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Where do you typically check the map during your navigation route?

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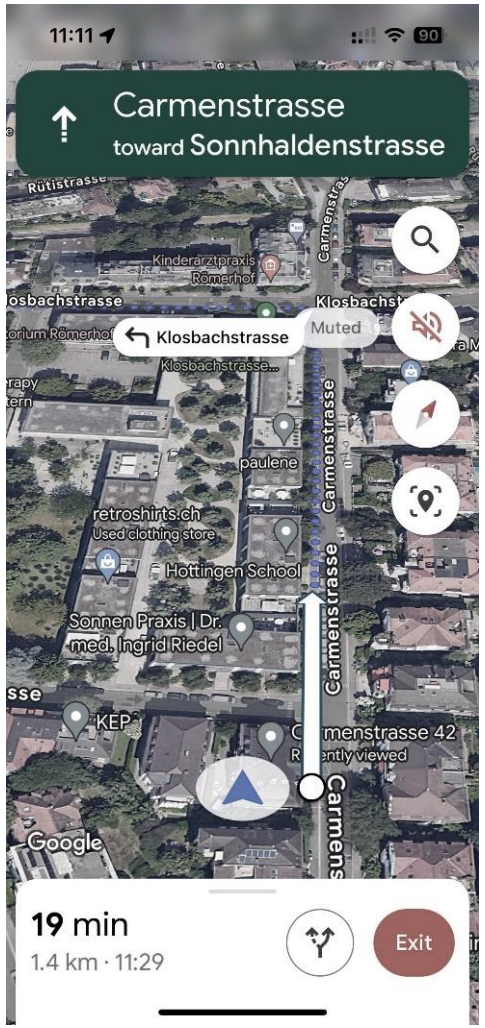


Turn by turn navigation

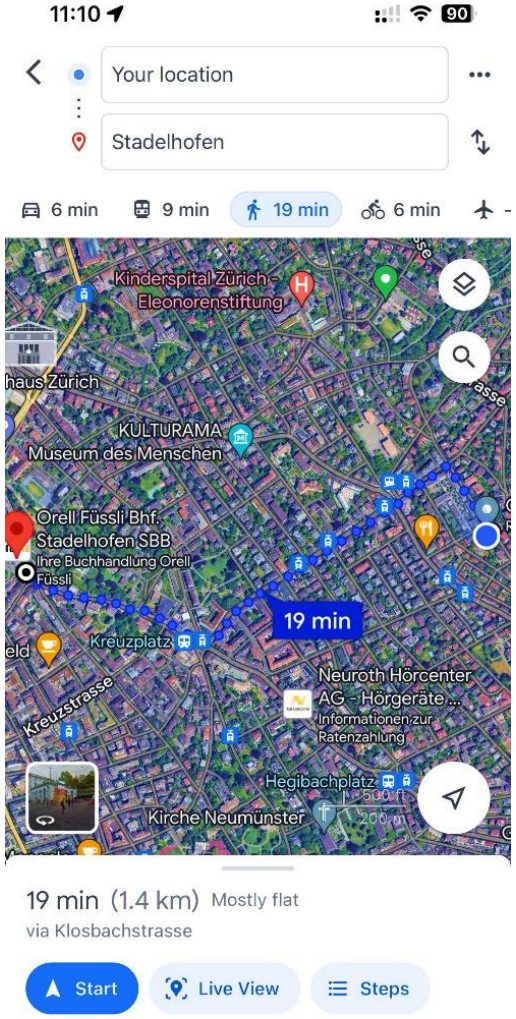
- Not optimal for pedestrian navigation.

Turn-by-turn guidance have made users **overly reliant on such guidance** and impaired their independent wayfinding ability. *[1]*

Turn-by-turn navigation system **negates route learning** and impairs scene recognition.*[2]*

……

Useful paradigm for **assisting people with visual impairments** during mobility. *[3]*



Map Based navigation

- Pedestrian tend to use Map Based navigation

- Question:

Where do you typically check the map during your navigation route?

