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# Towards Evidence-based Training for Fire and Evacuation

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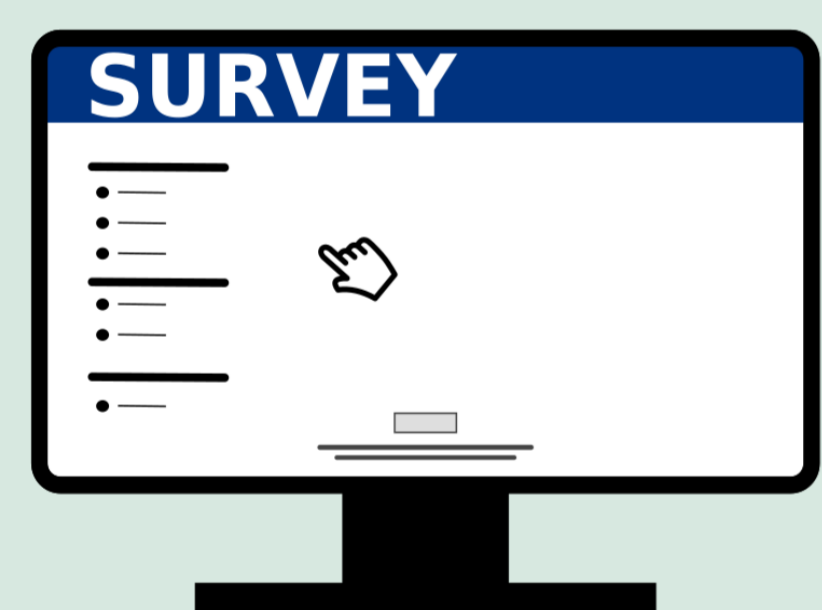
## Conclusion

- Current practise may be perceived as ineffective; No significant effects towards risk perception are found.
- Training improves the perceived preparedness and perceived quality of training plays a key role in its effectiveness.
- Basic fire evacuation training is important and helps managing risks in emergencies.
- Scenario-based and practical training is preferable.

## Fire Evacuation Training

Training Methods				Training Effects		
Serious Games	Virtual Reality	Augmented Reality	Evacuation Drills	Knowledge Gain	Knowledge Transfer	Knowledge Retention
Allows experiencing hazardous situations in safe environments			Potential for most realistic simulations	Studies show improved evacuation behaviour	Training decision making rather than repetition of known patterns	Short-term knowledge retention observed in training
Assessment methods vary greatly	Increased trainee engagement through high immersion	Merging dynamic simulations with real-world space	Disruptive; Often ineffectively organized; unengaging	Factors: engagement, immersion and realism	Transferability depends on the degree of realism	Long-term retention increases with engagement, immersion & realism
Increased knowledge retention	Realism depends on the virtual elements and computational capacities		High cost	Assessment methods for measuring evacuation knowledge and performance vary greatly		

## Methodology



An online **survey** was carried out among the general public to explore effects of evacuation training towards individual risk perception and decision-making (n = 323). Analysis employed non-parametric statistics.

