Pedestrian movement and language:
Are grammars "emergent" like passing-by routines are?

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Consider the behaviour of pedestrians moving about in public spaces. Imagine a thoroughfare – sufficiently wide for two persons to get past one another without having to negotiate who goes first and without other difficulties – where person A walks in one direction and person B walks in the opposite direction. How do they pass one another without colliding or otherwise delaying one another's progress? This can be a social problem of considerable significance in densely populated parts of the world; and it can be exacerbated when delays would be dangerous.

If A and B were driving cars on a road, this would be easy in just about all countries where there is road traffic: they would each stay in their lane – on the right (from one's own point of view) in most countries worldwide or on the left in a relatively few countries including Great Britain, and passing one another on the left or right, respectively – following a convention regulating the behaviour of those moving about in vehicles on public roads, or indeed as prescribed by law.

For pedestrians there are no such written norms or explicit conventions governing their walking behaviour. Still, in order to get past one another without delay or collision, or also without the embarrassment of having to spend some time negotiating who passes on which side, they will have to find a solution to their joint problem. Game theorists have done work on this sort of decision problem, but I'm not sure it has been treated as an empirical problem. I'd assume that both pedestrians – at a distance, once they have noticed the possibility of a hold-up or collision – will try to calculate the probable trajectory of the other, on the assumption that s/he continues in her/his motion as s/he does now, and then as early as possible each will seek to find a trajectory of her/his own that wouldn't result in delay, collision, or face-threat. Another, more rigid strategy might be to keep on one side of the walkway and signal to the other that one intends to stick to this side, and hope that

this power game is successful, with the other submitting and choosing the other side to avoid a conflict. Apparently, the right side is universally favoured, regardless of the side on which vehicles move in the country concerned. (Even though this is not to be recommended when pedestrians are sharing a road with vehicles and these drive on the right, too.) Perhaps this is because of the universal symbolic associations right = good, left = bad. Or perhaps there are, or once were, real advantages when one hand a safe border to one's right and could see and handle oncoming friends or foes on one's left. From another angle, moving on the left side of a road is in fact safer, or was safer when you were travelling on horseback and always had to reckon with the possibility of being overtaken by highwaymen intent on robbing you and doing you harm: most people being right-handed, they would have found it easier to defend themselves when moving on the left and hence being overtaken on their right. So, this particular consideration of safety appears to have been overridden for vehicular locomotion in countries other than those of the British Empire and her sphere of influence, and for pedestrian locomotion everywhere.

Let's complicate the social problem: let two or more pedestrians or preferably whole crowds of them walk in opposite directions. Will each individual pedestrian act independently of everybody else, other than perhaps one single oncoming walker with whom to negotiate how to pass by one another? No. Here we have clear empirical evidence that what will happen rather quickly is that LANES will be formed: instead of each walker relating to just a single walker in the opposite direction, they will seek to follow behind walkers in the same direction. Some or indeed all of those walking in one direction will keep on one side of the walkway, and some or indeed all those walking in the opposite direction will also keep on one side, the other side from the point of view of their partners in passing-by. And this is a reasonable routine, because lane formation is the most effective strategy of minimising delays, face-threats, or actual collisions. Again, it seems that the right side is universally preferred as a lane. When this happens on an open field or on a wide square, where there are no borders to possibly keep close to, this would seem to suggest that it cannot be the assumed safety of a border to one's right that primarily motivates the "rule" of passing-by one another on the right.

What I know about pedestrian movement is based (i) on several decades of participant observation and (ii) on work by Dirk Helbing, in particular his book *Verkehrsdynamik: Neue physikalische Modellierungskonzepte* (Heidelberg: Springer, 1997) and the 2001 paper 'Self-organizing pedestrian movement' by Dirk Helbing, Péter Molnár, Illés J. Farkas, & Kai Bolay in *Environment and Planning B: Planning and Design* 28(3). 361–383. If really interested, I'd recommend that you also watch this:

http://www.trafficforum.org/somsstuff/pedapplets/Corridor.html

(This author, incidentally, is a trained physicist and is now a professor in a sociology department: so much for the disciplinary ambivalence of the scholarly study of pedestrian movement.)

Details don't matter here, however. The point is that what we observe here are EMERGENT patterns of human behaviour: there are no norms or conventions, explicit or tacit, regulating the passing-by behaviour of pedestrians; no individual strategic considerations or communal discussions on the part of the social agents; no learning from experience or imitation (apparently) – and yet patterns of behaviour emerge which enable individuals to resolve collective problems.

This, for me, raises a few questions.

First, how are social animals solving this problem? Ants, for example. Do they just crawl over one another when they rush back and forth from and to a food source, with the path marked out pheromonally?