……

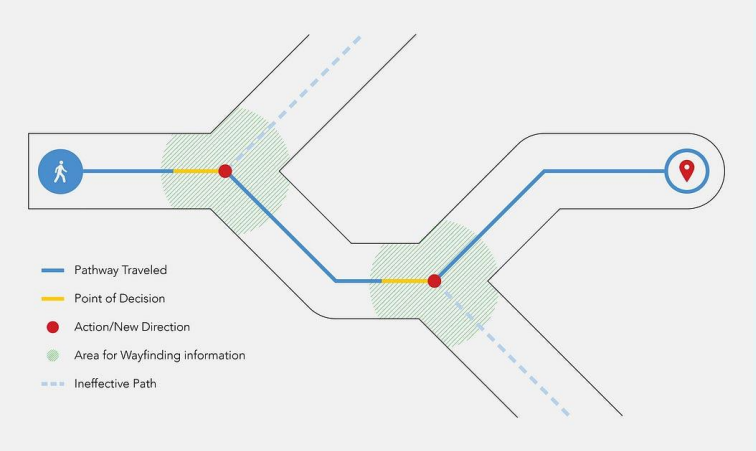
Decision points not sufficient for the more complex domain of pedestrians. *[7]*

• Decision Points

Knowledge of routes is represented as a sequence of **intersection-based choice points** where procedural decisions must be made. *[4]*

People consistently implicate **intersections** as critical decision points. *[5]*

Path segments between intersections are distinctly non-decision-related. *[6]*
(**Argue**: It may be non-decision-related, but there are many interactions between pedestrian and map in this process.)



Source: Medium_Written by Joseph Mackereth

• Decision Senses *[7]*

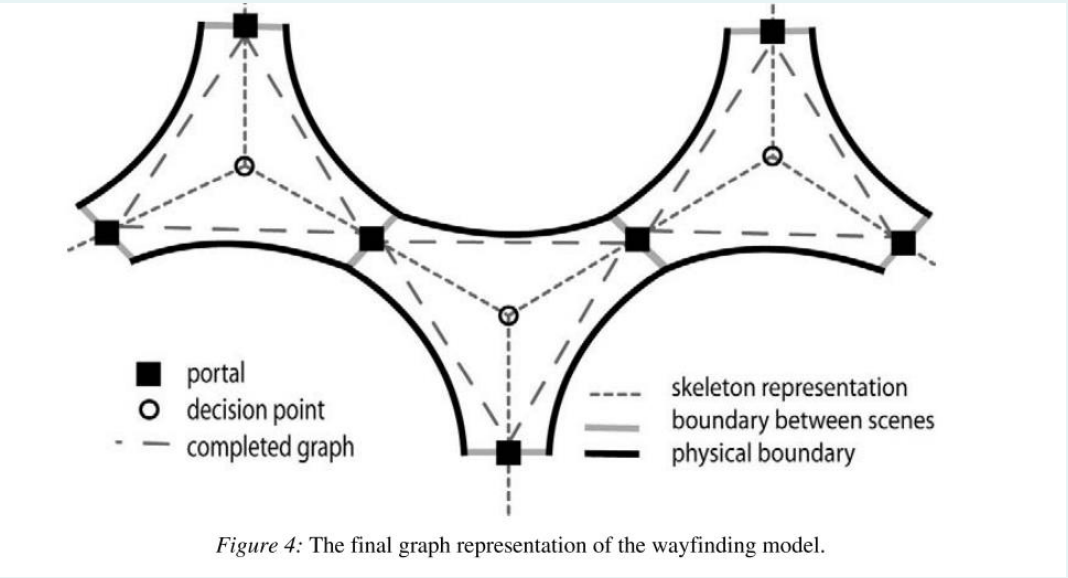


Figure 4: The final graph representation of the wayfinding model.

- Deciding whether to continue straight or turn involves a dynamic distributed decision-making process. People tended to make the request within path segments, not intersections.*[5]*

Back to Question:

Where do you typically check the map during your navigation route?

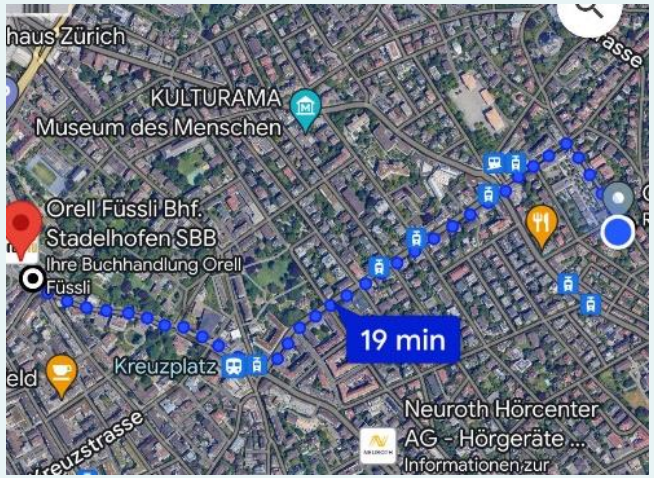
- **Decision Senses Still not sufficient**
- If people are unsure whether the current route is correct, pedestrians must frequently **confirm their current walking route** with the planed route during the process of navigation.*[8]*
- **People require information between those decision points** in order to maintain his trust in the information source and his confidence and orientation throughout the route.*[9]*

