

Pedestrians at crosswalks found to follow the Lévy walk process

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A team of researchers at the University of Tokyo has found that large numbers of pedestrians meeting in crosswalks tend to follow the Lévy walk process. In their paper published in *Journal of the Royal Society*

Interface, the group outlines their work observing crowd movement and what they found.

When large groups of people stand on either side of a road waiting for the light to change and then find themselves walking toward one another, they tend to walk in predictable ways. The approach taken is not generally one that typically provides the most direct or the quickest route, but one that takes into account the other people around them. In this new effort, the researchers sought to learn more about the behavior of people in such situations by studying them very closely in action.

To learn more about how people behave in crosswalk-type situations, the researchers enlisted the assistance of volunteers and asked them to walk in what they describe as mock corridors. As the volunteers did so, the researchers filmed them in action. They noted directional changes, the number of steps taken and step patterns.

The researchers found that individuals tended to deviate from their expected straight-ahead path as a means of most efficiently reaching their destination, and in so doing, faced a trade-off between path length and speed of transit. They noted that each individual made adjustments to their path based on the actions of those traveling in the same and opposite directions. They also found that [collective action](#) tended to arise, though the individuals involved did not seek to become participants. The collective action typically involved the formation of streams of people walking in uniform ways in both directions. Thus, rather than people continually meeting face to face, walkers would simply follow a person moving in the same direction, preventing the constant need to shift their [path](#). Doing so increased efficiency both for the individuals and for the crowd as a whole. The researchers also found that streams created by walking individuals followed the Lévy walk process.

The Lévy walk process is a mathematical description of a type of walk in which the pedestrian takes [small steps](#), but then takes long steps at regular intervals. Mathematician Paul Lévy showed that it leads to a power-law distribution of step lengths.

More information: Hisashi Murakami et al. Lévy walk process in self-organization of pedestrian crowds, *Journal of The Royal Society Interface* (2019). [DOI: 10.1098/rsif.2018.0939](https://doi.org/10.1098/rsif.2018.0939)

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