Increasing the Density of Local Landmarks in Wayfinding Instructions for the Visually Impaired

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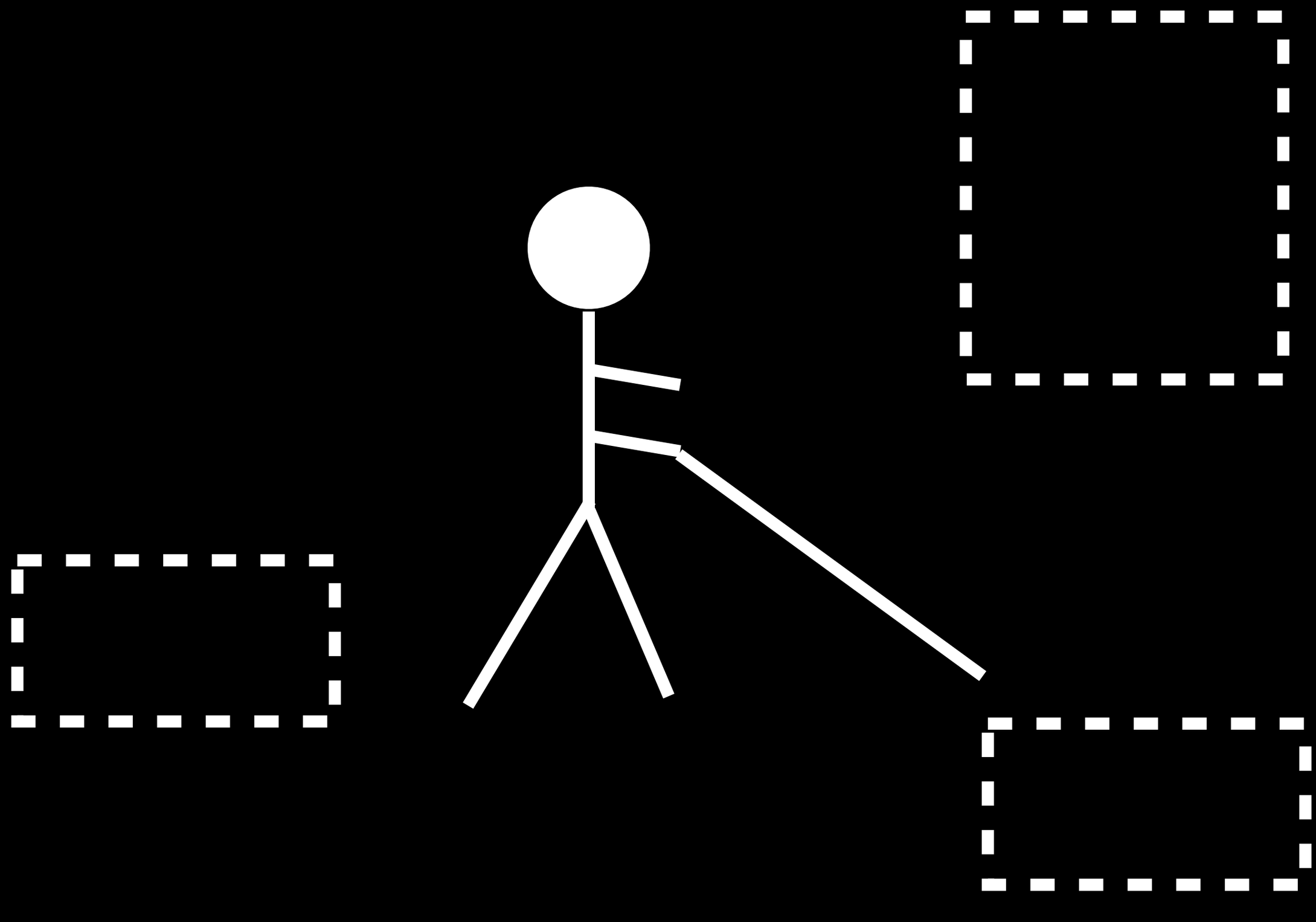