Second, how do human brains deal with this problem? There are presumably no parts of the brain specialised for just this kind of problem (unlike, say, for face recognition). Perception of position and movement in space and time will be involved, including proprioception. Coordination of own action with anticipated action of other. But, is a brain really needed for this sort of thing? Is memory? Or some kind of "representation" of space and time and bodies in motion? Is there a "grammar" of pedestrian's passing-by behaviour that could, in a meaningful way, be said to be mentally represented? Are there "dialects"? That is, for example, do pedestrians from rural, not-so-crowded places need to learn efficient passing-by when they find themselves in urban, crowded places?

But the main question I have is whether EMERGENT patterns of passing-by behaviour in crowds are in any relevant way comparable to patterns of LINGUISTIC

behaviour in speech communities. Remember that there is a linguistic school of thought that considers grammar *tout court* as "emergent" from language use, in opposition to "a priori" grammar controlling languae use. (See, for example, Paul Hopper's programmatic paper of 1987, Emergent grammar, *BLS* 13. 139–157, and the subsequent work this has engendered, usually under the rubric of "language in use".) Is grammar the same as passing-by routines of pedestrian crowds? Is grammatical change the same as changes in routines for passing-by in crowds, should these ever change?

To take an example. Suppose you want to address or refer to entities with proper names (people, places, rivers, whatever is name-worthy) more elaborately, by means of their proper name plus a title or classifier: e.g., *Professor Higgins*, *River Thames*, *London Town*. You'll have to deal with bipartite constructions, and the problem is how to serially order their parts, the name and the title or classifier. Now, is this problem resolved in the same way as a passing-by problem for pedestrians? And it is equally a communal problem, because it won't do if everybody within a speech community resolves it in their own way, regardless of what the others do. Sure, there are no explicit norms or conventions, either, which a speaker could take recourse to. There are the "rules of grammar" (of English, or any other language which has such constructions): but what is their mode of existence? Are they "emergent" patterns like the routines for passing by one another?

What we observe here, presumably, is that individuals growing into a speech community plainly imitate others in that community using this pattern. When they are successfully socialised, they follow the same "tacit" rule as everybody else does. There is no mutual tacit negotiating going on: if I act like this, and others can be expected to act like that, will matters pan out? There is no genetic determination of this matter, either: it would be humanly possible for a speech community to either opt for Title–Name or for Name–Title, and it is a historical contingency what they will opt for. Still, the rule which guides linguistic behaviour in this particular respect would be plausible assumed to be mentally represented in a way in which the routines for passing one another by aren't.

Perhaps it is in situations of change that one would especially like to be able to see a difference.

In earlier Germanic the linguistic rule was Name–Title (e.g., Old English *Ælfred cyning*), and in all Germanic languages it changed to Title–Name (except with certain place names, such as *London Town*). Presumably, at some stage, the primary linguistic data encountered by a language learner had become ambiguous: some people would say, in the old way, *Alfred King*, while others would reverse the order of the parts, for whatever reason (perhaps to avoid confusion with a different constructions, newly introduced, of given name and family name, with family names recruited from word that could also serve as titles), and say *King Alfred*: and the generation of learners faced with both options then had to "tacitly" agree on doing it one way or another. The new way, in this case, would be the winner, because it was able to distinguish the newly co-existing constructions, Title–Name (*King Alfred*) and Given–Family Name (*Alfred King*). Would one want to say that here, in successive periods, different linguistic patterns happen to be emerging? And would this then be the same kind of development as when lane formation changed from right to left?

A factual question here is whether there actually ARE historical changes in such emergent behavioural patterns. If there aren't, perhaps this is significant. What we do observe are transitions from a relatively brief state of non-orderly behaviour in groups (or non-recognisably orderly, at any rate) to orderly behaviour, and this quickly emerging orderly state is apparently superstable. Once lanes have been formed millions of pedestrians may pass through this thoroughfare for days and nights on end – and those walking in either direction will always stay on their "own" side. Is this true? What about the sudden appearance of an obstacle in the middle or on one side of the walkway? Or a sudden substantial increase in traffic? Or a sudden acceleration of walking speed in only one direction? Whatever changes of routine may be occasioned by such interferences, I don't think they would lead to lane reversals or abandoning the lane-forming strategy altogether.

What we observe with grammatical change is transitions from one orderly state (always Name–Title with all words serving as Names or Titles) to another orderly state (Title–Name with either all words serving as Names or Titles or well-delimited subsets of them, such as names of persons and lakes as opposed to names of towns), probably via an intermediate state of disorder (where the same words serving as Titles or Names may be placed in either sequence, or where randomly different

subsets of Title and Name words may consistently be placed in either one or the other sequence). There is no initial state of non-order.

Need to think this over; but it's too late now and I'm tired.