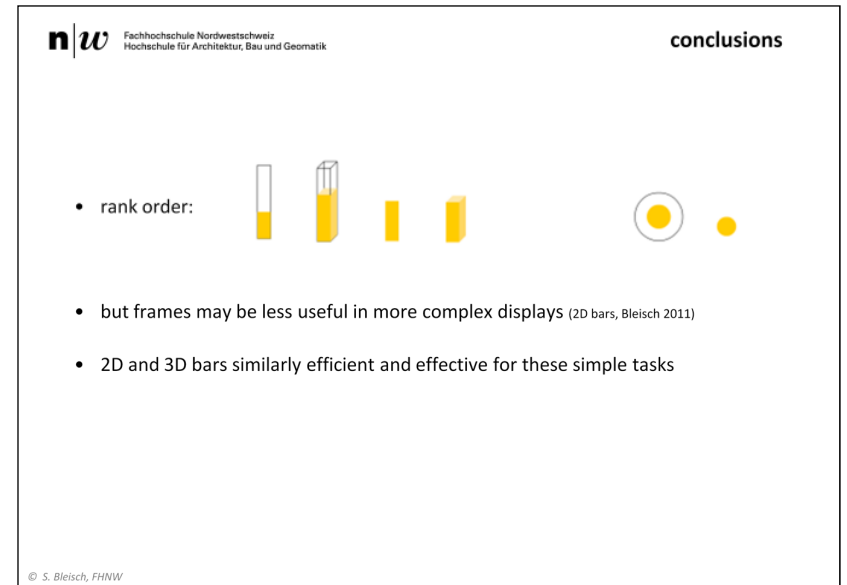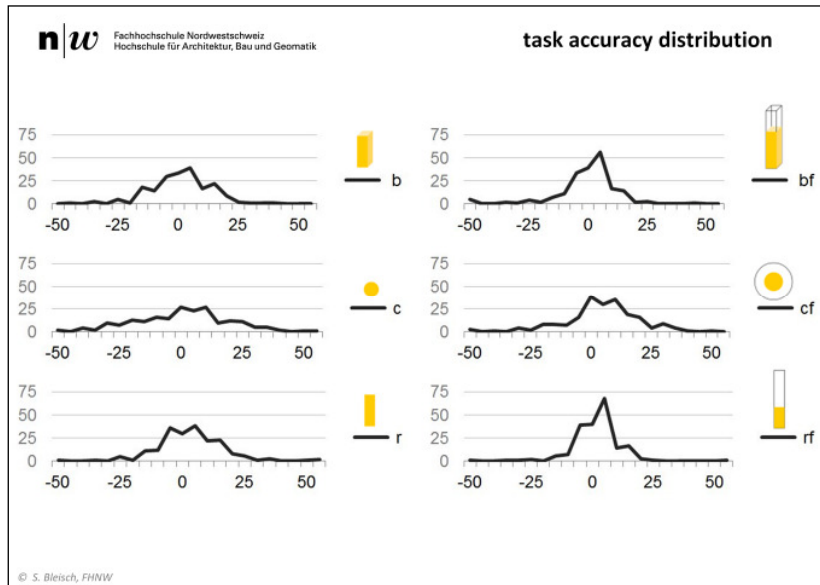
means of task performance times are higher for symbols with frames

the closer the difference to zero the more accurate the task result

higher for 3D bars and 2D rectangles but not for circles

higher for 2D bars, than for 3D bars than for circles

task accuracy distribution

conclusions

- rank order:

- but frames may be less useful in more complex displays (2D bars, Bleisch 2011)

- 2D and 3D bars similarly efficient and effective for these simple tasks

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Thank you!

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