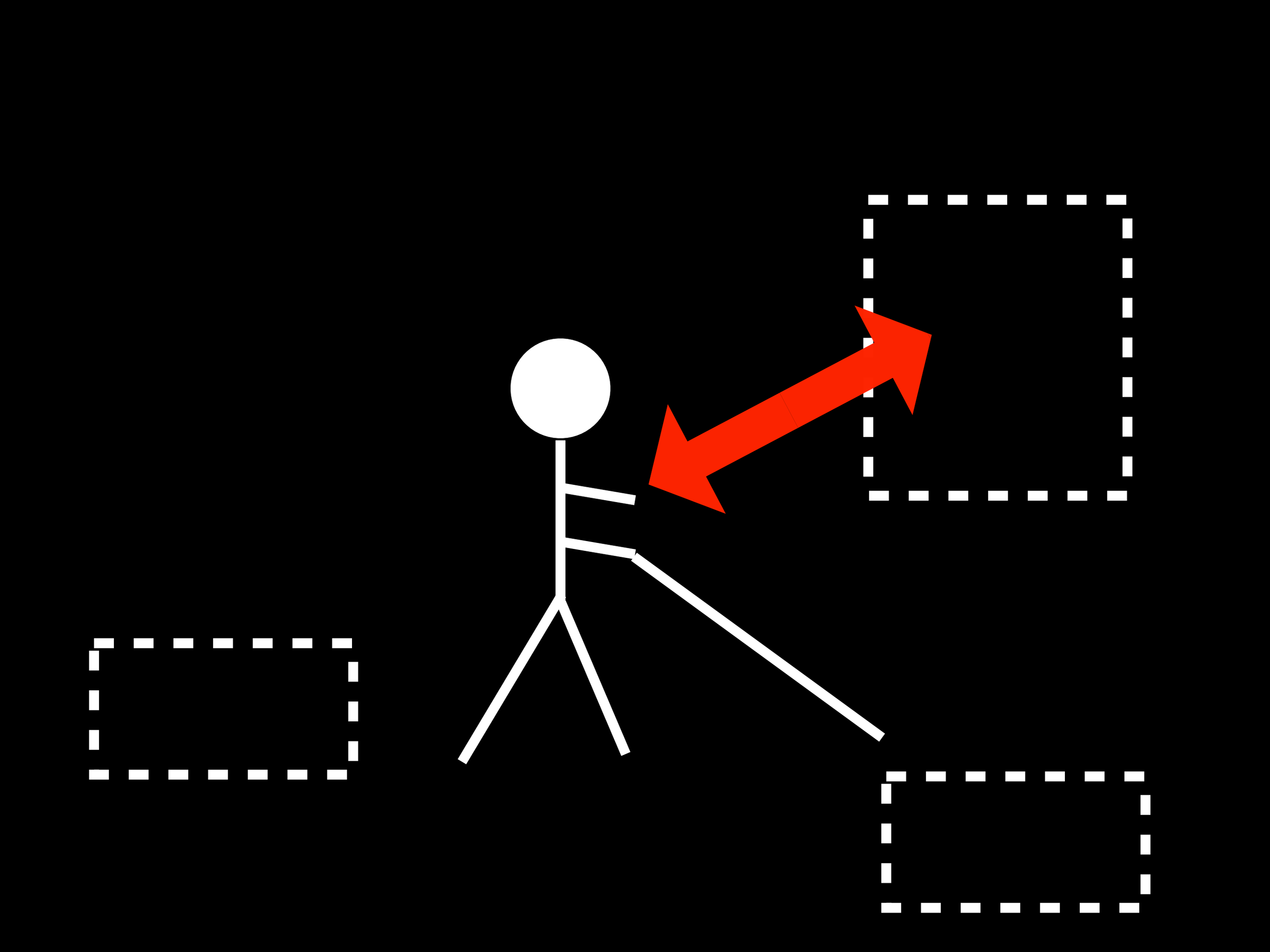
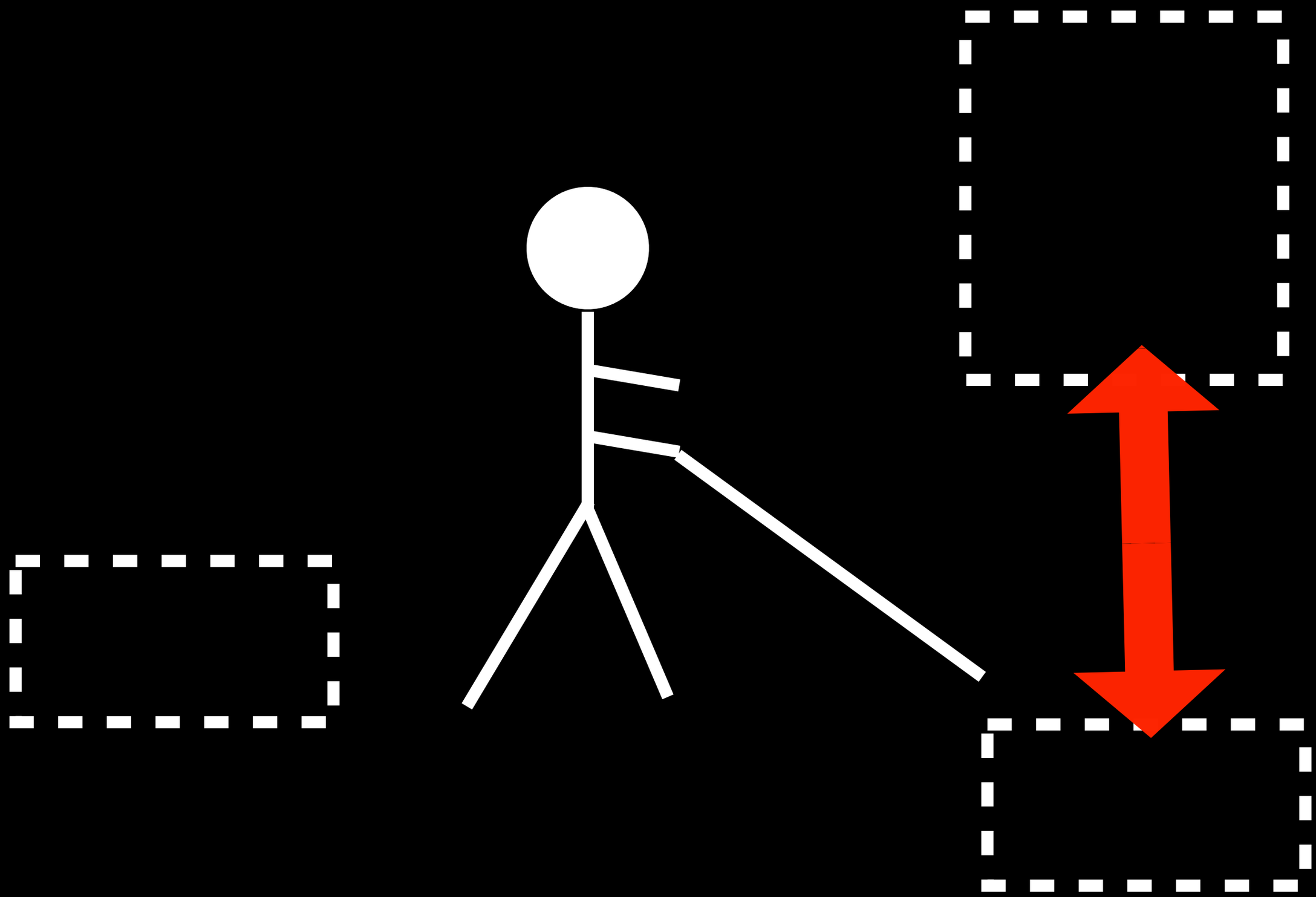
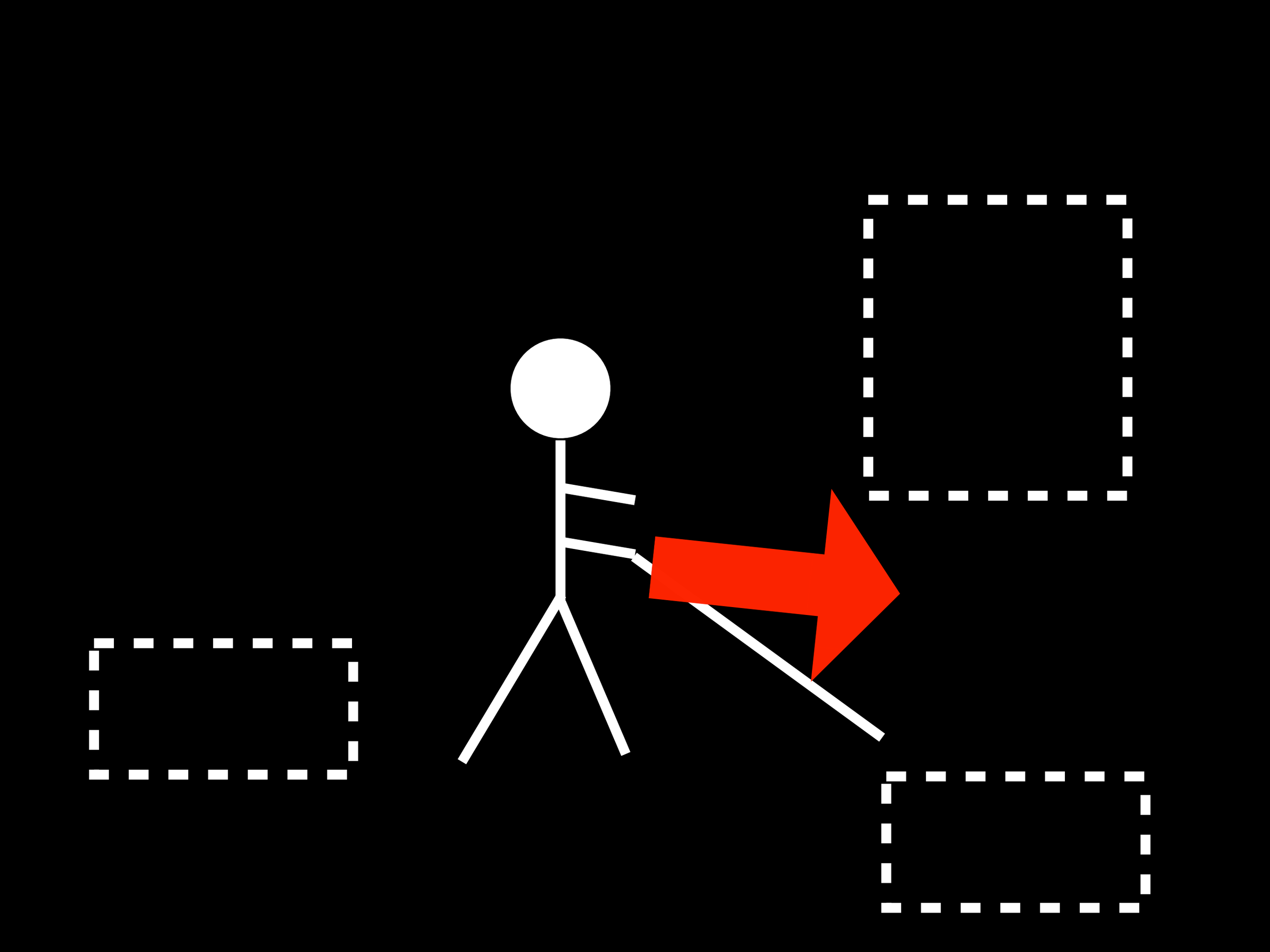
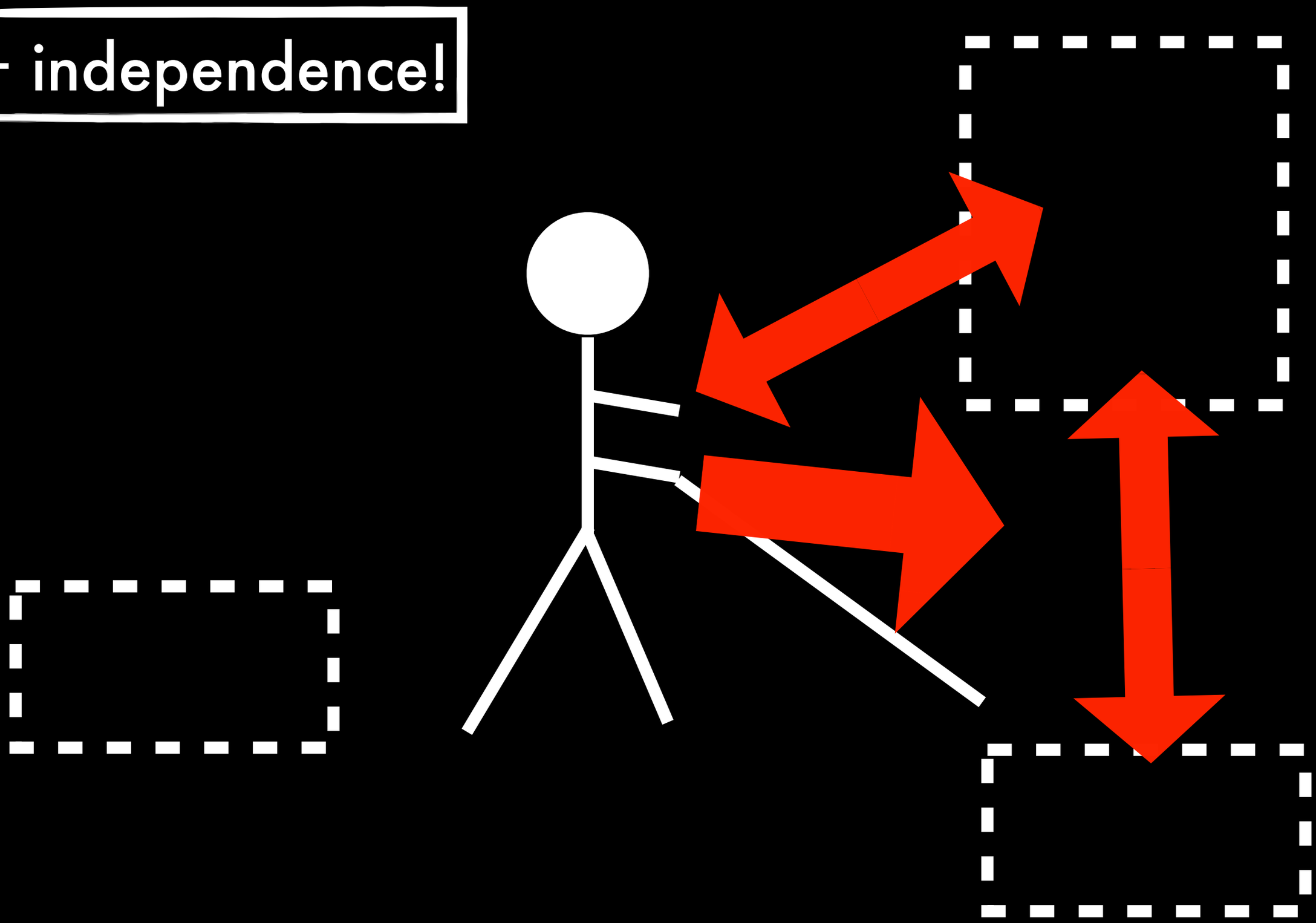






