

The urban animal: population density and social pathology in rodents and humans

Edmund Ramsden^a

In a 1962 edition of *Scientific American*, the ecologist John B Calhoun presented the results of a macabre series of experiments conducted at the National Institute of Mental Health (NIMH).¹ He had placed several rats in a laboratory in a converted barn where – protected from disease and predation and supplied with food, water and bedding – they bred rapidly. The one thing they were lacking was space, a fact that became increasingly problematic as what he liked to describe as his “rat city” and “rodent utopia” teemed with animals. Unwanted social contact occurred with increasing frequency, leading to increased stress and aggression. Following the work of the physiologist, Hans Selye, it seemed that the adrenal system offered the standard binary solution: fight or flight.² But in the sealed enclosure, flight was impossible. Violence quickly spiralled out of control. Cannibalism and infanticide followed. Males became hypersexual, pansexual and, an increasing proportion, homosexual. Calhoun called this vortex “a behavioural sink”. Their numbers fell into terminal decline and the population tailed off to extinction. At the experiments’ end, the only animals still alive had survived at an immense psychological cost: asexual and utterly withdrawn, they clustered in a vacant huddled mass. Even when reintroduced to normal rodent communities, these “socially autistic” animals remained isolated until death. In the words of one of Calhoun’s collaborators, rodent “utopia” had descended into “hell”.³

Calhoun’s experiments with rats and mice proved extremely influential. His findings resonated with a variety of concerns, including population growth, environmental degradation and urban violence. In the course of a project on the history of stress, Jon Adams of the London School of Economics and I have traced how evidence of crowding pathology, generated in the rodent laboratories of NIMH, travelled to an alternative setting: the buildings, institutions and cities of the social scientist,

city planner, architect and medical specialist. While urban sociologists and social psychiatrists explored correlations between density and pathologies in their statistical studies, environmental psychologists moved to the laboratory and fields such as the prison, the school and the hospital. Social and medical scientists were attracted to the possibility of providing evidence of how a physical and measurable variable – density – had important consequences demanding policy response. Many had already begun using Calhoun’s rats to support family planning programmes or for improving the physical design of the city.⁴

However, results from human studies of crowding proved inconsistent. In an influential series of experiments by the psychologist Jonathan Freedman, individuals employed to carry out tasks under varying conditions of density displayed few pathologies.⁵ Focus now shifted away from simply identifying the pathological consequences of density and towards factors that mediated its effects. This was aided by a distinction between “density” as a physical measure and “crowding” as a subjective response.⁶ Feeling crowded was determined by a range of social and psychological factors: an individual’s desired level of privacy, their ability to control a situation or their social role. Increased density might be inevitable but human beings were capable of coping with crowding.

Yet this did not mean that Calhoun’s research was rejected. Researchers recognized that Calhoun’s work was not simply about density in a physical sense, as number of individuals-per-square-unit-area, but was about degrees of social interaction. By reducing unwanted interaction through improved design of space – providing prisoners with individual cells or patients with independent living areas – crowding stress could be avoided.⁷ This had been the focus of Calhoun’s later research. Through improved design and increased control, Calhoun attempted to develop more collaborative and adaptable rodent

communities capable of withstanding greater degrees of density.⁸

Continued problems of prison overcrowding and transport congestion ensure that the subject of crowding stress remains pertinent, but the relevance of Calhoun’s experiments is less commonly acknowledged. Towards the end of his career, Calhoun, who died in 1995, would be increasingly dismayed that it was a simplified, negative message – population density equals pathology – that was more commonly associated with his work, making his contribution seem not only flawed in the human context, but dangerous. In the words of the sociologists Fischer & Baldassare: “A red-eyed, sharp-fanged obsession about urban life stalks contemporary thought.”⁹ In focusing upon crowding, not only were the benefits of dense city-living ignored, but other causes of urban pathology, such as poverty and inequality, were neglected. Yet Calhoun’s work considered many of these factors, suggested how they could be overcome, and as such, his role deserves reconsideration. ■

References

1. Calhoun JB. Population density and social pathology. *Sci Am* 1962; 306:139-48.
2. Selye H. A syndrome produced by diverse noxious agents. *Nature* 1936; 138:32. doi:10.1038/138032a0
3. Marsden HM. Crowding and animal behavior. In: Wohlwill JF, Carson D, eds. *Environment and the social sciences: perspectives and applications*. Washington, DC: American Psychological Association;1972.
4. Mumford L. *The urban prospect*. New York, NY: Harcourt, Brace & World; 1968.
5. Freedman JL. *Crowding and behavior*. San Francisco, CA: WH Freeman; 1975.
6. Stokols D. On the distinction between density and crowding: some implications for future research. *Psychol Rev* 1972;79:275-7. PMID:5056743 doi:10.1037/h0032706
7. Paulus P. *Prison crowding: a psychological perspective*. Berlin: Springer-Verlag;1988.
8. Calhoun JB. Space and the strategy of life. In: Esser AH, ed. *Behavior and environment*. New York, NY: Plenum Press;1971.
9. Fischer CS, Baldassare M. How far from the madding crowd? *New Soc* 1975;32:531-3.

^a School of Humanities and Social Science, University of Exeter, Rennes Drive, Exeter, EX4 4RJ, England. Correspondence to Edmund Ramsden (e-mail: E.Ramsden@exeter.ac.uk).