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Pandemics and the great evolutionary mismatch

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The current covid-19 crisis is reopening some of the core questioning of psychology: How do humans behave in response to threat? Can they be urged to behave differently? Panic and selfish behaviour are usually thought to be the prevalent responses to perceived danger. However, people affiliate and seek social contact even more when exposed to a threat. These inclinations might have been adaptive in our evolutionary past. They are our most serious problem now.

What do humans do when faced with a collective threat? This is a core question for psychology and is of major practical concern for the covid-19 pandemic. But do we have anything useful to share with governments and the media, or is this just an attempt to persuade ourselves that we can make some contribution in the face of our feelings of powerlessness when confronted with the unstoppable spread of this virus?

We could simply retire to the 'safety' of our ivory towers and leave everyone else to worry, but the fact that we have a strong drive to do something tells a very different story from the one that still dominates the social and psychological sciences and the media. This is the idea that danger brings out the worst in us: Panic, antisocial behaviour, and fierce competition for material and physical resources (see [1] for a review). Moral transgression and the abandonment of social norms may sometimes occur and certainly colour public imagination, but this behaviour tends to be rare. Sociological and psychological studies show that, under stress, people frequently remain calm and cooperative [1,2]. What's more, rather than selfish avoidance, it is cooperation and contact-seeking that are our primary responses to threat [1–6].

What increases in times of anxiety and threat is not a drive to help the self at all costs, but an intuitive drive to help others. The unfortunate consequence is that, in response to the current threat of infection, we desire social contact, particularly with the loved and the vulnerable.

Pandemics, and the 'breakdown of social order' narrative

When describing the behaviour of people living in countries affected by the spread of covid-19, the media has rapidly adopted a 'Hobbesian' view of human nature [4]. This is the expectation that exposure to threat makes people abandon social niceties and, being naturally rivals, fall back into "brutishness and misery". Major newspapers report panic, with people running to shops to collect masks, hand sanitizers and food. Those behaviours are routinely qualified as irrational: Why rush to buy food when we are told that there will be no shortages? We do not doubt that humans can be irrational (we misevaluate large magnitudes; underestimate risks and value short-term gain [7]). However, at the *individual level*, it is rational to hoard food and toilet paper when we are told that we will have to stay at home for an indefinite amount of time. It's not that we don't trust politicians, but we are right to be uncertain about the resilience of institutions, and the social contract in general, in the face of an unprecedented, unknown, and growing threat. Similarly, it is perfectly rational, at the *individual* level, to run for the exits when the building is on fire. However, these self-oriented rational decisions are the ones on which we have to consciously reflect [8]. Our initial, intuitive responses are, on the contrary, to be cooperative [9].

In real-life threatening circumstances, people do not take time and coldly deliberate about what behaviour would most suit their self-interest, i.e. leave others behind, and - metaphorically - run to the exit with sufficient food (and toilet paper). On the contrary, people seek social contact. They check on each other, and even respect or re-invent social norms, with moral or altruistic content [1,2]. In a recent work [10], we looked at how people behaved in a theatre under terrorist attack.

Where we might have expected generalised panic and stampede, we found that people formed queues to climb out to an emergency exit, while some even had voting sessions to collectively decide how best to keep safe.

The coming of covid-19 is being met with inertia and placidity, rather than mass panic. The French population was (and is still being) criticized by their own authorities for their laxity and nonchalance. Some weeks ago, the French continued to gather in bar terraces and break the obvious rules of social distancing. The German state of Bavaria took stricter confinement measures on March 21st, after finding that many individuals, despite the explicit instruction to stay away from others, were still gathering in groups as if nothing had changed. Similar violations of official advice are occurring everywhere.

An alternative to the accusation that people are irrational and irresponsible, is the suggestion that people are ignorant of the threat. We are not suggesting that these effects are not a play (more below), but we want to suggest that knowing the threat is perfectly compatible with seeking company of friends and loved ones. Being with others, and getting but also providing social support is how we cope with stress [11]. Increasing threat is only likely to reinforce this social inclination.

Affiliation and contact-seeking as core responses to perceived danger

Affiliation and physical contact-seeking are core responses to danger [4,12]. Even in the absence of threat, spatial distancing is unnatural. In normal circumstances, a distance of around 1 meter is expected when interacting with friends and acquaintances [13]. Humans, like other primates, stay close to significant others to create and maintain social bonds [14,15]. Contact-seeking may be a “natural” drive which is embedded in our physiology. Social touch contributes to the physiological regulation of the body’s responses to acute stressors and other short-term

challenges. Close social support is not an extra for getting additional rewards. It constitutes our baseline [16]. Our brains do not respond positively to its presence, but negatively to its loss. People can crave for social cues just like they crave for food [17]. The policy implications of decades of research in social neuroscience are clear, but widely ignored: Asking people to renounce social contact is not just asking them to abstain from pleasurable activities. It is asking them to diverge from a point of equilibrium - toward which they normally all gravitate.

In threatening contexts, our affiliative tendencies and desire to seek physical contact become even stronger. Rather than "falling back" into selfish isolation, as in the Hobbesian picture, people who feel afraid, stressed, and threatened will not just seek social contact: They seek even more social contact [4,12]. Research on disasters has shown that contact-seeking rather than distancing is the primary response to perceived danger, even if the latter is safer [3]. When we know there is something to lose, rather than to win, we are more prone to join others, both to diffuse stress and to reduce our feelings of responsibility [6]. Affiliative tendencies and contact-seeking would preferentially target individuals who are already familiar [3]. In their absence, people look for *familiar places associated with close ones* [3]. It is this, perhaps, that explains mass movements before confinement rules are proclaimed. It is also possible that ad hoc groups emerge from scratch when threat arises, emerging from a feeling of 'common fate' [2]. Exodus away from dense city centers has occurred in several countries and has been criticized for its potentially disastrous epidemiological consequences.

