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PRESENTATION
FROM THE

ICA JOINT WORKSHOP



Olomouc
Czech Republic
April 27–30, 2018



Atlases & Cognition & Usability



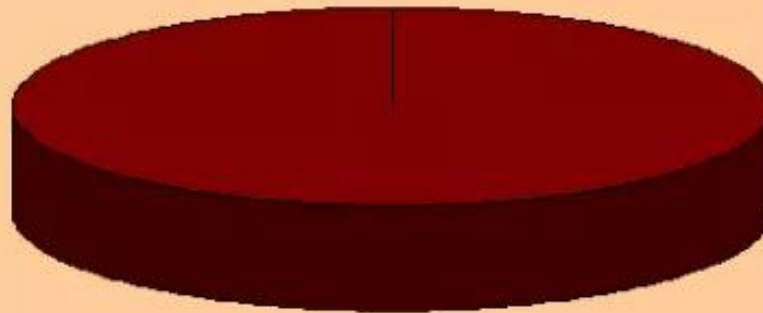
Death to 3D pie charts? Hold on a second.

Raimund Schnürer, Martin Ritzi, Arzu Çöltekin, René Sieber, Lorenz Hurni

ICA Joint Workshop, Olomouc

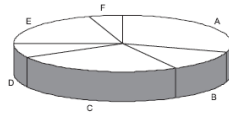
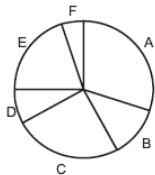
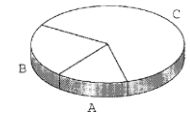
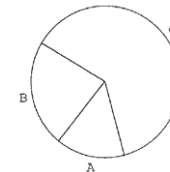
29.04.2018

**Should you ever use a
3D pie chart?**



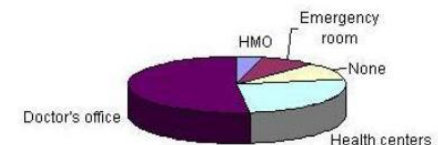
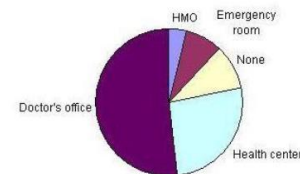
No

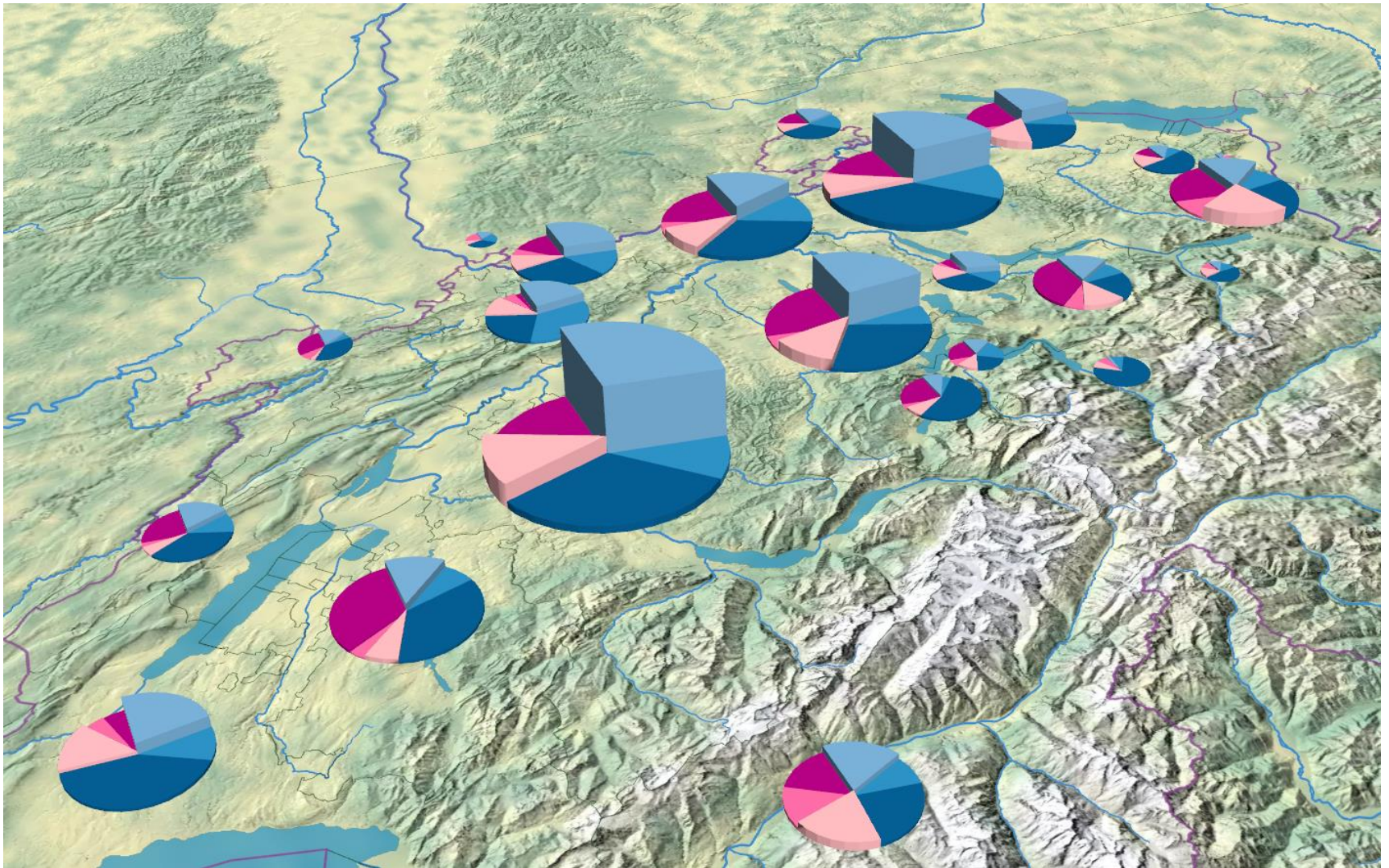
“Subjects’ estimates were better for 2-D pie charts than for 3-D pie charts.” (Siegrist 1996)



