Pedestrian collision avoidance on narrow sidewalk: a meeting between psychology and virtual reality
Cléo Deroo, Angélique Montuwy, Béatrice Degraeve, Jean-Michel Auberlet, Anne-Hélène Olivier, Marie-Axelle Granié

To cite this version:
Cléo Deroo, Angélique Montuwy, Béatrice Degraeve, Jean-Michel Auberlet, Anne-Hélène Olivier, et al.. Pedestrian collision avoidance on narrow sidewalk: a meeting between psychology and virtual reality. TRB 2019 - Annual Meeting Transportation Research Board, Jan 2019, Washington DC, United States. hal-02396553

HAL Id: hal-02396553
https://hal-univ-rennes1.archives-ouvertes.fr/hal-02396553
Submitted on 31 Jan 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
In order to study this kind of situation in virtual environment, a meeting between psychology and virtual reality is proposed. NARROW SIDEWALKS can be seen as an URBAN JOUSTING, where pedestrians have to step down and the virtual pedestrian sees pedestrian in the public space, and detects him in the social space. It can be modeled as a conflict where the pedestrian is the opponent and the virtual pedestrian is the aggressor. The virtual pedestrian decides to step down if his detection time is greater than the other pedestrian involving in the jousting. A Social Perception Model is proposed, which shows that speed and attention influence the decision to step down:

- Speed and attention increase the detection time.
- Pedestrians are more sensitive to the virtual pedestrian's speed and attention.
- Pedestrians are more sensitive to the virtual pedestrian's speed and attention when the jousting is credible.

A first experiment was conducted to study the influence of speed and attention on the decision to step down. The results showed that:

- Pedestrians are more likely to step down when the virtual pedestrian is faster.
- Pedestrians are more likely to step down when the virtual pedestrian is more attentive.

A second experiment was conducted to study the influence of speed and attention on the detection time. The results showed that:

- Pedestrians were more likely to detect the virtual pedestrian when the jousting was credible.
- Pedestrians were more likely to detect the virtual pedestrian when the jousting was credible and the virtual pedestrian was faster.

Overall, the results showed that speed and attention are important factors in collision avoidance behaviors in virtual environments. Future work will focus on understanding the effects of other factors, such as distraction and personal factors, on collision avoidance behaviors.