

Modeling the collective motion of escape panic



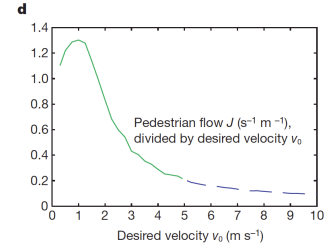
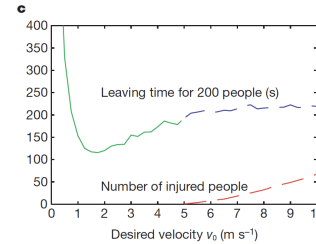
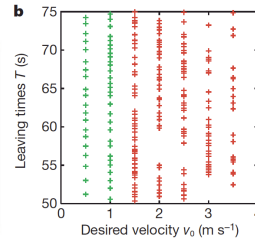
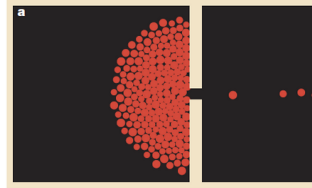
1 Clogging

- People rushing leads to the *clogging* of an exit

Faster is Slower

- As desired velocity \uparrow leaving speed \downarrow

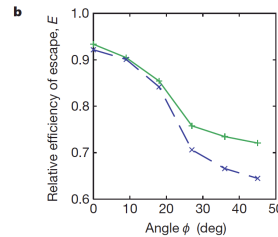
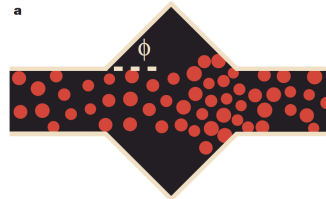
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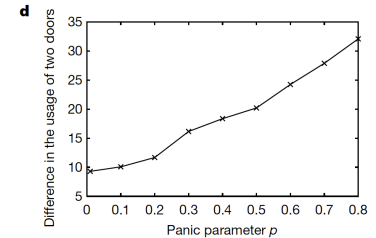
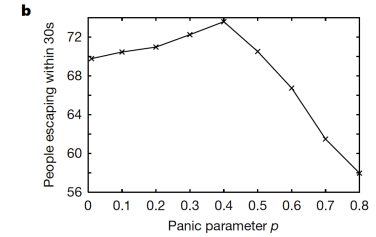
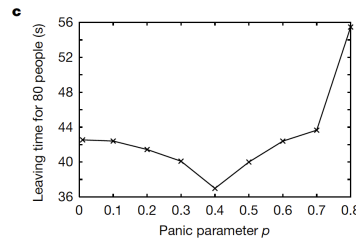
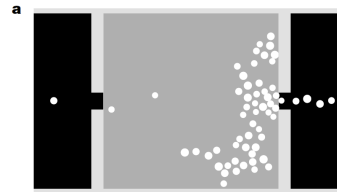
2 Corridors with widenings

- Escape efficiency is reduced as the angle **difference** (ϕ) from a linear corridor increases

2



3



3 Smoky rooms & invisible doors

- p_i = degree of panic
 - Individualistic vs. herd-like
- Optimal survival likely requires a mixture of both

Applications:

- Suitability for building design in emergency situations
 - p_i parameter allows testing flexibility

Source: Helbing, Farkas, & Vicsek, (2000):
Simulating dynamical features of escape panic

