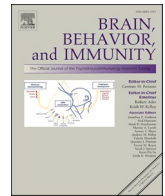




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Viewpoint

Social psychoneuroimmunology: Understanding bidirectional links between social experiences and the immune system

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Does the immune system have a “social life,” wherein our social experiences can affect and be affected by the activities of the immune system? Research in the nascent subfield of *social psychoneuroimmunology* suggests that the answer to this question is a resounding “yes” – there are profound bidirectional connections between social experiences and the immune system. Yet there are also vast opportunities for discovery in this new subfield. In this article, I briefly define and outline some core tenants of social psychoneuroimmunology (Fig. 1). I also highlight opportunities for future work in this area. Bringing together social psychological and psychoneuroimmunology research will undoubtedly lead to important discoveries about the interconnections between the immune system and social experience that will advance both basic science knowledge and understanding of health and well-being.

1. What is social psychoneuroimmunology?

Decades of research in psychoneuroimmunology have documented that there is significant crosstalk between the central nervous system and the immune system, such that psychological experiences can affect and be affected by the immune system. Despite this foundational work, only relatively recently has research examined how *social* psychological processes interface with the immune system. I term this area of research *social psychoneuroimmunology*, an interdisciplinary subfield dedicated to studying how social experiences elicit changes in immune system processes and how activation of the immune system feeds back to the brain to shape social cognition and behaviour (Kemeny, 2009; Eisenberger et al., 2017; Gassen and Hill, 2019). Social psychoneuroimmunology thus builds a bridge between research in social psychology, which focuses on modeling, measuring, and manipulating social emotions, cognitions, and behaviors, and research in psychoneuroimmunology, which focuses on understanding connections between the brain and the immune system.

While social psychoneuroimmunology research is still in its early days, two core tenants should guide future research in this area. The first core tenant is that real and imagined social situations that may signal (or

have historically signaled) increased likelihood of injury (e.g., ostracism) or infection (e.g., socially connecting with others) will lead to changes in the activities of the immune system (Kemeny, 2009; Eisenberger et al., 2017; Gassen and Hill, 2019; Slavich and Cole, 2013; Leschak and Eisenberger, 2019). The second core tenant is that the brain is constantly monitoring the physiological state of the body and integrating this information with signals from the broader environment to gauge metabolic demands and guide adaptive behavior (Sterling, 2012). As such, even relatively minor fluctuations in immune system activation outside of an experience of acute illness, injury, or chronic disease, can feed back to the brain to guide social cognition and behavior. These core tenants highlight the bidirectional associations that are critical to social psychoneuroimmunology: social experiences can drive changes in the immune system, and immune system activation can drive changes in social experience.

2. Why social psychoneuroimmunology?

There are both conceptual and practical reasons why defining the new subfield of social psychoneuroimmunology is valuable. Conceptually, adding an explicit reference to the *social* component of psychoneuroimmunology will elevate the status of social processes in investigations of causal links between psychological and immunological processes. This is important because conceptualization, and therefore, manipulation and measurement, of social processes has been relatively impoverished in PNI research to-date, despite initial foundational work on social-immune connections. Much more sophisticated considerations of the social experiences that affect and are affected by immunological processes are needed, building on classic social psychological theory and experimental methods. Practically, having the label of social psychoneuroimmunology will allow like-minded researchers to more easily identify one another, facilitating collaboration. Further, having a more precise name for this subfield could lead to focused pre-conferences and workshops, special issues of journals, funding opportunities, and training programs that will accelerate the pace of discovery in this area.

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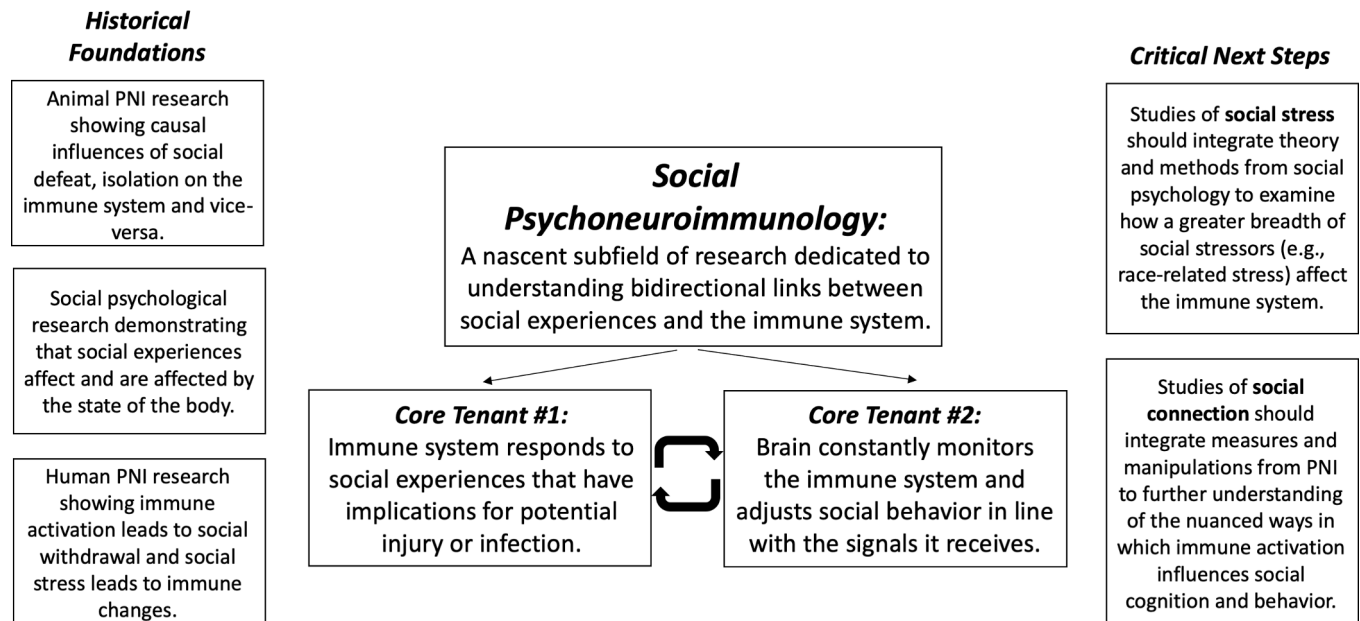