“[...] strong evidence has been put forward that 3-D pie charts can distort the data significantly. Far better then to use a 2-D pie chart which does not distort the data!” (Rangecroft 2003)

“[...] 3D displays appear to work as well as 2D displays, but they do compromise comprehension of pie charts.”
(Schonlau & Peters 2012)





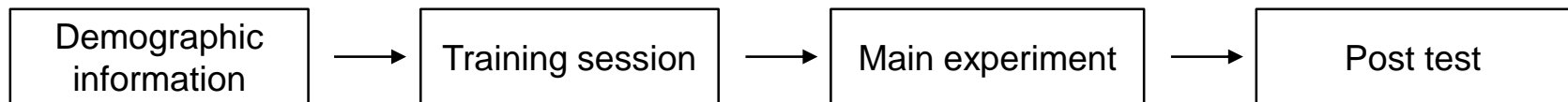
Atlas of Switzerland – online: Automatic wood-fired heating systems



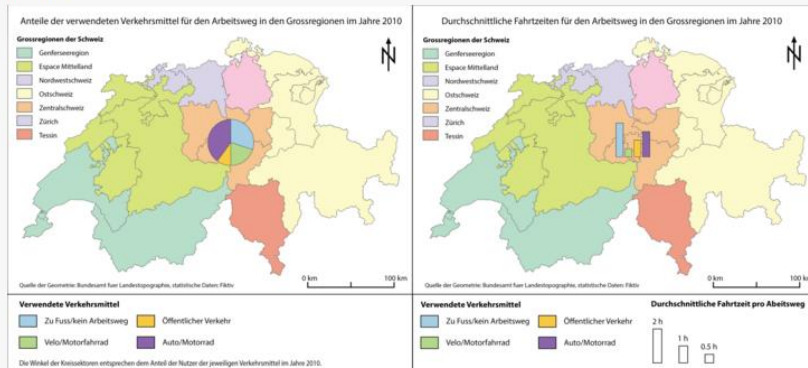
VS.



- 181 adults aged 19–77 (M=32 years)
- Online survey

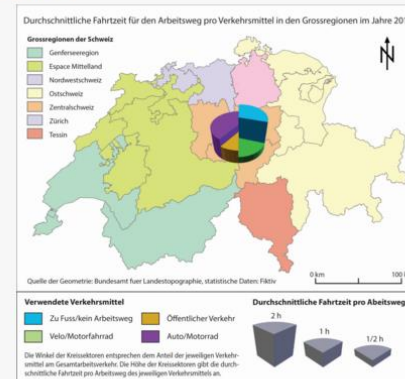


★ Welchen Anteil am Gesamtverkehrsaufkommen hat das Verkehrsmittel mit dem zeitlich durchschnittlich längsten Arbeitsweg?



10% 20% 30% 40%

★ Welchen Anteil am Gesamtverkehrsaufkommen hat das Verkehrsmittel mit dem zeitlich durchschnittlich längsten Arbeitsweg?