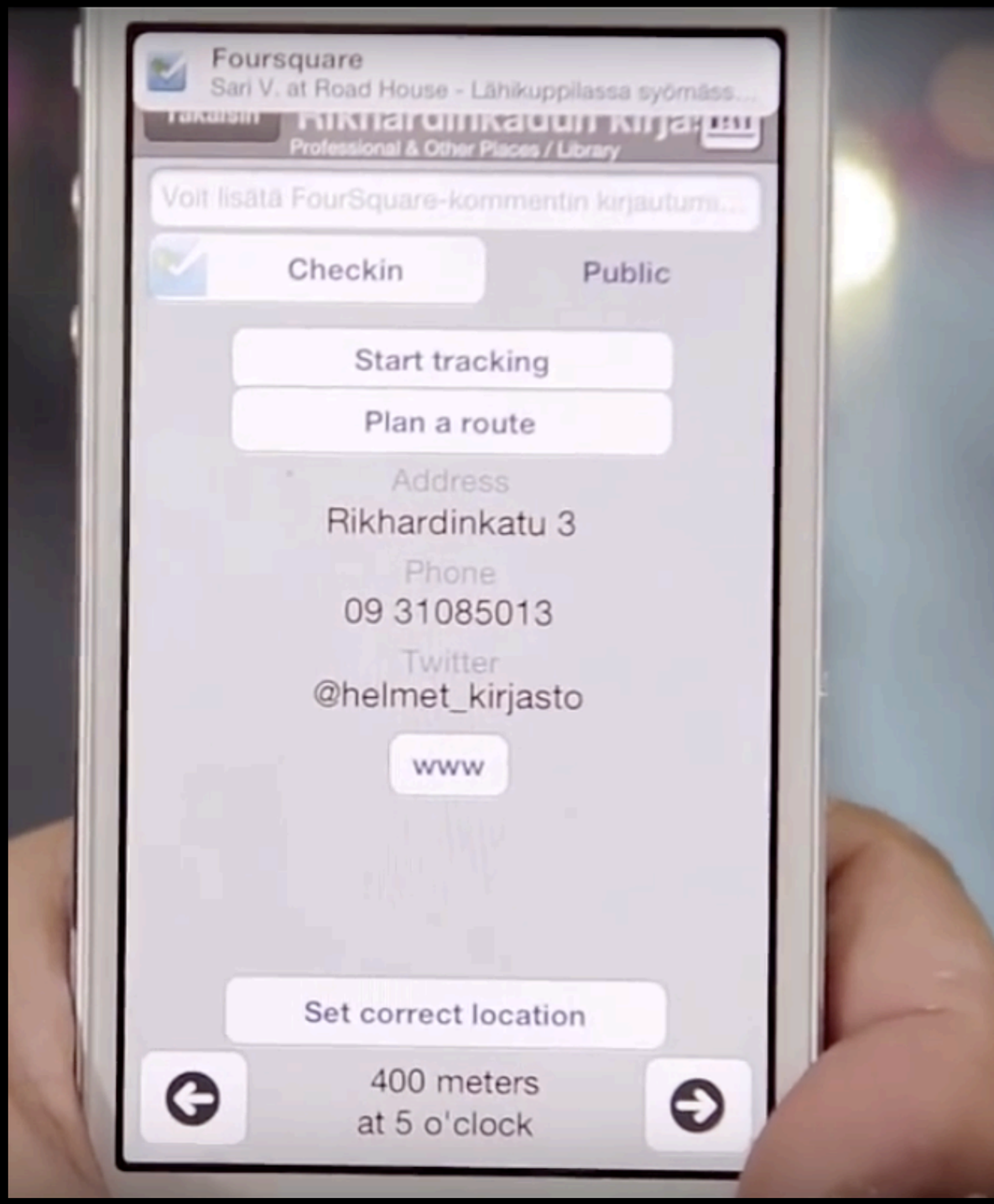


+ independence!



‘Spatial Displays’ - Loomis et al.
http://www.geog.ucsb.edu/pgs/multimedia.htm

AriadneGPS



BlindSquare

Page | Discussion

OpenStreetMap Funding D

OSM for the blind

Availa

· Deutsch · **English** · français · italiano · polski · русский · 日本語

Oth

OSM is the map for everything and everyone, so some projects hav

OSM for the blind is the name of this group of projects.

Contents [hide]

- Main Page
- The map
- Map Features
- Contributors
- Help
- Blogs
- Shop
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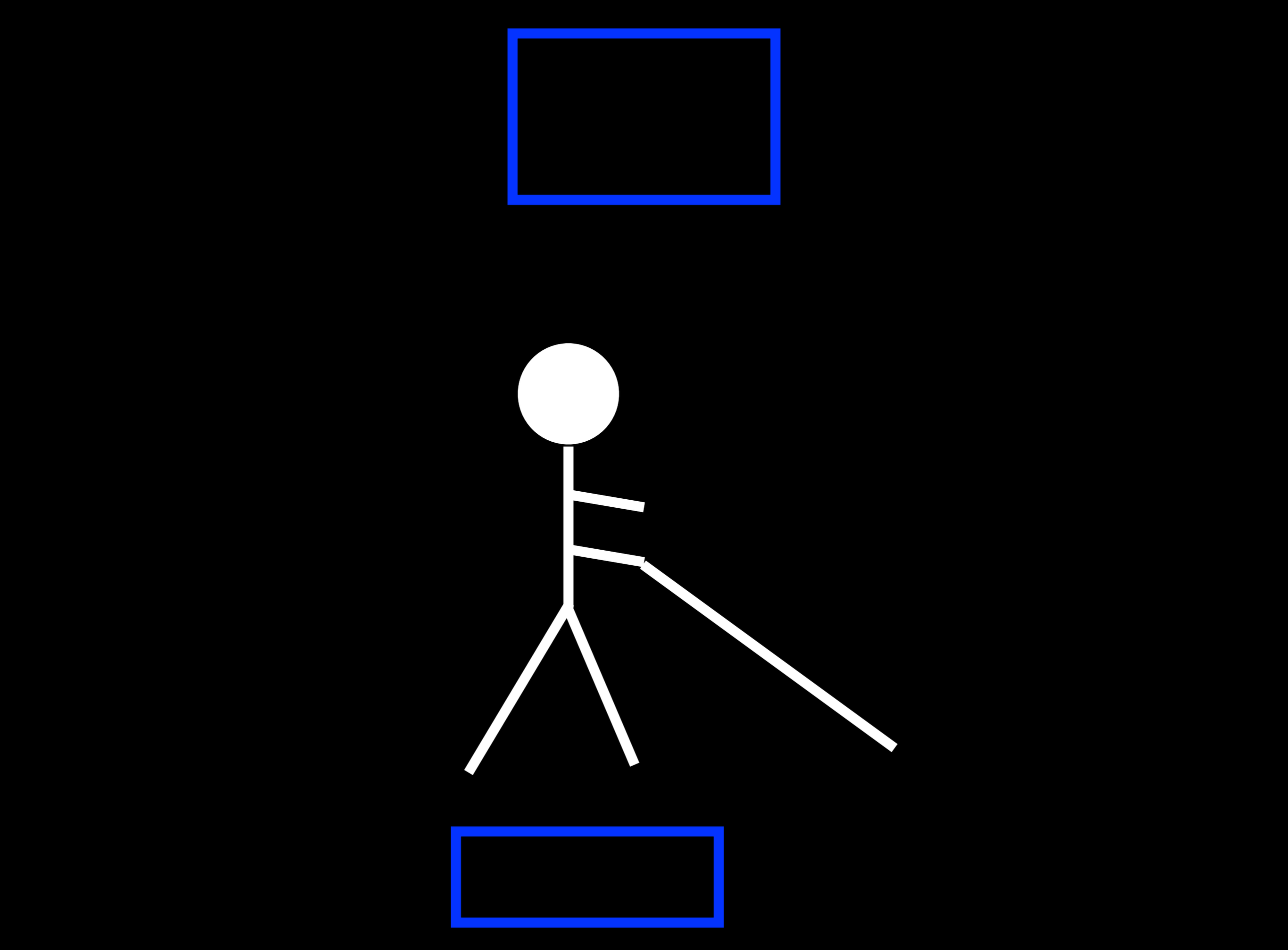
Tools

Ben's Cafe

Joe's Cafe



Our Questions:

Can we increase the density of objects relevant to the for visually impaired?