### Semi-structured interviews

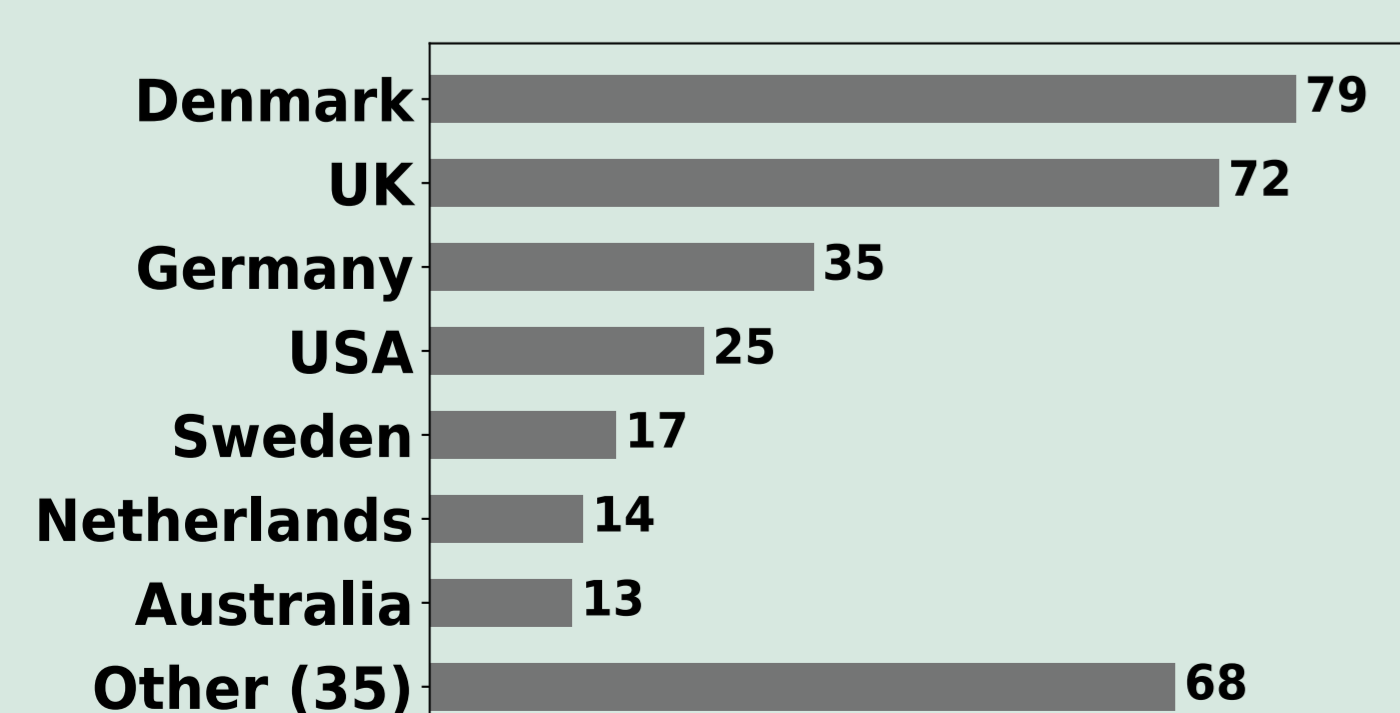
(n=28) were carried out and are analysed through thematic analysis. The aim is to better understand emerging trends in the quantitative data and explore the perception and attitudes towards fire evacuation training.



Most questions employed a 5-point Likert scale (-2 to +2) measuring participants' agreement and opinions.