- **Environment (Route) Learning from spatial perspectives**

- **Environment Learning(EI) from spatial perspectives** *[10]* **:**

Environment learning can be achieved through map study or through direct experience with the environment.

Map Study(check map in navigation)



Metacognition
Monitor&Control

Route Experience(without map checking)

EI is Goal-directed manner.
Focus on Navigating Goal. (In our case)

- **EI Research Gap** *[10]:*

Explored the nature of EL within spatial perspectives independently.
Less studies on switching or combining Map Study and Route Experience.

EL research limited participants' ability to choose and/or switch between spatial perspectives freely.
Hard to examine how metacognition affects how participants switch between different perspectives in EL.

Back to Question:

Where do you typically check the map during your navigation route?

Understanding the spatial distribution of **Map Study** and **Route Experience** during the navigation process can be very effective in helping us answer this question.

- **Potential Research Questions**:

1. How are the two spatial perspectives learning, **map study** and **route experience**, **distributed** in a navigation route?

2. What are the factors that affect perspective switching in a navigation process? (e.g. environment complexity, metacognitive monitoring, individual differences in spatial skills).

3. How effective is **predicting the distribution** of the two spatial perspectives in a route using machine learning methods for individuals? (Each participant has 16 navigation routes, when give a new navigation route, could we predict where is map study and route experience segments for this individual?)

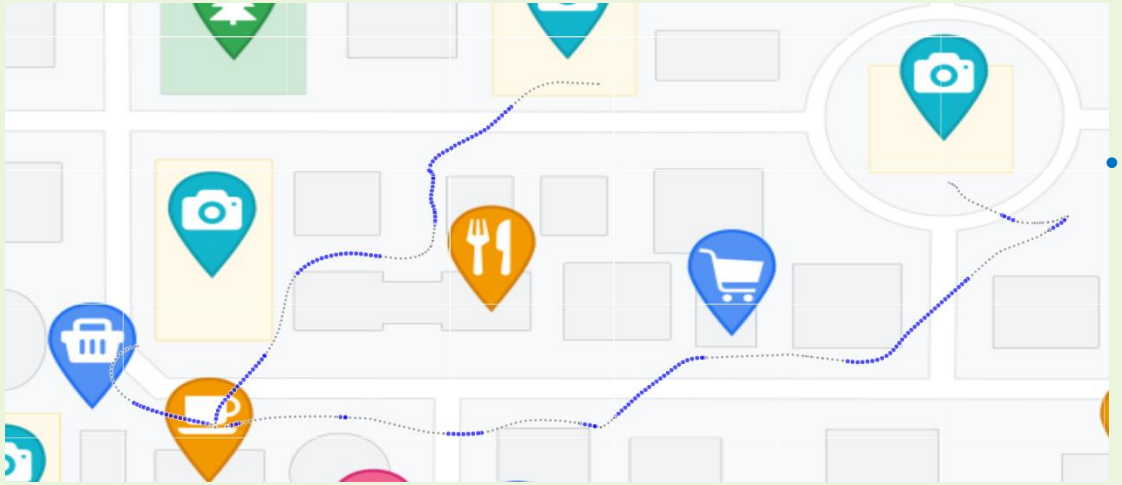
4. How do monitoring and control in metacognition interact during navigation route learning? *(Spatial Cognition, Psychology)*