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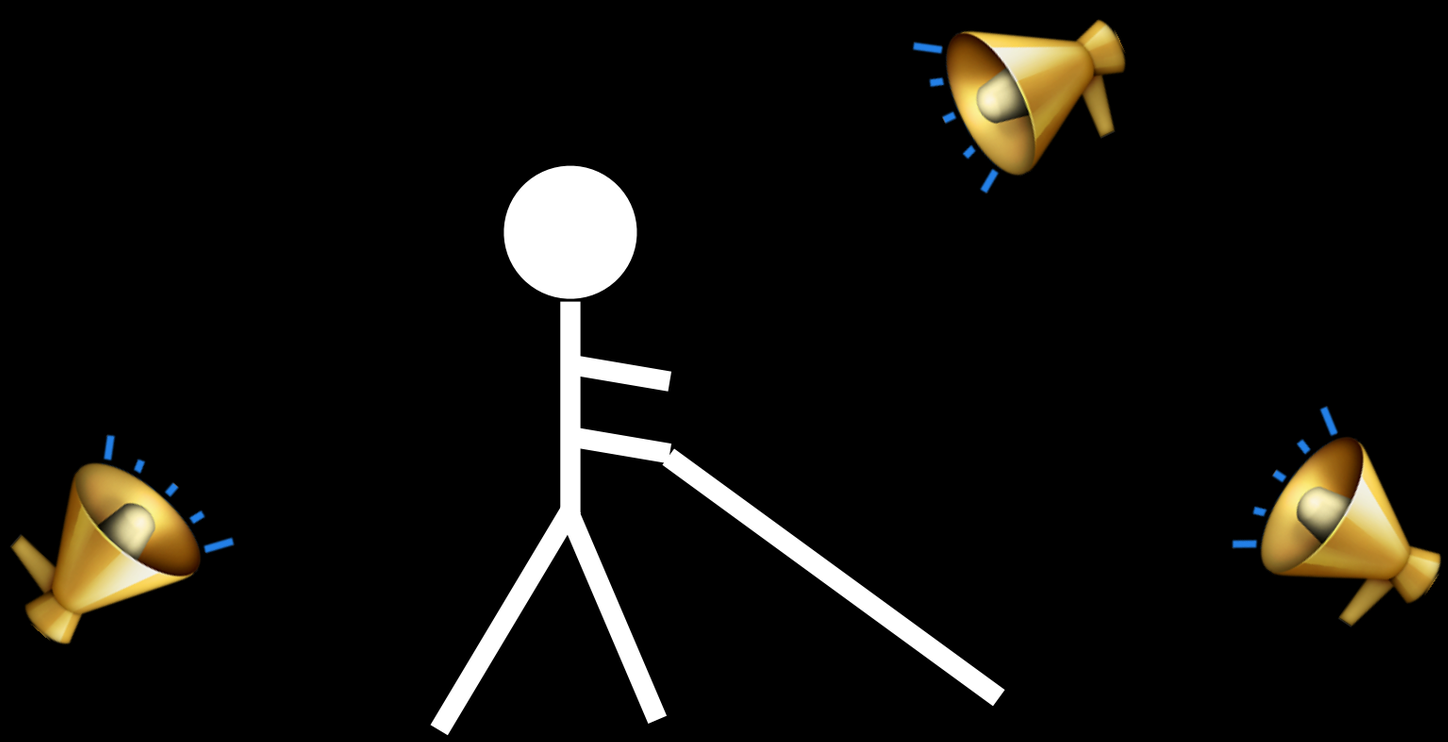
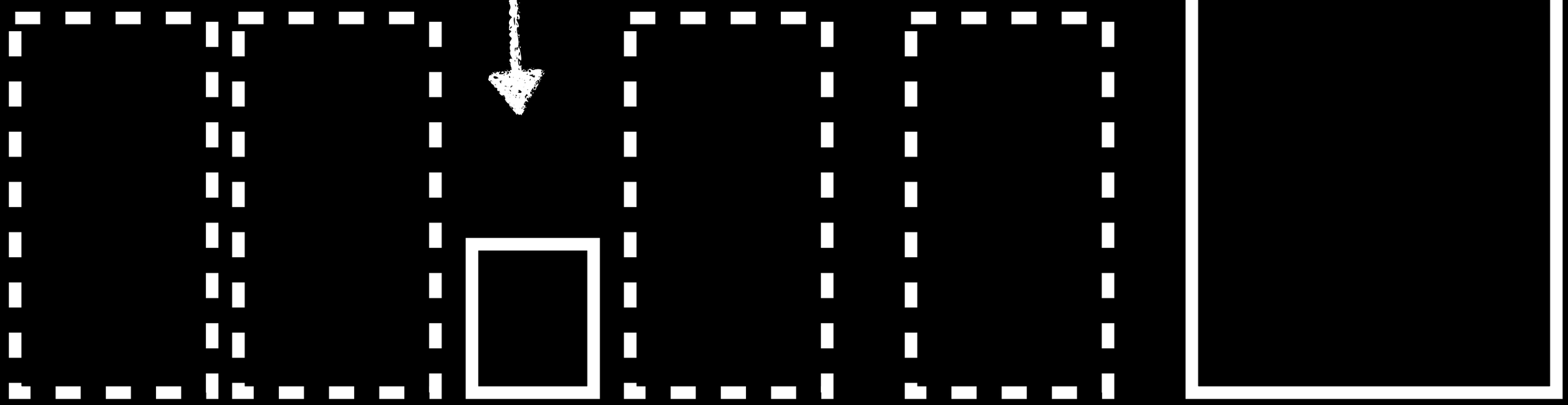
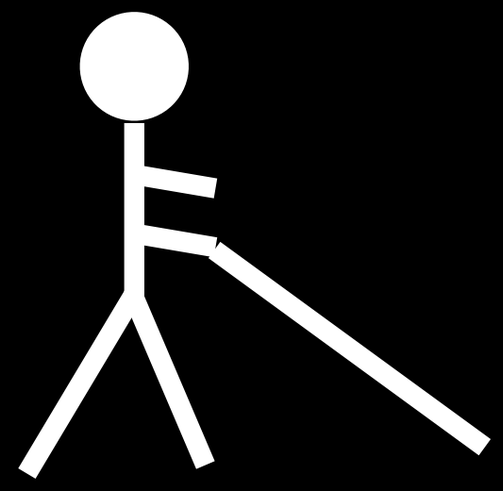
Can we increase the density of objects relevant to the for visually impaired?

Will this negatively affect the complexity of audio instructions?

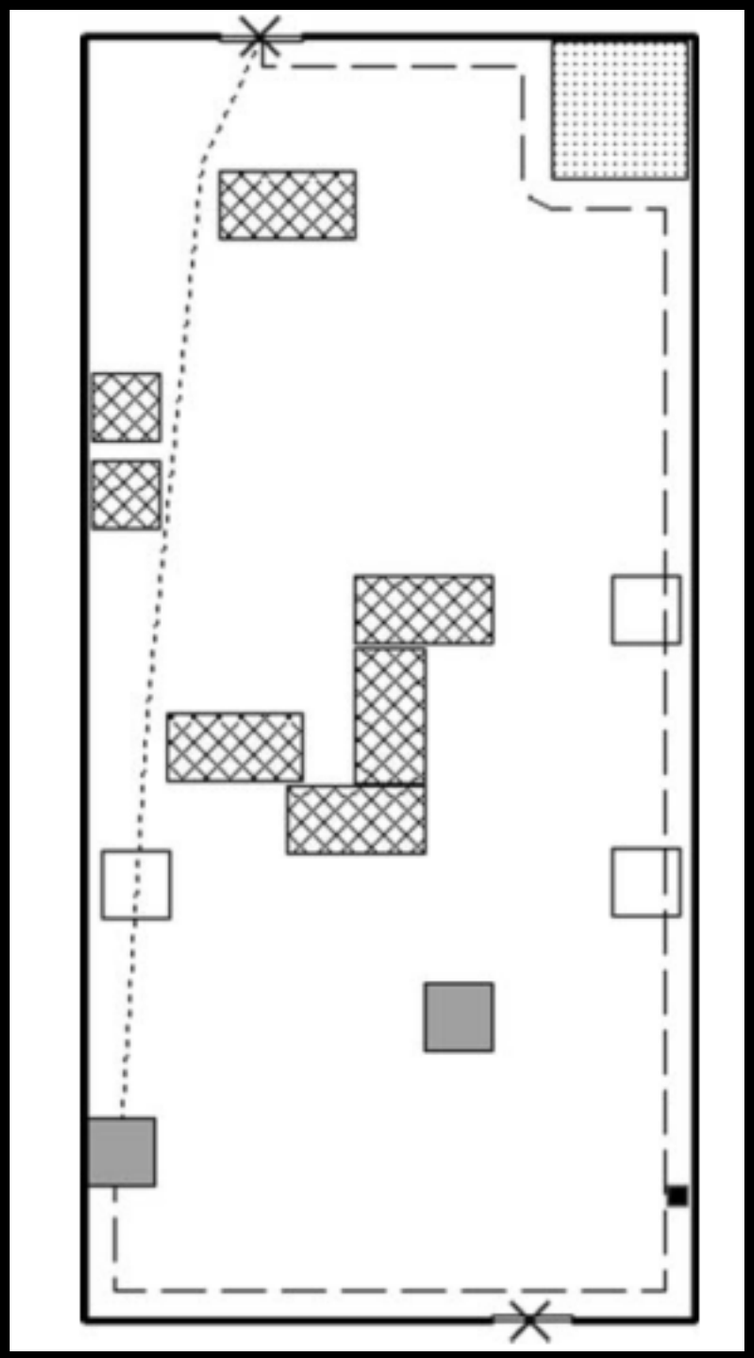


(detectable + salient/unique)