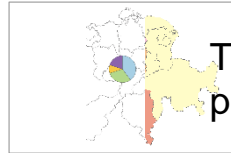
10% 20% 30% 40%

Example question: Which share of the whole traffic volume has the transportation means with the longest travel time?

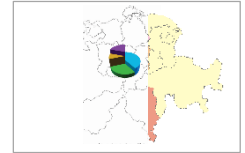
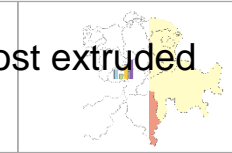
Group A

Group B

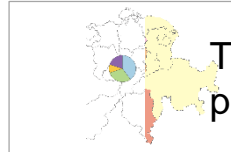
Highest magnitude



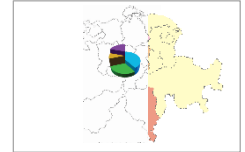
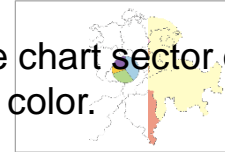
Tick the color of the highest bar or the most extruded pie chart sector.



Estimate proportion



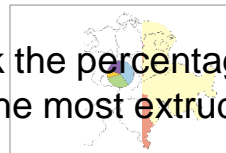
Tick the percentage of a pie chart sector or an extruded pie chart sector in a certain color.



Groups A & B

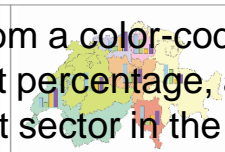
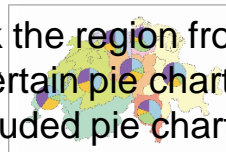
Combination task

Tick the percentage of a pie chart sector from the highest bar or the most extruded pie chart sector in the same color

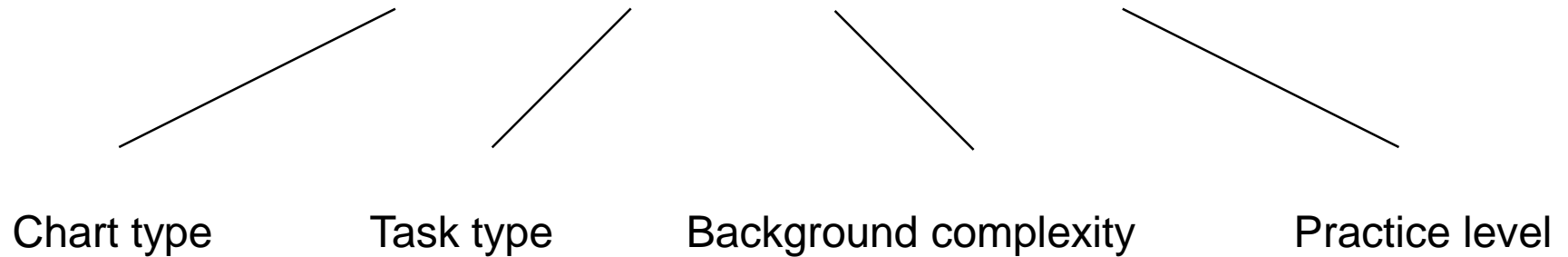


Map-related task

Tick the region from a color-coded means of transportation, a certain pie chart percentage, and the highest bar or most extruded pie chart sector in the same color.