- **How to apply our data to research question (Interactive Visualization):**

Map Study(check map in navigation) ⇩ **Duration of screen unlocked**

Route Experience(without map checking) ⇩ **Duration of screen locked**

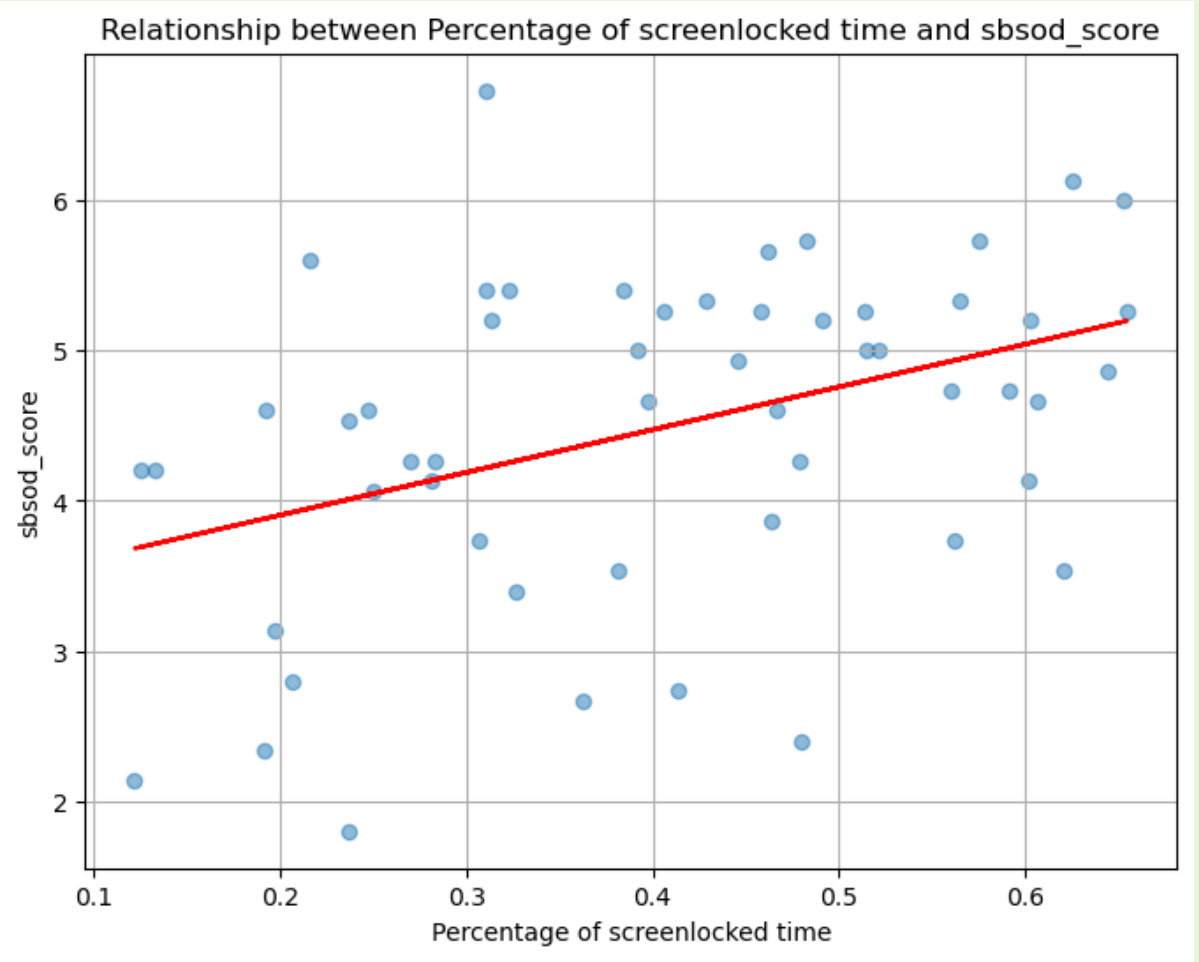
1. How are the two spatial perspectives learning, map study and route experience, distributed in a navigation route? *(Spatial Science)*



- Locked screen(Route experience)

- **How to apply our data to research question (Interactive Visualization)**:

2. What are the factors that affect perspective switching in a navigation process? (e.g. environment complexity, metacognitive monitoring, individual differences in spatial skills)



- **Potential Limitations:**

Is it rigorous to consider two spatial perspective learning by distinguish the screen lock or unlock?

Map Study(check map in navigation) ⇩ **Duration of screen unlocked**

Route Experience(without map checking) ⇩ **Duration of screen locked**

- **Alternative:**

Only focus on the process of screenlocked. Because people may have undetected map check while screenunlocked, but we can definitely say they do not check map while screenlocked.

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