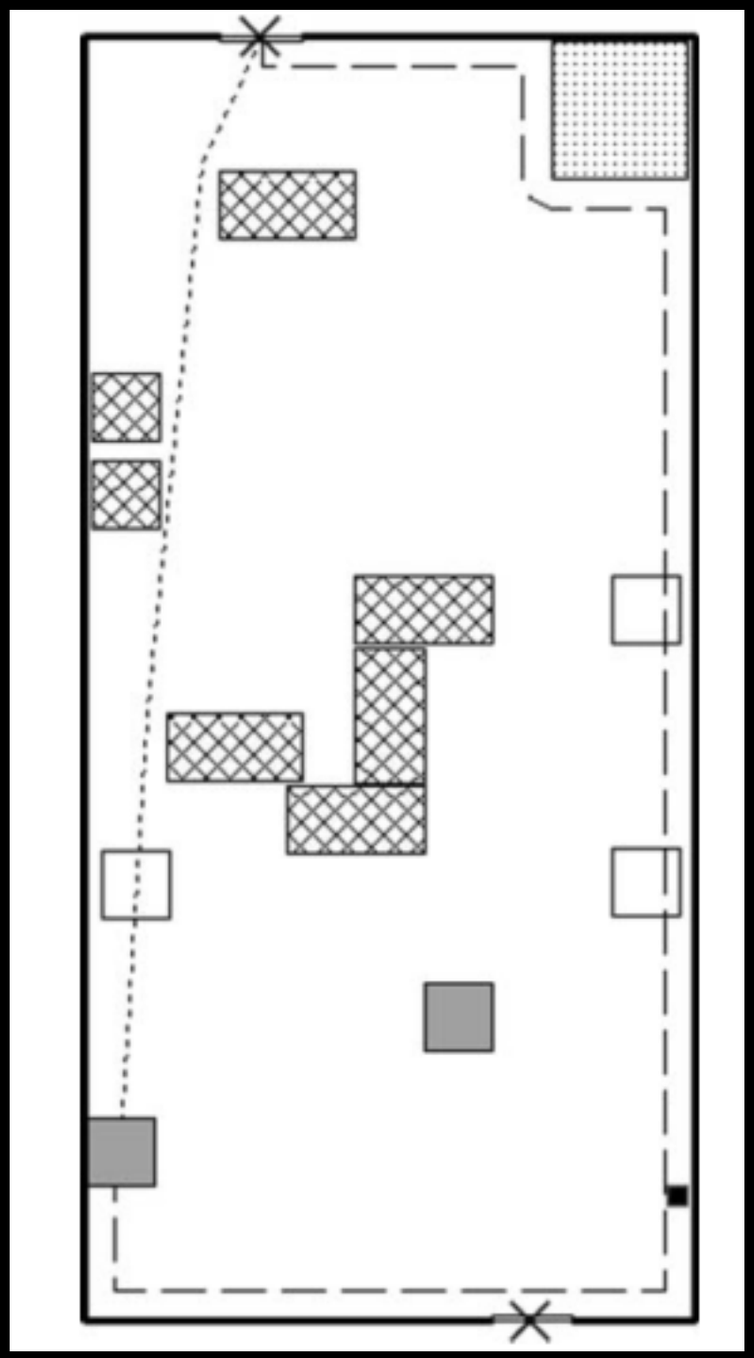


local landmarks
increase confidence along the route



obstacle hazard cue landmark

Swobodzinski & Raubal, 2009



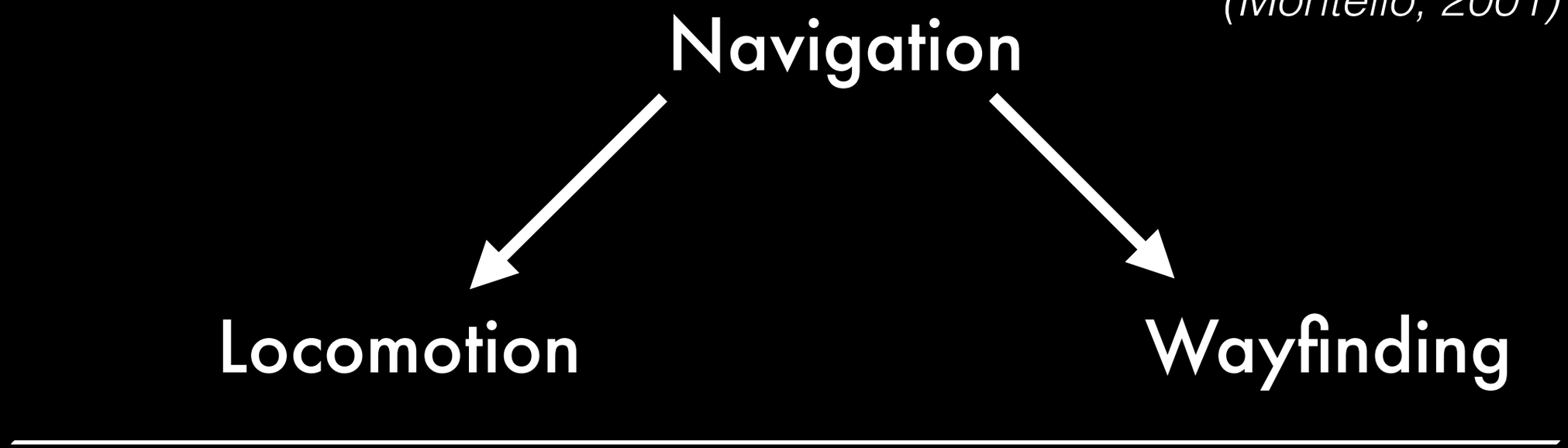
obstacle hazard cue landmark

(repeatable)

(unique for the navigator)

Swobodzinski & Raubal, 2009

(Montello, 2001)

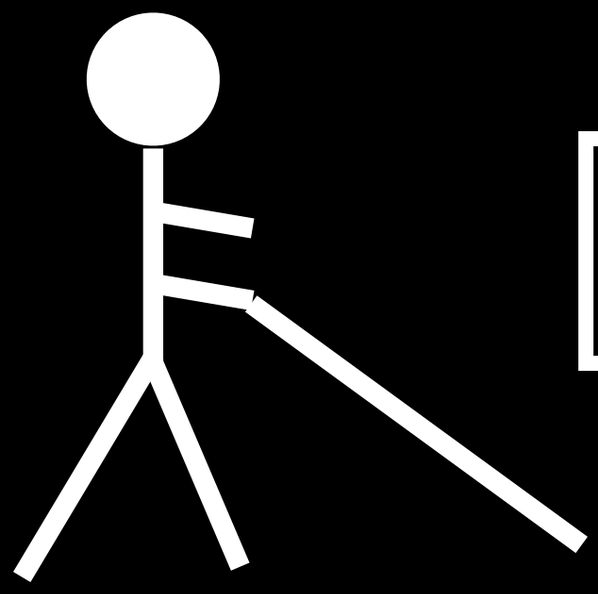


(Montello, 2001)

Navigation

Locomotion

Wayfinding



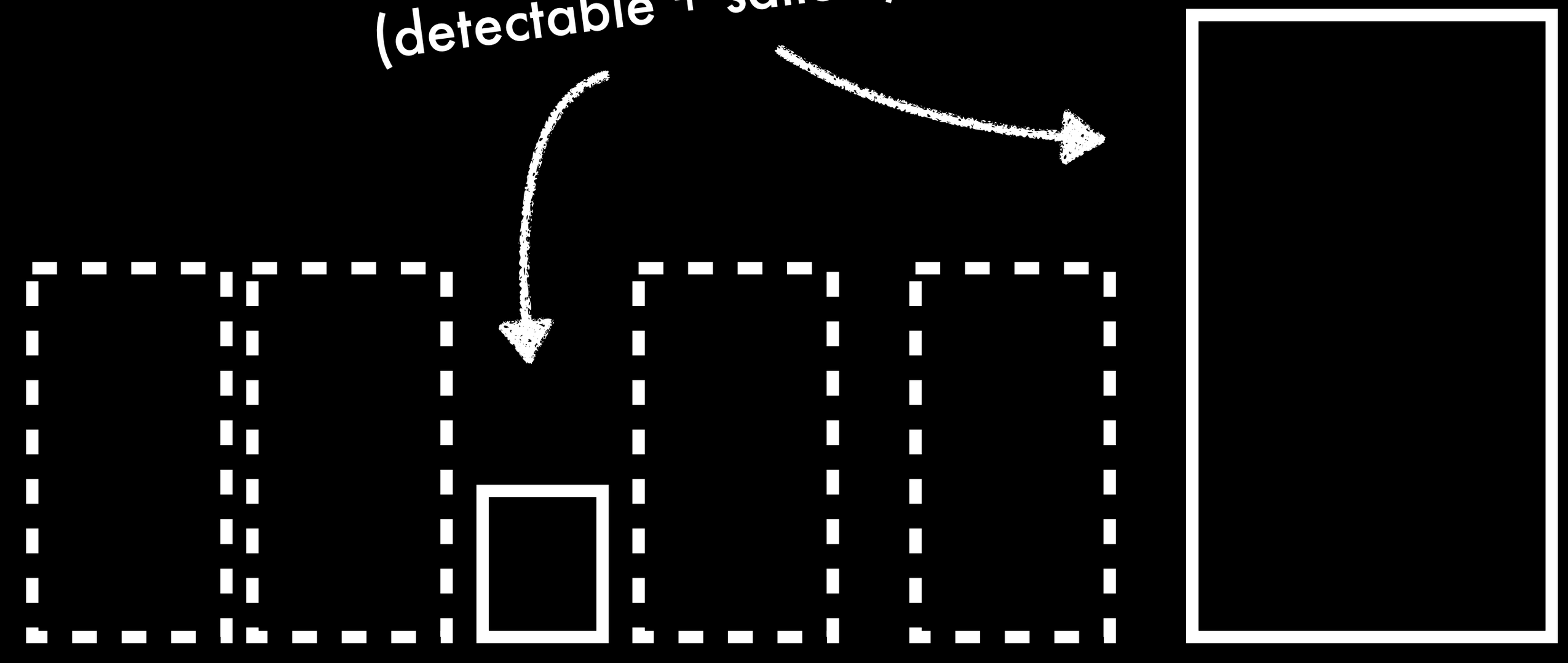
bigger effort

decisions at shorter intervals

Giudice and Legge (2008)
Passini and Proulx (1988)

Can we use increased effort on Locomotion *for* Wayfinding?

Identifying Landmark Candidates



Identifying Landmark Candidates

Landmark	No. of participants
Access and exit areas	10/10
Traffic lights (ATS)	10/10
Surface materials	10/10
Tactile areas and tactile strips	10/10
Railings	8/10
Walls	8/10
Bus stops with a shelter	8/10
Tree pits	8/10
Staircases	8/10
Bus stops without a shelter	0/10
Others (please specify)	2 mentions of *street gutters*