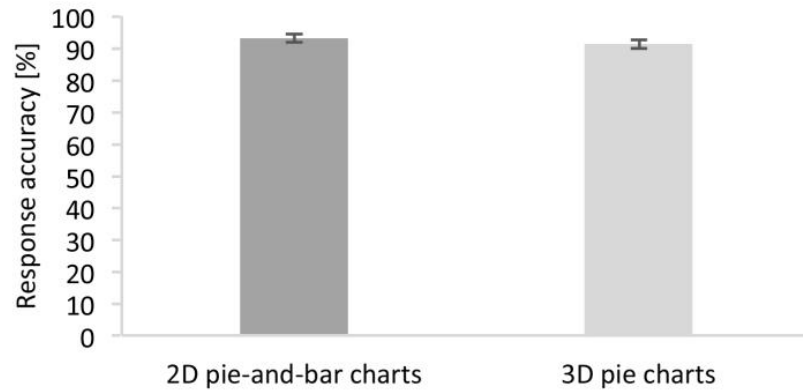


Independent variables

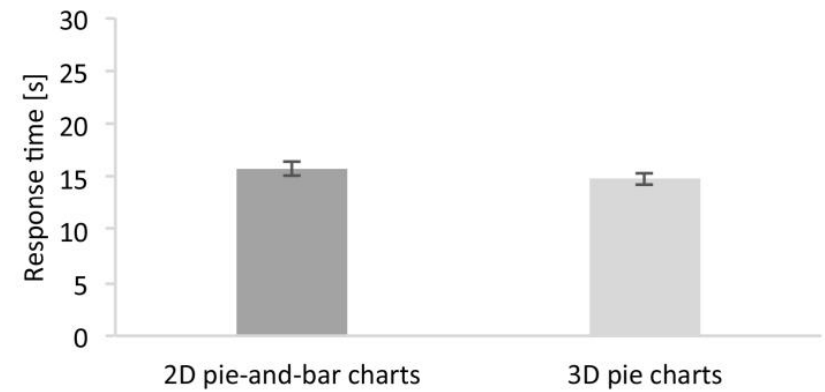


Dependent variables

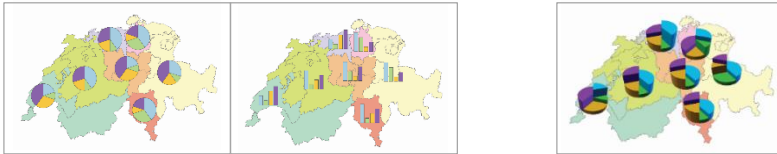




Overall effectiveness



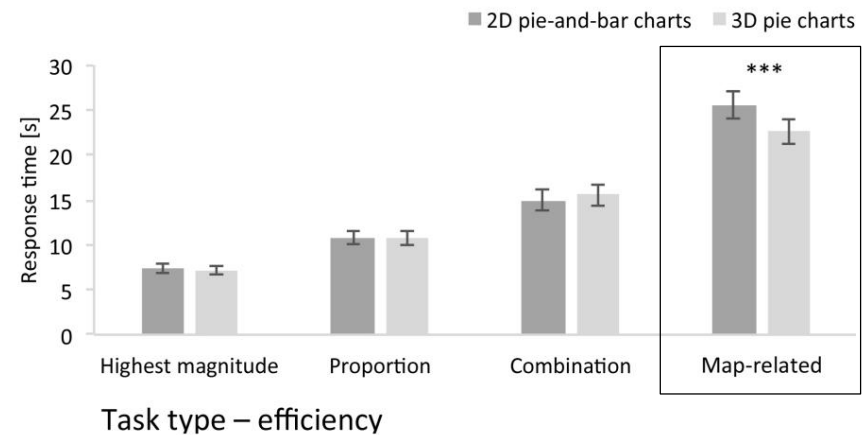
Overall efficiency

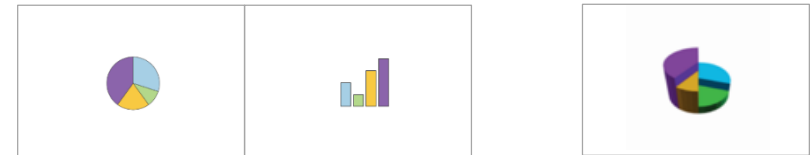
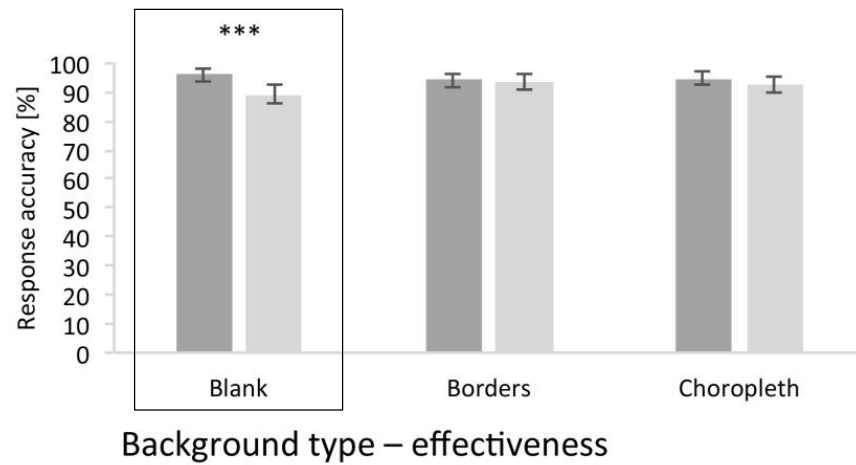


Which NUTS-2 region has the following properties:

- the highest average travel time for “car/motor bike”
- and a share of 40% on the traffic volume for “car/motor bike”?

