

# SOLID WALLS IN URBAN ENVIRONMENTS

and their effect on women's perceived safety in virtual reality



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## Abstract

Women's perceived safety in urban environments is affected by the streets' urban design. One design intervention that increases people's perception of safety is the presence of windows, as it increases the probability of potential witnesses (Navarrete Hernandez, 2021).

In this study, we tested women's perceived safety of solid walls in a virtual reality (VR). Six different street environments were created and evaluated with a within-subject experiment. The women had to make a choice between two streets, one with solid walls and one with windowed walls, in regards to perception of safety. Aspects changed between the scenes were the amount of cars, greenery and height of buildings.

The results indicate that solid walls have an impact on women's perceived safety in urban environments. However, methodological flaws may have influenced the results, making them uncertain.

## Goals

- To examine if solid walls in different urban environments have a negative effect on women's perceived safety, using VR as an evaluation tool.
- To investigate whether VR can be an alternative to more traditional evaluation methods by studying women's perception of safety.

Our scientific question is phrased as follows:

*Do solid walls have an effect on women's perceived safety in an urban environment experienced in virtual reality?*

## Background

Literature shows that the designing and planning of public spaces do not take women's experiences into account in public spaces (Burgess, 2008). A theory by Jane Jacobs suggests that adding more "eyes on the street", i.e. windows and doors serve as witnesses which can increase the perception of safety and even reduce crime (Jacobs, 1993).

This phenomenon was confirmed by a study made by Navarrete-Hernandez (2021). However, as this study used manipulated photographs as stimuli to the participants, an opportunity to do a similar study but with more immersive stimuli such as virtual reality (VR) arises.

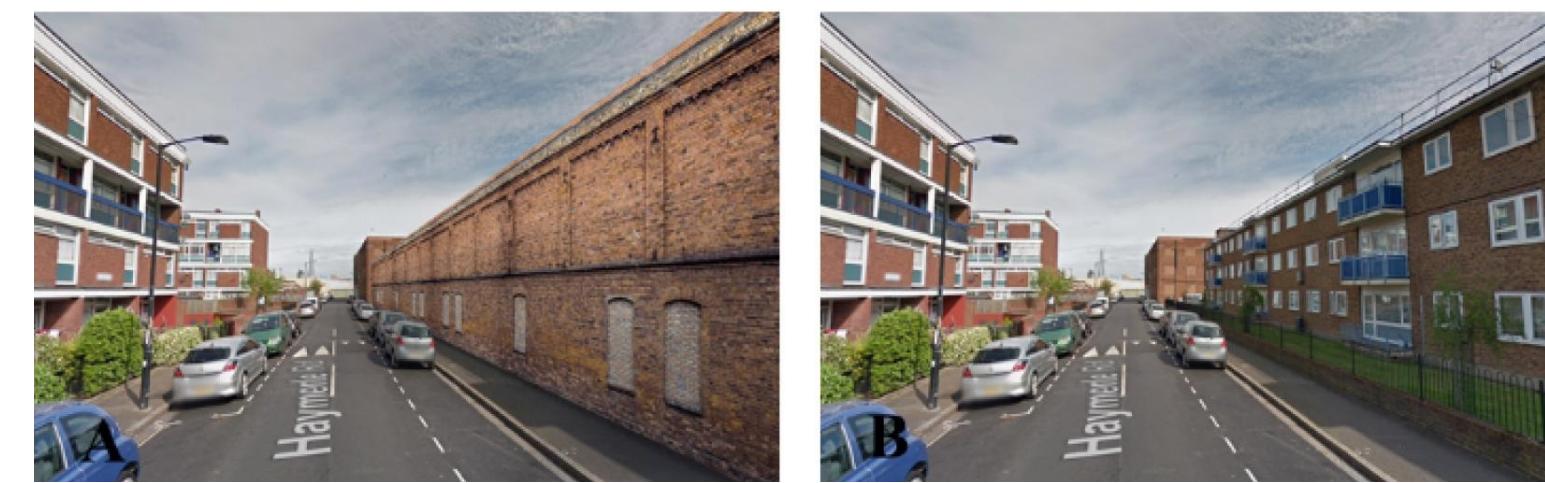


Fig 1: Photostimuli used in the study by Navarrete-Hernandez (2021)

## Method

Six different street corners were created in Unity that each consisted of two streets, where one of them had windows while the other one was a solid wall. The scenes varied in greenery, amount of cars and height of building. 10 female students at KTH, between the ages 20-26 participated in the study. Each participant was presented with all six corners in a randomized order using virtual reality, and asked to choose their preferred street in terms of safety. A short interview was conducted after each test.