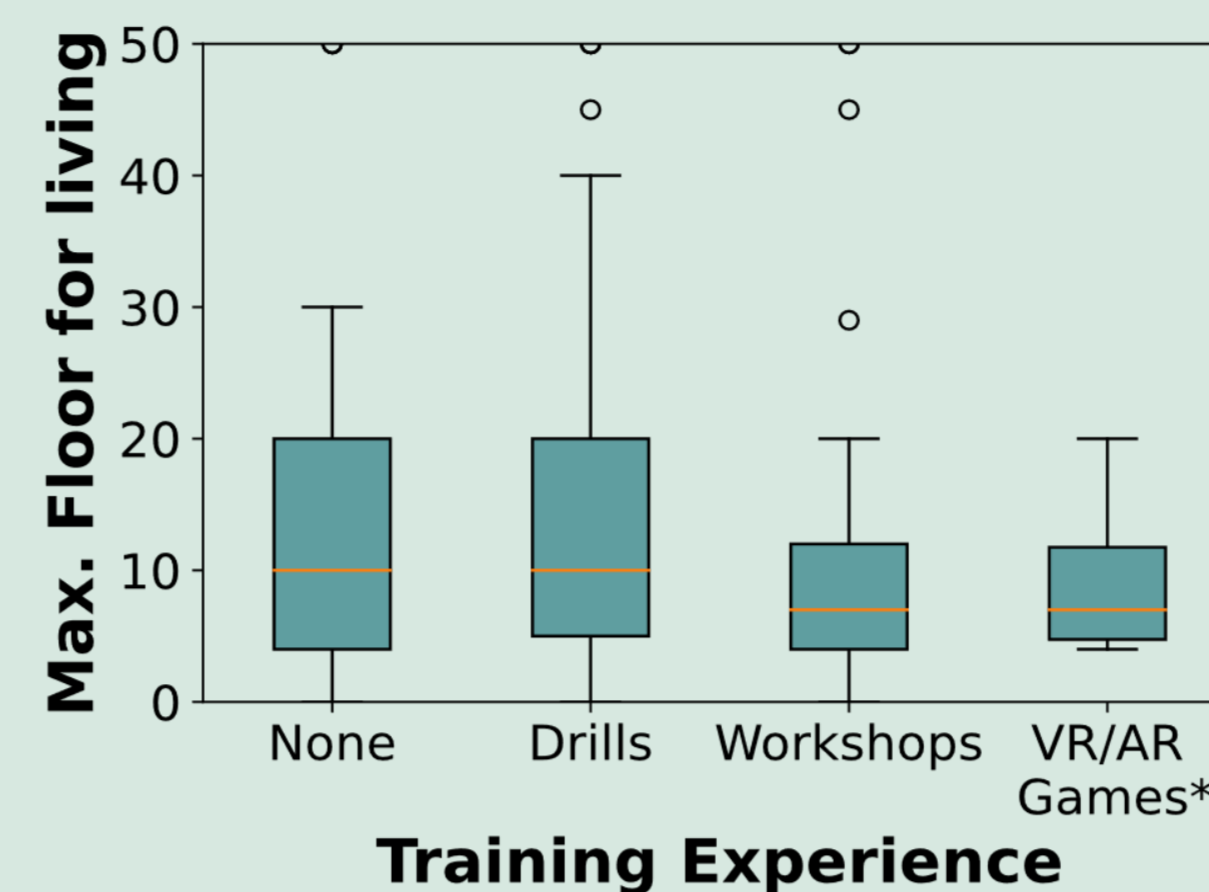
Individual risk perception was gauged through measuring people's disposition to live on higher floors in taller buildings.



