

# Unpredictability in pedestrian flow: The impact of stochasticity and anxiety in the event of an emergency

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Random interactions among pedestrians, usually produced by psychological effects (e.g. anxiety), can produce collective nontrivial phenomena in their flow dynamics. Here, we improve our understanding on these phenomena by implementing cellular automaton (CA) simulations in a simplified one-dimensional corridor model. We consider different types of randomness that could be used to parametrize social, cultural or psychological behaviors; their incidence on the average evacuation time and standard deviation are studied. The randomness in the pedestrians' motion allows separating between different phases of movement, which in the end, drives the dynamics. Our study allows to distinguish among emergent collective phenomena, unpredictability, and unexpected Brownian type behavior in certain regimes, that occur in one-dimensional hallways, such as exists in airplanes, cinemas, massive sports events, etc. These findings may be relevant to evacuation procedures in the event of an emergency, where anxiety may compromise people's performance and the effectiveness of the evacuation plan. Therefore, it could be highly useful to introduce these aspects in the simulation of pedestrian dynamics.