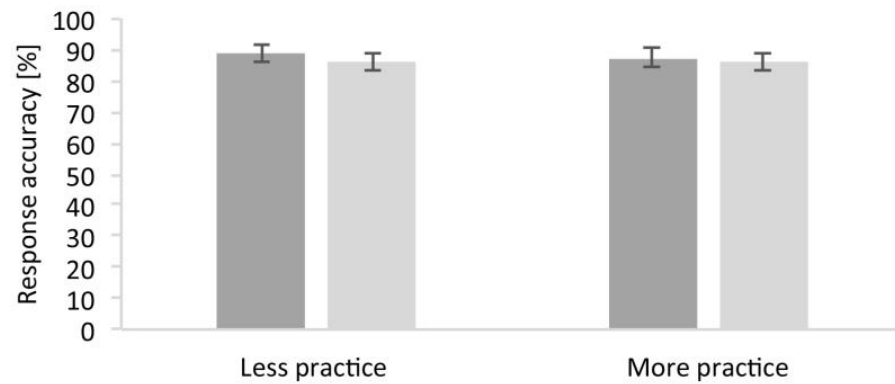
Answer: Northwestern Switzerland



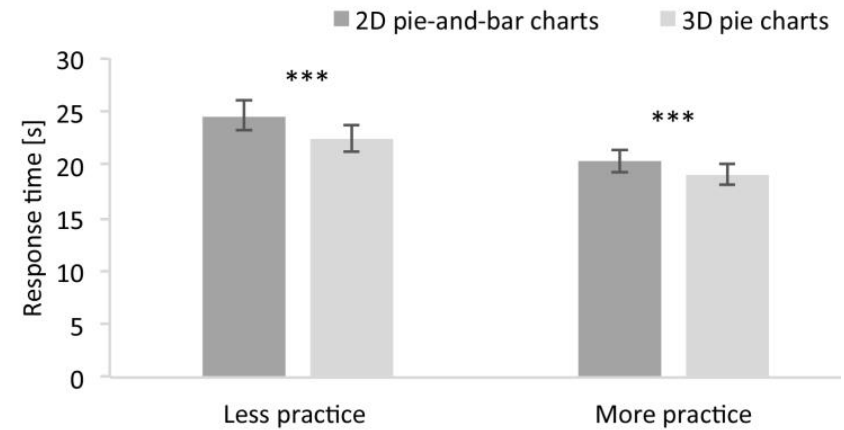


Which share of the whole traffic volume has the transportation means with the longest travel time?

Answer: 40%



Practice level – effectiveness



Practice level – efficiency



No differences for highest
magnitude and proportion task

Higher efficiency for **map-related
task**

Higher effectiveness on **blank
background** for combination task

Higher efficiency for **less and
more practiced participants** for
combination and map-related task

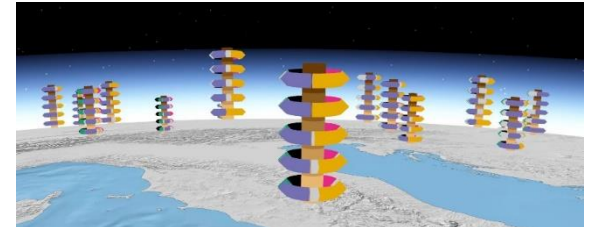
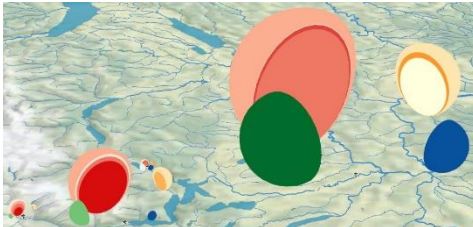
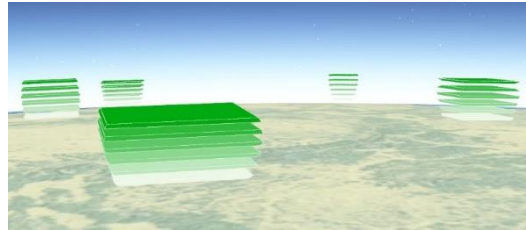
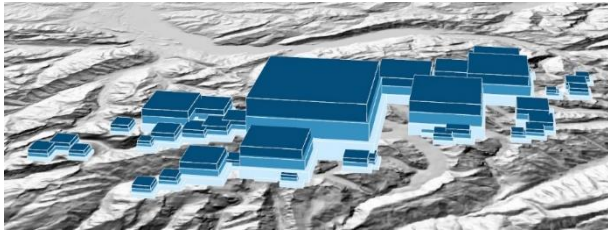
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- More 3D chart types
- Color distances within chart and versus background
- Sector proportions (min, max, intermediate)
- Dynamic environment (panning, zooming, rotating)
- Other comparison techniques (data lense, swipe tool)
- Different experimental setup (time limit, eye tracking)



Thank you for your attention!

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