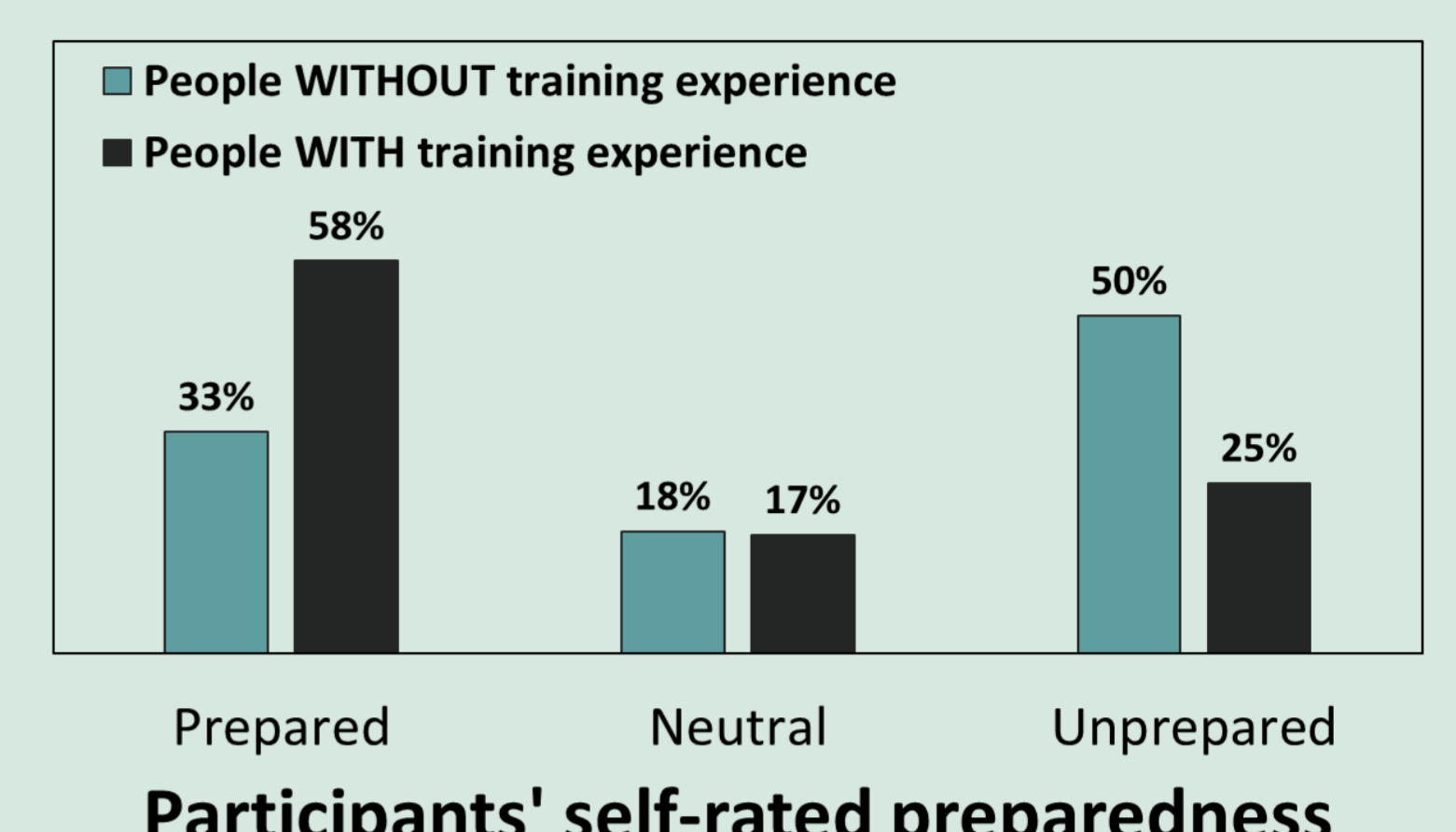
The chart shows the number of survey respondents across different countries, 80% were 18-35 years old.

Interviews were carried out with residents from Denmark and Sweden.

