



Social behavior and disease: supporting science during the pandemic

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Led by field observations of Collias and Southwick (1952), the innovative thinking of Alexander (1974) and Freeland (1976; Capitanio 2012), and today supported by evidence from multiple disciplines, the significance of social behavior in the transmission of disease in nature and the development of society-level and population-wide immunity have long been recognized. Basic research on diverse model systems has integrated ethological, ecological, evolutionary, genetic, immunological, psychological, sociological, theoretical, and epidemiological approaches to understand the risks posed by pathogens and parasites, host responses to infection and infestation, and the consequences of disease to fitness (Brown and Brown 1986; John and Samuel 2000; Schmid-Hempel 2005; Nunn and Altizer 2006; Fefferman and Traniello 2009; Kappeler et al. 2015; McCabe et al. 2015; Perez-Saez et al. 2017; Rosengaus et al. 2017; Cremer 2019; Samson et al. 2019; Sanz et al. 2019; Silk et al. 2019; Korn et al. 2020; Pull and McMahon 2020; Wilson et al. 2020). The studies cited above represent a minute fraction of published work documenting the impacts of group living and movement in relation to contagion. In sum, they demonstrate that social behavior has dual roles, serving to spread disease through contact among individuals living together, particularly in large groups and at high densities, but also enabling the collective control of infection.

A broad socioecoimmunological foundation promotes an understanding of how human social behavior may lower infection risk and control future outbreaks. This strong interdisciplinary and broad phylogenetic perspective can be applied to the current COVID-19 pandemic. Van Bayel et al. (2020)

offer important insights from social and natural science research to “help align human behaviour with the recommendations of epidemiologists and public health experts.” Lopes (2020) questions if social distancing is “natural” to humans and notes that diseased vampire bats, mice, and eusocial insects voluntarily isolate themselves from uninfected group members. Human actions in response to expert public health guidance for reducing coronavirus infection, in contrast, appear to be influenced by age-associated risk tolerance, selfish independence, and parochialism. Simple prophylactic measures that have little personal cost and are empirically known to provide great benefit in managing the spread of disease have been difficult to implement with consistency. Some of these measures, moreover, have become polarizing “green beard” markers of group affiliation (Hamilton 1964; Dawkins 1976) that decrease compliance with authoritative advisories. Physical distancing has proven problematic, although it is still possible to maintain a high degree of social connectedness through multiple channels of communication and readily accessible technologies. Human behavior during the pandemic has been frequently contrary to evidence-based recommendations for intervention practices that maximize public health benefits, and interest in the common good has often been subordinate to personal, economic, and political gain. Core elements of human sociality that may constrain the expression of flexible and adaptive cooperative behavior at the level of the family, society, and international community appear to be exerting their influence.

At this unprecedented time of global crisis and in a persistently disturbing and frustrating culture of denialism within which evidence-based findings have been and continue to be marginalized, suppressed, and devalued, our understanding of the behavioral biology of disease causes us to again emphasize the significance and necessity of science in post-truth society (Traniello and Bakker 2017). As researchers who have examined the behavior, ecology, and evolution of disease and immune response and as Editors-in-Chief of *Behavioral Ecology and Sociobiology* who regularly publish articles concerning social behavior, infection, and immunocompetence and

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whose editorial board includes preeminent scientists with expertise in the behavioral ecology of disease, we are compelled to clearly declare our support for scientific practices and reasoning to guide the course of actions necessary for health security throughout the pandemic.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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