Identifying Landmark Candidates

Access/Exit Areas

Identifying Landmark Candidates

Tactile Strips

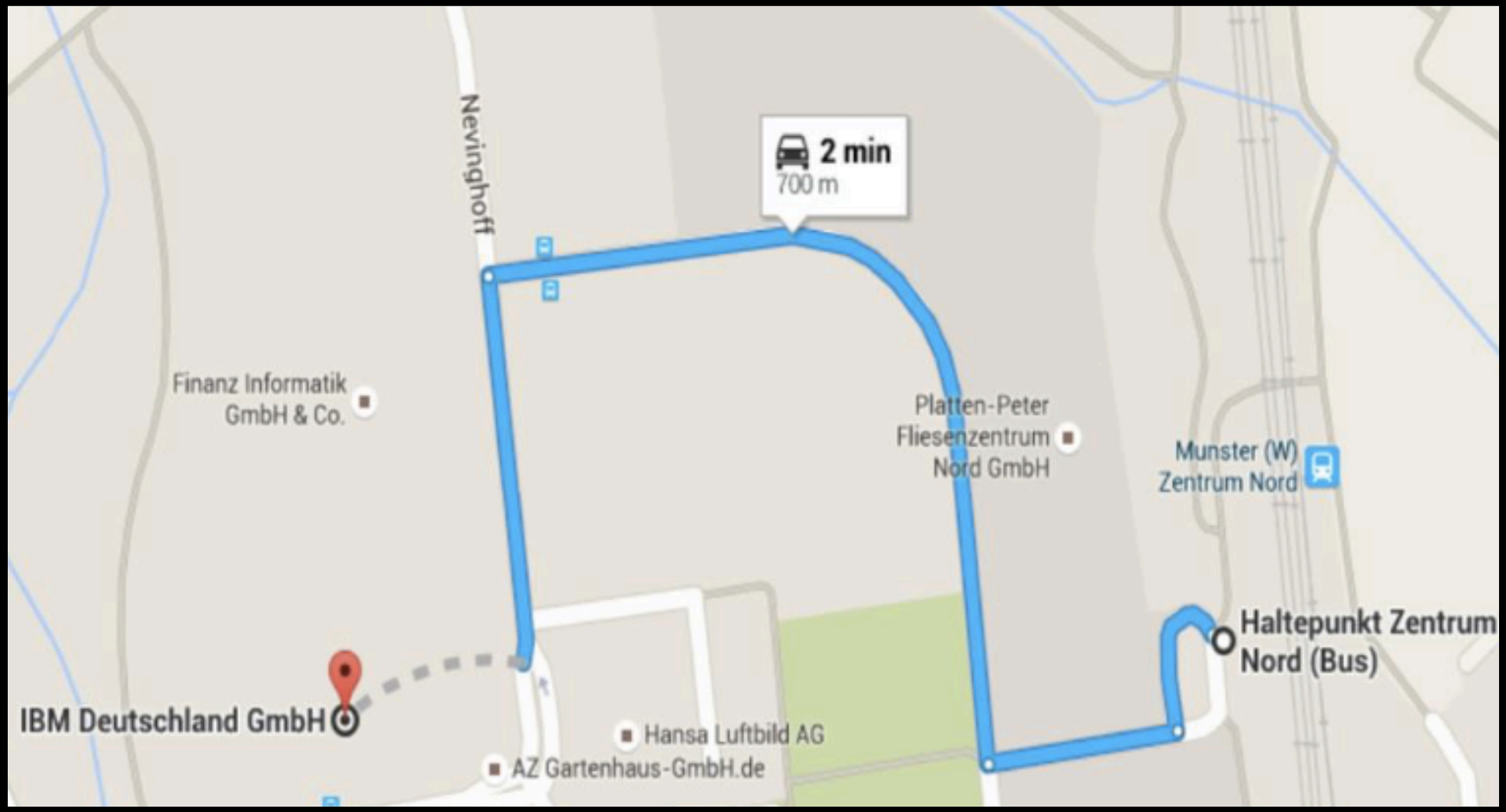
Identifying Landmark Candidates

Tree pits

Identifying Landmark Candidates

Fencing

Designing a User Study



Designing a User Study

2 Wizard-of-Oz ‘systems’:

- Landmark-Enhanced

- non Landmark-Enhanced

Designing a User Study

2 Wizard-of-Oz 'systems':

- Landmark-Enhanced

- non Landmark-Enhanced

LE	nonLE
Walk 10 m	Walk 10 m
Turn right and go downstairs	Turn right
Turn right onto Access and Exit Area for Platten-Peter Fliesenzentrum	Turn right for Platten-Peter Fliesenzentrum
Walk 50 m and pass by Access and Exit Area	Walk 200 m
Walk 150 m	
Walk 25 m	Walk 200 m
Follow right side small wall	

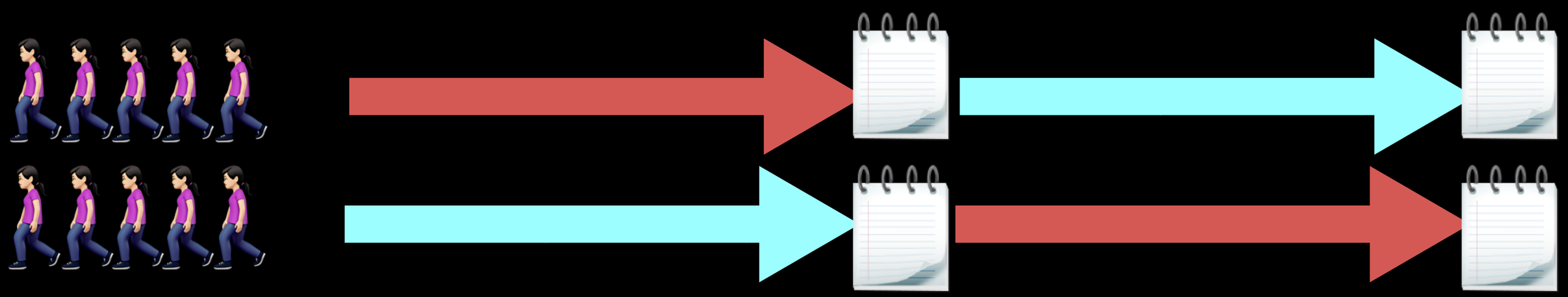
Designing a User Study

2 Wizard-of-Oz ‘systems’:

- Landmark-Enhanced

- non Landmark-Enhanced

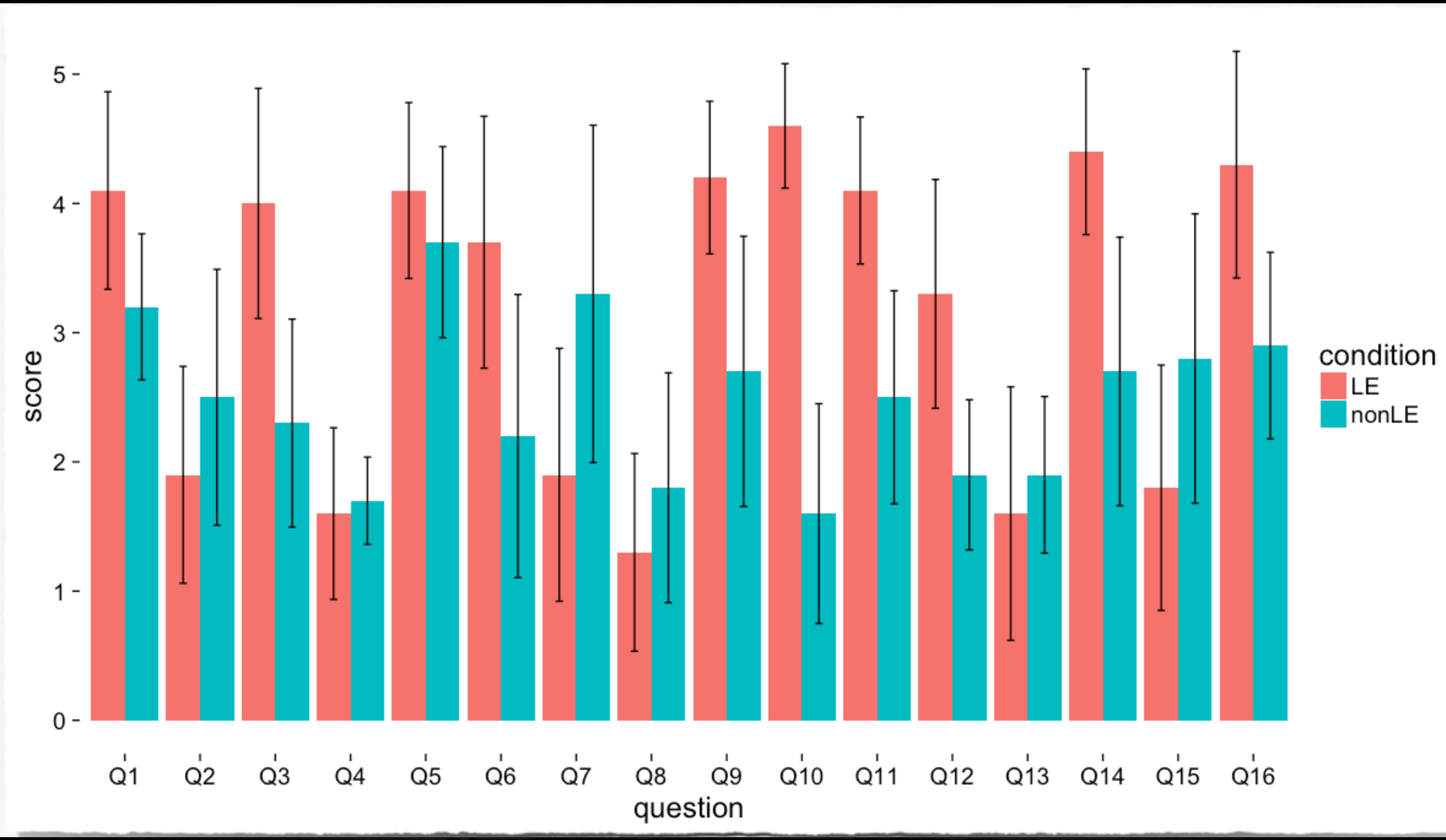
10 participants,
one route,
counterbalanced:



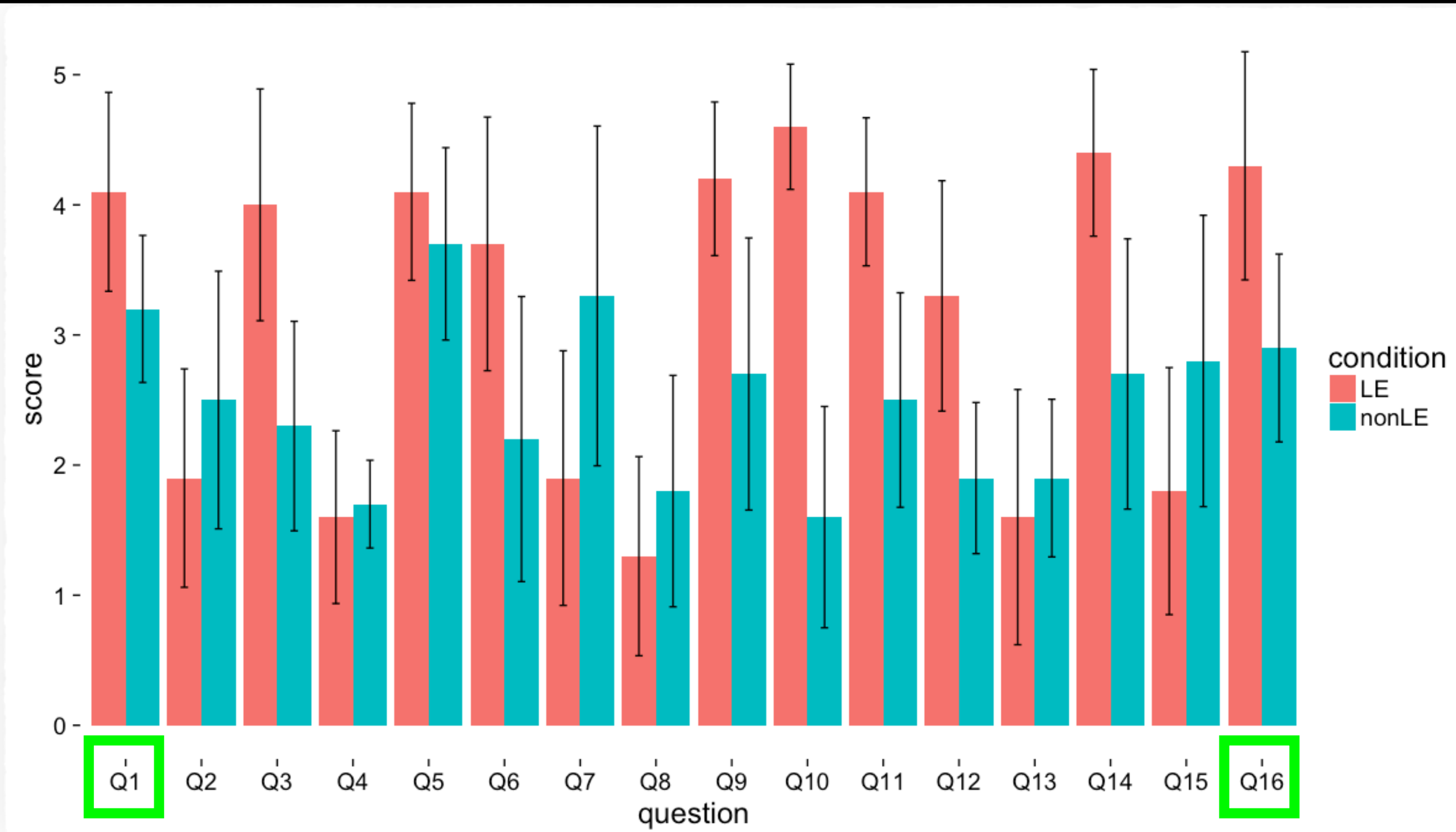
Designing a User Study

	Question
Q1	I would like to use this system frequently for navigation
Q2	I thought the system has made the navigation more complex
Q3	I found this system has more detailed instruction
Q4	I think I need practice to use this system
Q5	It feels easy to handle this system
Q6	I found this system helps me to identify turns and curves easily
Q7	I found it was harder to find streets and routes with this system
Q8	I thought this system has irrelevant landmarks for guidance
Q9	I found this system leads me to correct path
Q10	I thought the system aids me in identifying the landmarks
Q11	I found the system helps me to travel faster
Q12	I found the system guides me to identify the crossings
Q13	I think I need technical support before using this system
Q14	I could reach the destination precisely
Q15	I felt the verbal command was inconsistent
Q16	I felt very confident using this navigation system

Results

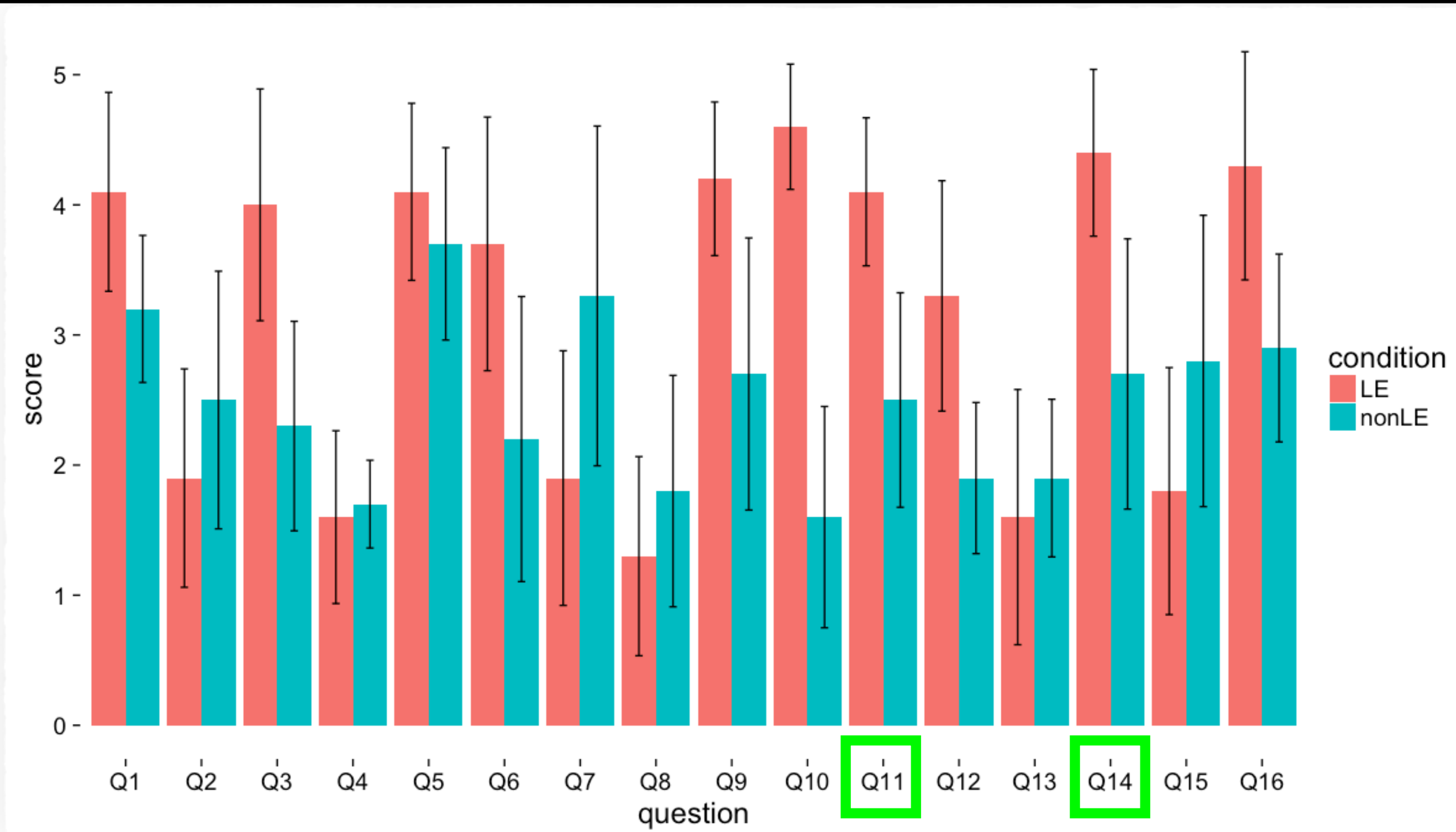

5
4
3
2
1
0
score
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
question
condition
LE
nonLE

Results



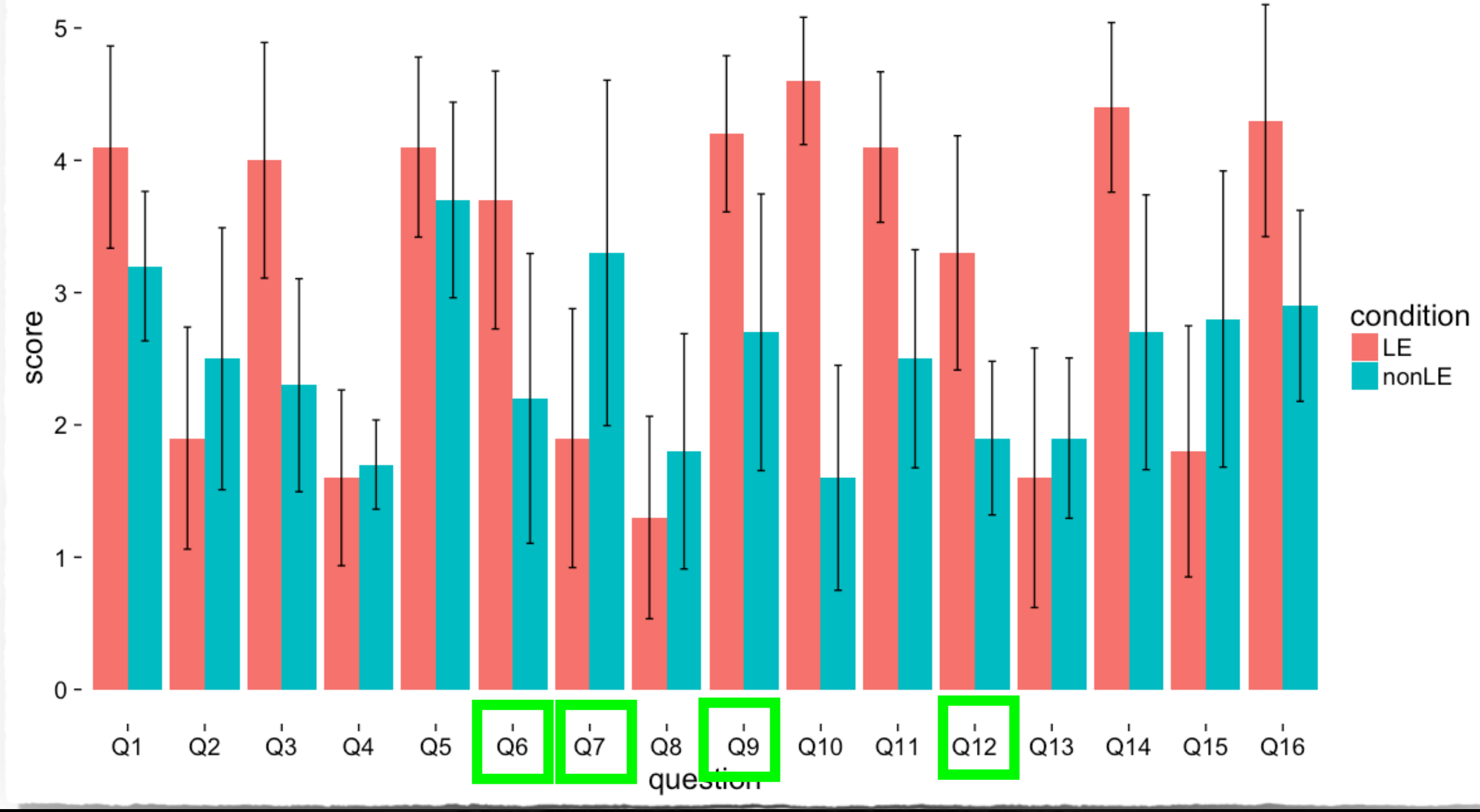
more satisfied and more confident with the instructions