Who is the "we" in "we are in this together"?

That there is a threat does not mean it will be perceived as such. The same goes for its severity, or the extent to which it will be reacted to. People may give credibility to sources other than official ones, and under-estimate the threat, but they are not gullible [18,19], and danger is likely to make

them even more vigilant. Many of us clearly *by now believe* there's a threat, but do not perceive it as a collective threat that directly affects 'us'.

One major issue is that diseases are largely invisible, particularly diseases (like covid-19) which remain asymptomatic in a large part of the population. This imperceptibility means that it is not even detected, let alone recognized as a collective threat. Hence, the defensive avoidance mechanisms associated with fear and disgust will not operate. Similarly, our social tendencies simply continue as, in the absence of symptoms, we don't perceive that we may carry the infection. Even if we believe that the threat is widespread within our own group, the implications for oneself are challenging. Recognizing that one is likely to become a deadly threat to others is incongruent with our self-image, leading to dissonance and denial of the danger.

There is however a second issue: A threat stemming from infection, in societies with optimally functioning health systems, may be detected and yet recognized to be severe only for a small fraction of the population. Unless we feel we belong to that fraction, the threat may not be construed as collective: It is them, not us. A threat that remains invisible, and is thought to apply only to some individuals, is unlike other threats (such as predators, enemies or hurricanes) which are clearly menacing *everyone* in a given location. More than physical proximity and co-vulnerability is needed for a threat to be recognised as collective. Some actual or potential understanding of aspects of the threat as shared by us all, in a collective 'we' [2,20] is also required.

Once anchored in the idea that it affects a small fraction of people, either different or same as us, people are likely to miss what exponential growth mean. Like the King in the legend, a cognitive limitation makes us miss that placing two grains of rice on a chessboard, and multiplying them by their own number square after square will ultimately ruin us, because it will ruin everyone [21].

What's more, populations in which people think of themselves as 'independent persons' could be more likely to downplay the severity of the problem, because they will have greater trouble imagining the threat would actually become dangerous to their loved ones, or affect society as a whole. In societies and populations where a 'conjoint' model of the self is prevalent [22] (i.e., people think of themselves as 'member of a group' and as socially interdependent), this could be the other way around: Such populations may be likely to promote the emergence of collective norms and stick to them. Unfortunately, in many countries at least and despite the Spanish Flu (1918-1920), Asian Flu (1957-1958), Hong Kong Flu (1968-1969), Russian Flu (1977-1978), H1N1 Flu Pandemic (2009-2010), avian influenza A [H7N9] virus (2013), there are no clear established cultural norms for behaviour in the face of mass epidemics, even less for a global one.

In all likelihood, the mismatch between our misperception of the severity of the threat and its consequences is likely to become even more destructive in dense urban areas in which social isolation is a costly good.

Affiliation and contact-seeking as our current greatest problem

Pathogens and viruses are old evolutionary problems: Many organisms avoid contaminants and infected individuals, and infected individuals may also seek isolation, stopping the propagation of the virus. We humans also are equipped with mechanisms (e.g., disgust) to avoid possible contaminants and prevent us from being infected [23,24]. Many studies, from sensory to more abstract cases of disgust, suggest that this mechanism is very conservative. One instance of food poisoning generates long-lasting aversive responses to the same food, as well as similar ones [25,26]. Even knowing that the shirt worn by a sex-offender has been washed multiple times, or a cockroach plunged in a glass, in a perfectly sterile way will suffice to make us refuse to use or

consume these goods [27]. So why don't we avoid each other in times of infections? It is because our infection-avoidance mechanisms are overwhelmed by a much stronger drive to affiliate and seek close contact.

As a growing number of countries enforce or recommend confinement in response to the spread of covid-19, we believe it is important to reflect on the particular challenges these recommendations can lead to, and solutions to address them. *Pace* Hobbes, our great evolutionary equipment is not working to turn us away or against each other in times of peril. During collective threats, we seek even more physical closeness. These intuitive social inclinations make us hear various measures of prevention as all the same, or blur their differences: Self-isolation, quarantine, lockdowns and distancing may indiscriminately trigger feelings of social loss, when they could highlight future social benefits.

Our social cravings, actual or anticipated, can have deadly consequences, but there is also an increasingly optimistic aspect of the story. There is growing evidence that the collective menace makes us more socially supportive and cooperative, but now we can reach out - virtually, but no less meaningfully - to neighbours, distant relatives, or even anonymous and purely potential beneficiaries on social media. Politically, this means that access to the internet and communication is a priority, especially when the most vulnerable coincide with the less technologically connected. What will be the effects of this long-term switch to the internet? We are in the midst of a massive 'real life experiment' exploring whether our brains, and bodies, can do without physical proximity (see [28] for a preliminary answer). What we get out of this special situation matters as much as how, and how long, we can cope with it.

In Brief Dezecache et al. argue that affiliation and contact-seeking are key responses to danger. These natural social tendencies are likely to hinder the observance of physical distancing during the current pandemic. Universal internet access has been discussed as central to freedom of expression. It also here becomes a measure of public health.

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