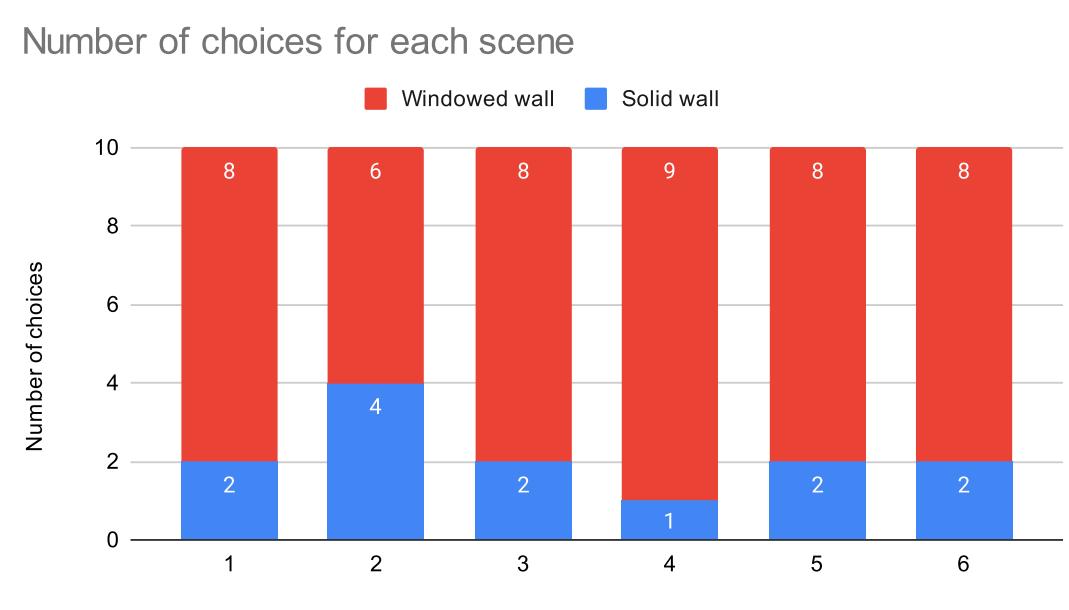
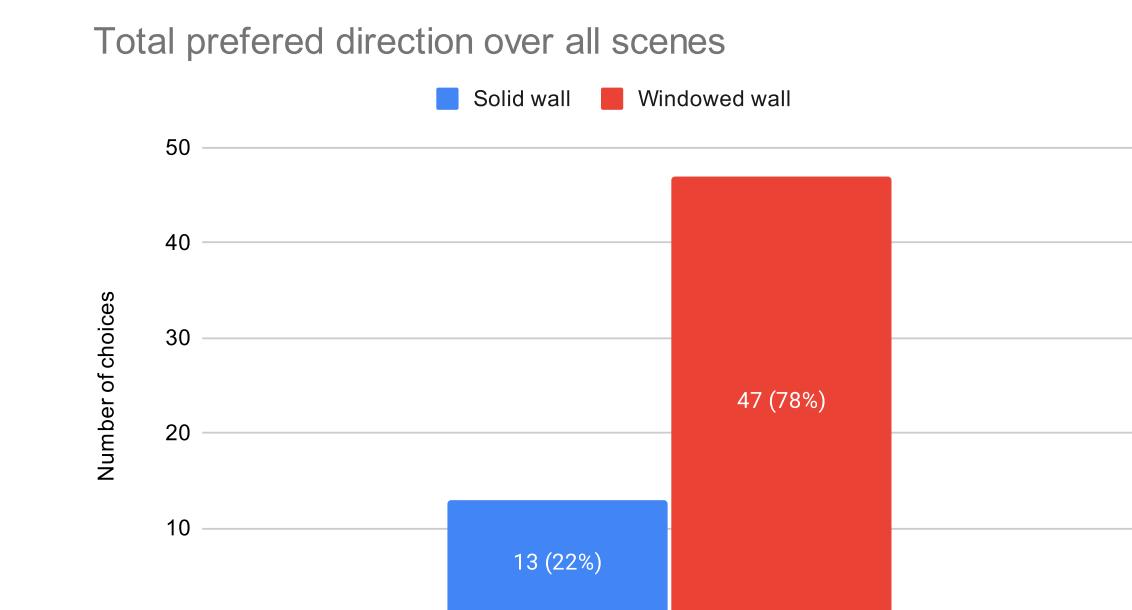
Fig 2: The presented scenes (1-6), ordered from left to right



Fig 3: Participant doing the experiment

## Results

- The study gave a total of 60 choices, 47 (78%) of them were of windowed walls and 13 (22%) of solid walls.
- For all six scenes the windowed wall was chosen most frequently.
- Nine of the participants said that they based their decision-making on the walls and that the windows made them feel safer since people could see them.
- Six of the participants said that the first corner was the hardest to make a decision on since they could not spot any differences. Two of these expressed that all scenes from scene two and onwards were easy to make a decision on since they had detected the difference by then.



## Conclusions

Our results indicate that our hypothesis was correct; solid walls tend to have a negative effect on women's perceived safety. This is in line with the results from Navarrete-Hernandez (2021), further strengthening the evidence for the phenomenon.

## References

1. Burgess, G. (2008) "Planning and the Gender Equality Duty – why does gender matter?" *People, Place & Policy Online* (2008): 112-121.
2. Jacobs, J. (1993) *The death and life of great American cities* (Modern Library ed.). New York: Modern Library.
3. Navarrete-Hernandez, P, Vetro, A & Concha, P. (2021). "Building safer public spaces: Exploring gender difference in the perception of safety in public space through urban design interventions". *Landscape and Urban Planning*, Volume 214, 2021, 104180, ISSN 0169-2046.