Results



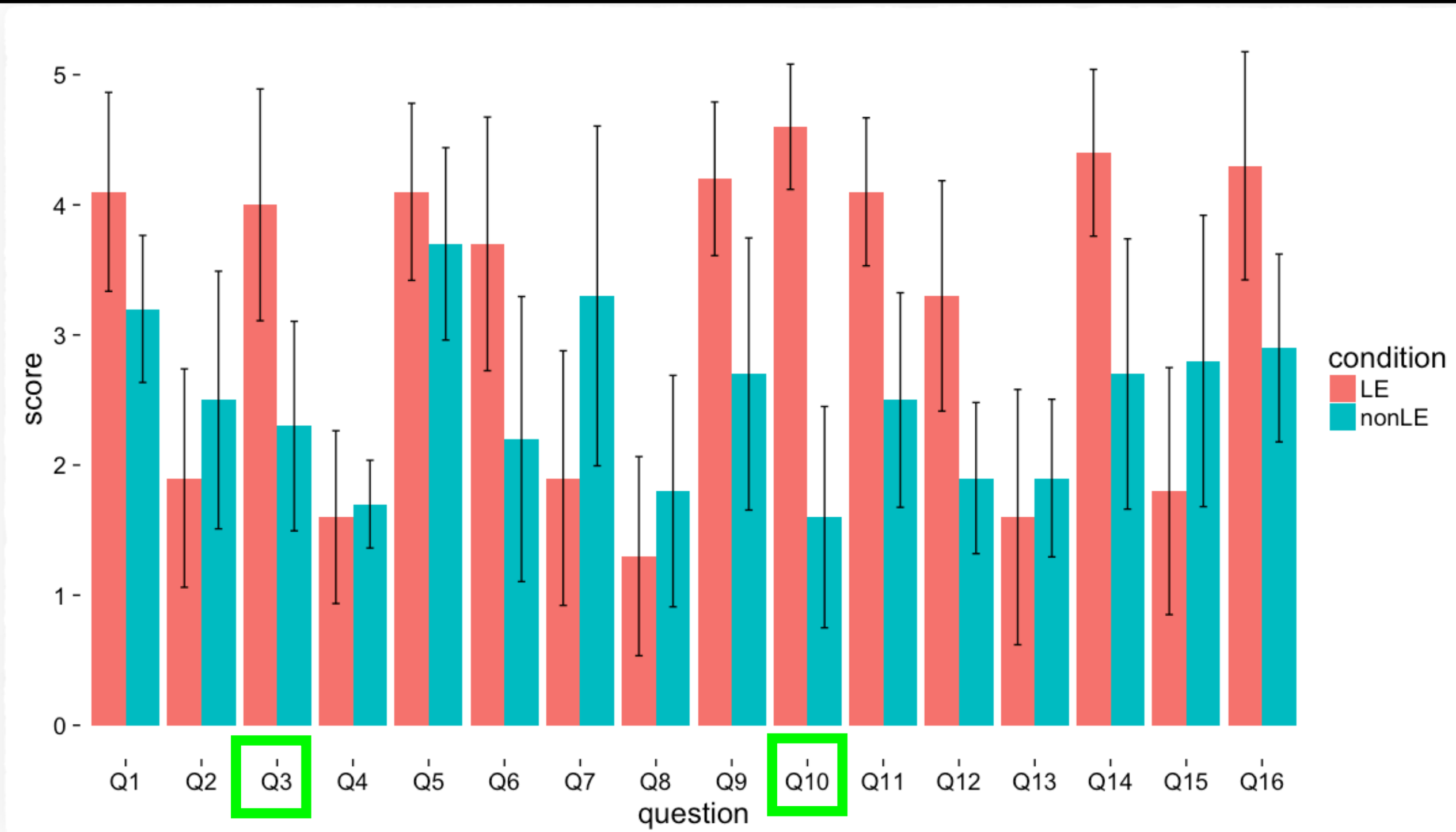
felt that they're traveling faster and with better precision

Results



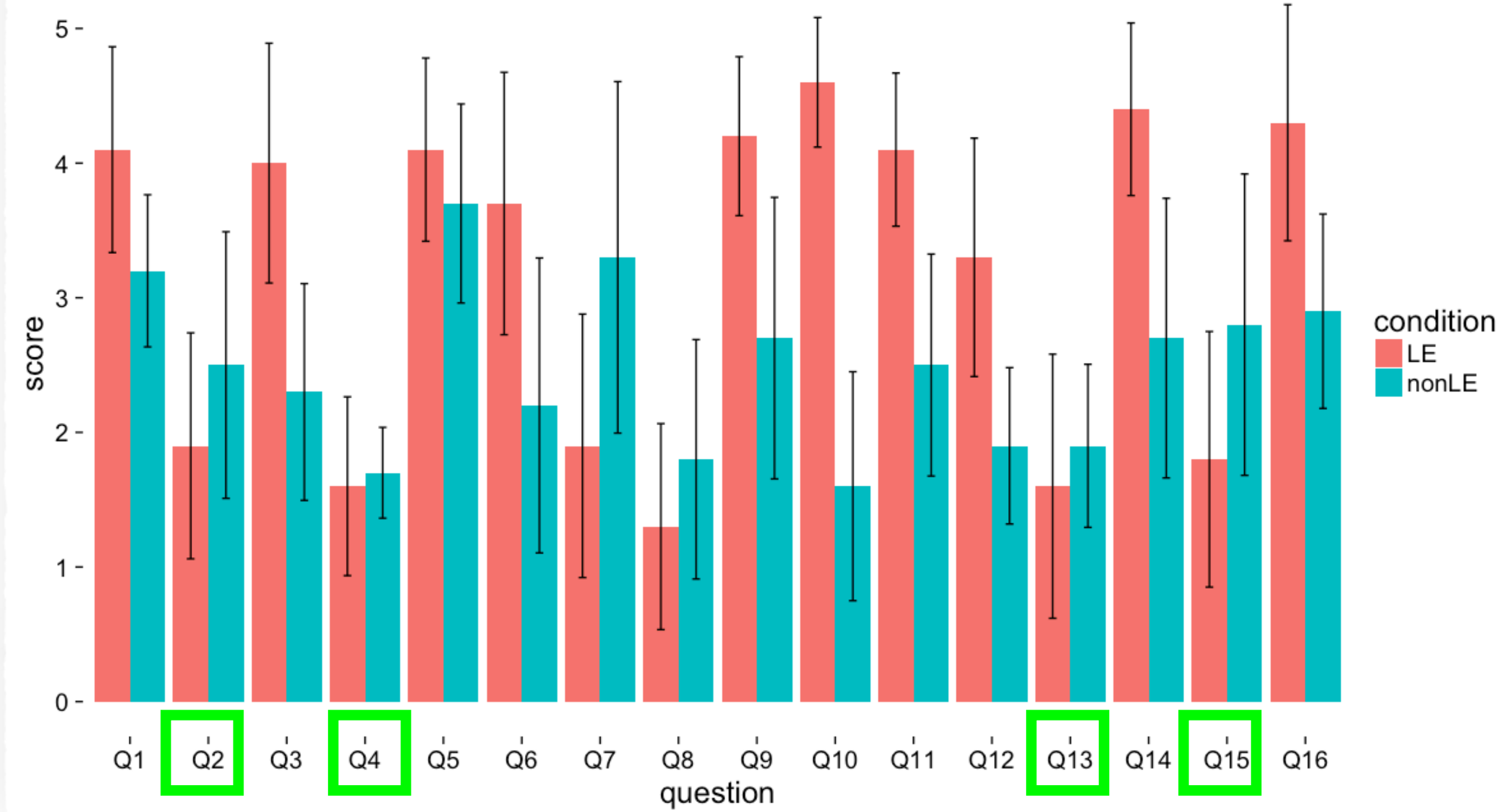
easier to identify turns, pathways and road crossings

Results



landmark-related instructions felt useful and relevant

Results



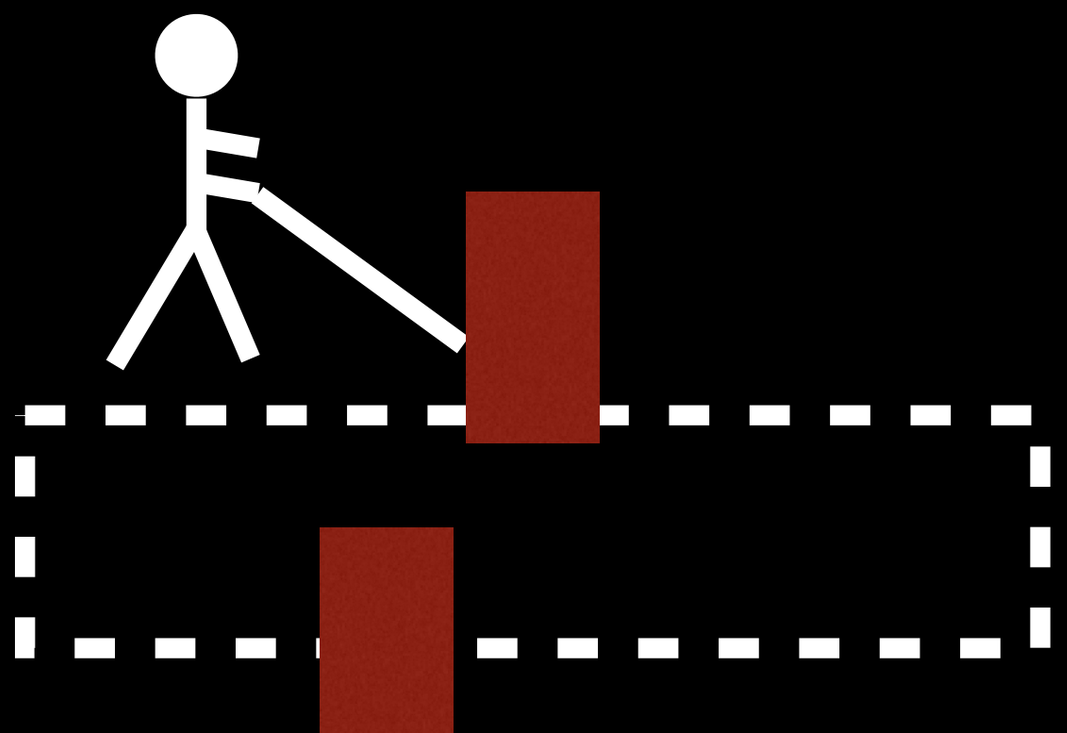
no difference (or lower) perceived complexity

Conclusion

- Instructions with Local Landmarks subjectively preferred over those without Local Landmarks
- ...and not perceived as more complex or difficult

Limitations

- Subjective satisfaction ≠ True satisfaction ≠ Usage
- Is the approach scalable?
- Can it be crowdsourced without training?
- Spatial knowledge acquisition is another challenge



Thank you!

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