## Results

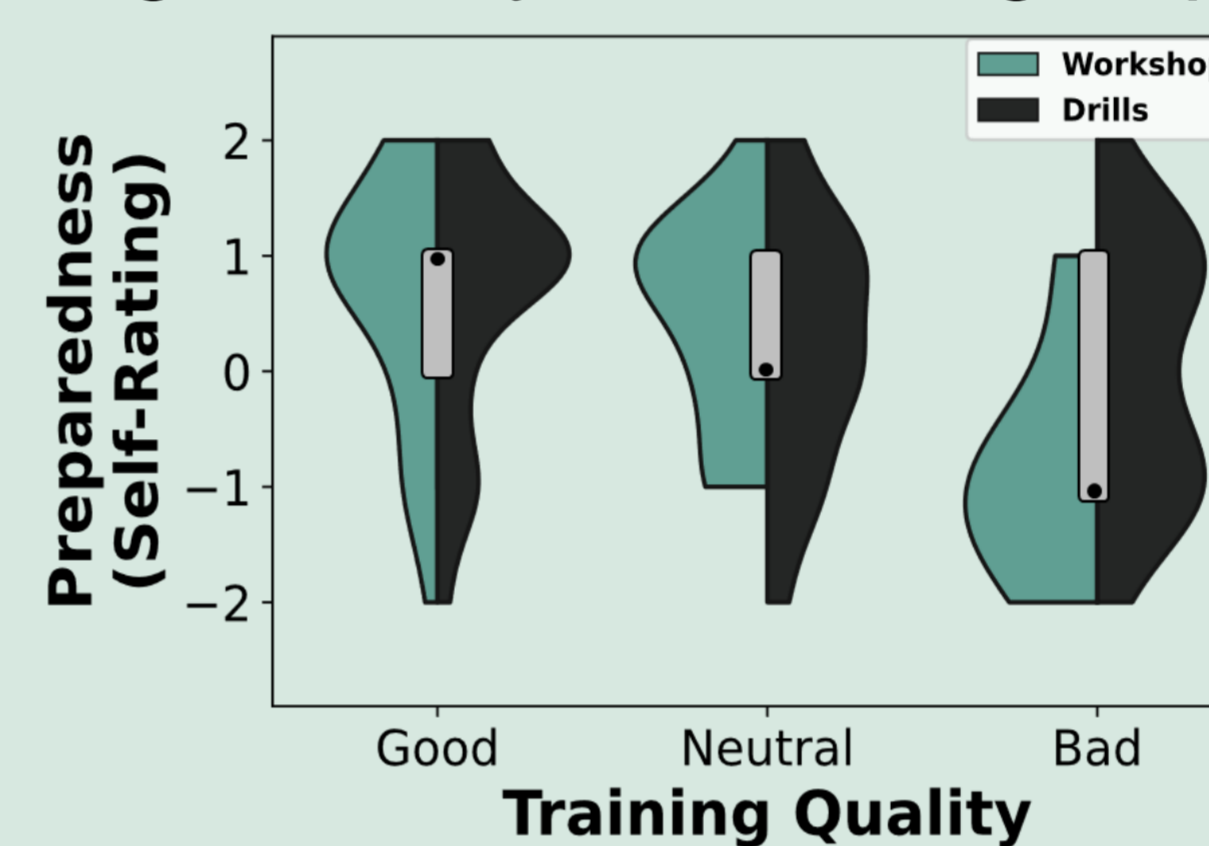


Respondent's disposition to live on higher floors to capture individual risk perception depending on training experience. (\*limited data)



Respondent's self-assessment of their own preparedness for emergency depending on training experience.

Statistically significant effects of training experiences could not be observed towards individual risk perception as measured through people's indication of the maximum floor they would be comfortable to live on. Self-rated preparedness differed significantly between groups ( $p < 0.01$ ;  $d_{effect\ size} = 0.57$ ) with experience of fire evacuation training ( $\mu = 0.41$ ;  $\sigma = \pm 1.1$ ) and without such training experience ( $\mu = -0.24$ ;  $\sigma = \pm 1.2$ ).



Perceived preparedness vs. perceived quality of training experiences for different fire evacuation training methods

A perception of higher quality of training correlates with an improved sense of preparedness among respondents.

**'If you have some basic training, then it's all around and you can use that everywhere [...].'**

**'It's not realistic enough [...] to take it seriously. Like a lot of people don't pay attention because they think it's a waste of time.'**

**'I think from an early age it should be provided by schools.'**

**'You could even make it like a game, like with virtual reality where you make a simulation of you being in the building and there is fire and how you would react.'**

**'It just felt like something I had to do [...]. I don't feel like I learned much.'**

**'Because there's always gonna be a few people [...] acting like a chicken with their head cut off.'**

## Future Work

Understanding current fire evacuation training practise, its effects, and attitudes towards it among the target group (i.e., the public), facilitates the design of training frameworks that can account for acceptance among participants and maximised effectiveness.

This work serves to inform future experimental investigations into determining general effectiveness of different training methods to enable the evidence-based use of training in safety strategies.

## Acknowledgements

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