Fig. 1. Model outlining the subfield of social psychoneuroimmunology. Depicted at left are the historical foundations that gave rise to this area of research. These include experimental PNI research with animals showing that social experiences (e.g., social defeat, social isolation) lead to changes in the immune system, and studies demonstrating that manipulations of the activities of the immune system (e.g., inflammatory challenge) lead to changes in social behavior, including social withdrawal but also greater social engagement behaviors under some circumstances. Social psychological research has long appreciated that the physical state of the body, including physiological activation across multiple channels (e.g., autonomic nervous system, endocrine system) influences and is influenced by social cognition and behavior; however, social psychologists have only recently started examining the immune system as an additional bodily context that can shape social experience. Human PNI research has also examined links between social experiences and the immune system, focusing to-date primarily on social stressors as elicitors of immune changes with some work also showing that immune changes (e.g., inflammatory challenge) shape social experience (e.g., social disconnection; heightened sensitivity to cues of care providers). The middle panel depicts the definition and core tenants of social psychoneuroimmunology that are proposed in the present paper. Finally, depicted at right are two concrete examples of critical next steps for social psychoneuroimmunology research, highlighting how PNI can benefit from social psychology, and how social psychology can benefit from PNI. These are just two examples of future directions; in fact, there are numerous exciting opportunities for future research in this area. PNI = psychoneuroimmunology.

3. Opportunities for future research in social psychoneuroimmunology

There are tremendous opportunities for future research in this area. Two specific examples of research topics that would benefit from a social psychoneuroimmunology lens are research on social stress and social connection. With regard to social stress, psychoneuroimmunology research would benefit from integrating the nuanced and sophisticated theory and methods that social psychology offers regarding social stress (Trawalter et al., 2009). For example, while most laboratory experimental research in psychoneuroimmunology has focused on the influence of social evaluative stressors on inflammation (Kemeny, 2009; Marsland et al., 2017), stress is a multi-faceted concept and individuals face a variety of acute and chronic social stressors beyond social evaluation that may impact the immune system. Future experimental research that examines how other types of social stressors, including race-related stressors and/or threats to one's position in a social hierarchy, influence the immune system would provide more breadth and nuance to our understanding of the causal links between social stress and immunology. These topics are widely studied in social psychology (Trawalter et al., 2009) but relatively neglected in experimental PNI research to date, making this an area ripe for future investigation.

A second topic that would benefit from a social psychoneuroimmunology lens focuses on the immune system and social connection (Eisenberger et al., 2017; Leschak and Eisenberger, 2019; Hennessy et al., 2014; Kiecolt-Glaser et al., 2010). Seminal psychoneuroimmunology research shows that social withdrawal is a hallmark “sickness behavior,” as increases in inflammation lead to less social exploration and feelings of social connection. However, other work suggests that the effects of inflammation on social behavior may be more nuanced, in

some cases leading to *increases* in social behavior (Eisenberger et al., 2017; Leschak and Eisenberger, 2019; Hennessy et al., 2014). Given these interesting connections between inflammation and social behavior, it is surprising that, until quite recently (Kemeny, 2009; Eisenberger et al., 2017; Gassen and Hill, 2019), social psychologists have largely failed to appreciate that immune system activation could be contributing to the cognitions, emotions, and behaviors that they are studying. Future work integrating psychoneuroimmunology into social psychology could lead to significant advancements in our understanding of how immune system activation influences social behavior, highlighting the immune system as a critical context for social experience that social psychologists need to consider.

In sum, there are tremendous opportunities for future research that integrates theory and methods from social psychology together with knowledge and tools from psychoneuroimmunology to advance our understanding of how social experiences affect and are affected by the activities of the immune system. Ultimately, research in social psychoneuroimmunology has the potential to revolutionize our understanding of how social and bodily contexts interface to influence thoughts, feelings, and behavior in ways that contribute to health and well-being.

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Conflicts of interest

Nothing to disclose.

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