

December 15, 2012

Walk Like a Fish

By ALEXANDRA HOROWITZ | NY Times



NOBODY in their right mind visits Midtown Manhattan during the holidays. The reason is simple: everyone, it seems, is in Midtown Manhattan during the holidays. Drawn to the scene like lacewings to streetlights, tourists jam the sidewalks, the crowds slow-moving, veering, shopping-bag-laden, and only vaguely walking forward.

New Yorkers normally roll their eyes, but they ought to take a closer look: watching these tourists interrupt the flow of traffic shows us how well pedestrians in our city usually move. This year I slowed down and observed them.

The study of pedestrian movement took off with the urban sociologist William H. Whyte, who in the 1970s recorded walkers' behavior in the city, noting loitering and flirting; capturing the dynamics of bus-stop queuing; and analyzing how the throngs of people mostly managed to cooperate, instead of dissolving into a turbulent rumpus. What he found is how reliably pedestrians automatically adjust to one another's behavior. Modeling this behavior is now a field of study, invoking

everything from fluid dynamics to behavioral heuristics to describe how we navigate our sidewalks, swollen with people, without saying a word to one another.

Fred Kent, who worked with Mr. Whyte and founded a nonprofit called Project for Public Spaces, showed me how it was done as we walked together down a busy street. “We who know the city can kind of ...” and here he mimed the “step and slide” — a small movement out of the way of an oncoming walker. While striding forward, we turn ever so slightly to the side, pulling in our bellies and leading with the shoulder instead of the nose. This lets us barely brush against passing pedestrians, our hands to our torsos and faces turned away politely.

This is but one of the ways we adjust to being small fish in a big pond. Fish happen to be a good model for what we do: research on fish “traffic” management has led to the formulation of three simple rules they follow to avoid congestion while moving together with hundreds or thousands of other fish. The same rules explain the remarkable synchrony of flocks of birds, swarms of army ants and even mass migrations of wildebeests and whales.

First, avoid bumping into others (while staying comfortably close). What counts as comfortably close — the “personal” space an animal attempts to maintain between itself and others — will vary by species. Little brown bats roost tightly packed together, with full-body contact, and Emperor penguins are happy setting up shop a mere couple of flippers’ lengths from other birds, while humpback whales appear to prefer to stay more than a mile away from one another — still close enough to react to the behavior of those around them.

A second rule: Follow whoever is in front of you. No matter that she may herself be following another, or may be only a temporary leader (the head of a flock of birds, for example, is only momentarily, and circumstantially, at its nose, and will cede leadership at the next turn right or left). For humans, following the person in front of you helps, on the most basic level, to form natural walking routes that become well populated. While we do not settle exactly in someone else’s slipstream, as fish do, we hover, preferring to look over the shoulder of the person ahead of us. On a sidewalk, this tendency sets up ever widening and narrowing channels of walkers going in the same direction.

The final rule: Keep up with those next to you. Everyone must speed up or slow down with attention to those around them. This seems like a difficult calculation, until you realize how little effort you have to exert to walk next to a friend down the street.

These rules of “attraction” (staying with others ...), “avoidance” (...while not too close), and “alignment” (going the same direction and speed as those around you) are sufficient to explain all herd, school, flock and swarm behavior — not to mention that of big-brained and busy human pedestrians.

We generally follow these rules unconsciously, but we still need to have our eyes open, not just to see who is there, but to calculate how we need to move relative to those around us. We make small turns of our heads; our eyes dart in investigatory saccades. Within an oval projecting forward from our feet to about four sidewalk squares ahead, we note the direction and pace of anyone headed our way. We also glance at others' faces and the angle of their heads, which tell us if they are planning to walk straight ahead or turn a corner. Our heads lead our bodies by eight degrees and as much as seven steps: watch a walker's head and you can predict his path down to a single step.

All this is what makes the visiting crowds such difficult sidewalk company: they change the dynamic of the flowing shoal. Many, distracted by cellphones and sale signs, are no longer even using their fish brains: they do not align themselves (they swerve); they do not avoid (they bump); and they do not slip behind and between others (they blunder).

There can be virtues in this. As Mr. Kent told me, slowing down "is social," and "that's what a city is." But on one recent weekday evening, watching the frustrated natives dart through flurries of visitors, I was reminded of something else I'd learned, from Iain Couzin, who studies the movements of insects. Mormon crickets and locusts seem to cooperate marvelously, moving in the same direction in march-step in caravans miles long. But they are not just cooperative; they are also cannibalistic. Coordinated swarm movement can also be generated, it turns out, if you are trying to eat the animal in front of you while avoiding being eaten by the animal behind you.

For a moment, on a particularly gnarly stretch of Sixth Avenue near Rockefeller Center, as I ducked a grimacing commuter with a briefcase, I considered the merits of this.

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