

RESPONSE

Contention, Consensus, and the Behavioral Immune System: From the Forum Forward

Steven L. Neuberg
Arizona State University

Research on the Behavioral Immune System (BIS) has made impressive gains in a short period of time. Distilled from the 7 thoughtful contributions to this forum, the author highlights 3 sets of ideas for moving BIS theory and research forward: (a) The benefits to be gained via additional vertical and horizontal conceptual integration, and via greater specificity in the articulation of mechanisms to capture the complexity of pathogen-relevant phenomena; (b) the need to take great care in selecting methods tightly appropriate to the specific hypotheses (and alternative hypotheses) BIS researchers are (and should be) testing; and (c) the need to avoid the disciplinary ethnocentrism that confronts many multidisciplinary and interdisciplinary endeavors.

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The ancient Forum was a gathering place, the most important public space in Roman life. It was a place for celebrants, but also for combatants—merchants and consumers armed with product and coin, gladiators armed with sword and shield, and intellectuals armed with words and rhetoric. It was an open space, “out of doors,” so the trading of goods and blows and ideas could be seen by all, and be available for all to contemplate, comment upon, and judge. The aim of the Forum was not just to benefit those actively engaging in commerce and battle and debate, but, through those transactions, to also enhance the public good.

I was reminded of this when asked to participate in this contemporary forum focusing on the state of research on the so-labeled Behavioral Immune System (BIS). Reading the seven thoughtful contributions, I saw, as the Romans had many generations ago, celebration, combat, and critiques of the past intended to inform the future. Of course, a forum in the pages of a journal, represented as a collection of individual

essays, necessarily lacks the give-and-take of a forum of contributors held in vivo and in real time. This makes it more difficult to assess points of real underlying agreement and disagreement, and more difficult to assess whether and how this interchange may indeed enhance the public, scientific good.

I have taken as my role, then, that of interpreter. To anticipate, I see some useful points of contention among contributors, although I would suggest that many are more apparent than real. Indeed, I see much consensus on points of true importance for moving this science forward. I also see some challenges related to what some have called the sociology of science—issues that characterize not just this endeavor but also many others in which the questions of interest are pursued by those with different disciplinary inclinations, aesthetics, and languages.

Theory: The Need to Connect, Integrate, and Deepen

Great science requires theory that is logically coherent, accounts for that already known, and is capable of generating novel, testable hypotheses. By these criteria, BIS research over the past decade or so has made impressive progress (e.g., Schaller & Park, 2011). BIS researchers

Correspondence concerning this article should be addressed to Steven L. Neuberg, Department of Psychology, Arizona State University, Tempe, AZ 85287-1104. E-mail: steven.neuberg@asu.edu

take as starting points two relatively noncontroversial claims—that fitness benefits would have accrued to ancestral organisms that successfully managed the threats posed by infectious pathogens, and that those ancestors who possessed cognitive, emotional, and behavioral mechanisms that led them to avoid contact with such pathogens (rather than merely possessing mechanisms to fight them off postinfection) would have had fitness advantages over those lacking such mechanisms. The conceptual framework developed from these two ideas has added clarity to a great number of previously observed cognitive and social phenomena (e.g., ethnocentrism and stigma, dimensions of mate preference, and collectivism). Moreover, this framework has motivated researchers to consider intriguing predictive variables lying outside the logical reach of traditional psychological and behavioral theories (e.g., stage of pregnancy; Navarrete, Fessler, & Eng, 2007), and has led them to consider outcome variables that, in the absence of BIS reasoning, would seem to have little to do with disease (e.g., extraverted disposition; Mortensen et al., 2010; Schaller & Murray, 2008). Many such novel hypotheses have been tested and have received support.

That said, there remains much conceptual work to do. The best theorizing is vertically integrative, horizontally integrative, and able to account for nuanced complexities, and several of the forum's contributions take on these issues. Whereas much behavioral science cares little about vertical integration, it is an important—and distinguishing—ambition of evolutionary science, for which a full theoretical understanding is expected to eventually include an articulation of the causal connections among genes, physiology, mental computations, and behavior. The essay by Gangestad and Grebe (2014) explicitly notes this, and Clark and Fessler (2014) highlight the value of integrating BIS theory and empirical research with theorizing and research in the area known as “psycho-neuroimmunology” (PNI). Although there have been some efforts by researchers within the BIS tradition to make such connections (e.g., Miller & Maner, 2011; Schaller, Miller, Gervais, Yager, & Chen, 2010), Clark and Fessler are correct that much more work along these lines can, and should, be done. Simply put, a mature research endeavor exploring pathogen avoidance will need to be conceptually integrated

with theorizing on what might be called the “classic” immune system and PNI.

Theories that are horizontally integrative—that reach broadly to include a wide range of phenomena that might not otherwise appear to be conceptually related to one another—have great advantages over the “minitheories” that characterize too much of the behavioral and social sciences. As noted above, BIS mechanisms have already been applied to help explain a wide range of phenomena. Thornhill and Fincher (2014a) work to further extend the reach of BIS, proposing that the problem of managing exposure to pathogens also underlies humans' impressive mental abilities and social intelligence. This will be a controversial proposal. Not only does it potentially threaten existing explanations for the evolution of human mental abilities and social intelligence (e.g., Dunbar, 1998; Flinn, Geary, & Ward, 2005), but there are also legitimate challenges to the inferences one can draw from the methods that have largely been used to test such hypotheses (Hruschka & Hackman, 2014; Tybur, Frankenhuis, & Pollet, 2014). I will return to this latter point below.

Several of the contributions move BIS theorizing forward by attempting to better capture the complexities of the BIS. Because different pathogen avoidance tactics are likely to impose somewhat different combinations of specific fitness costs and benefits, they are likely to be engaged by different circumstances, in individuals with somewhat different chronic strategic interests, and be directed by somewhat different algorithms. As Gangestad and Grebe (2014) put it, it may not be so useful to think in terms of “the” BIS. Schaller (2014) deepens BIS theorizing by suggesting that there will be different disgust-based strategies for reactively avoiding currently present pathogens and for proactively reducing future infection threats. Specifically, the experience of disgust may result from the perception of heuristic cues to pathogens, but cause—via its effects on memory, attitudes, and interpersonal communication—proactive avoidance strategies. Lieberman and Patrick's (2014) broader point—that BIS researchers need to keep firmly in mind that the BIS (or, in their terms, the pathogen disgust system) is a computational system—is both consistent with, and potentially strengthens, Schaller's arguments.

The benefits to be gained by theoretically connecting BIS work to the contributions of both “classic” immunology and PNI strike me as important and noncontroversial, and I suspect that the contributors would agree. Arguments about the benefits to be gained by developing theory to better capture complexities related to the psychological and behavioral mechanisms comprising the BIS, and by articulating in more detail the inputs, algorithms, and outputs of such mechanisms, also strike me as important and noncontroversial—although there might be some disagreement about the particulars proposed. Had the contributors participated in a somewhat more interactive forum, then, I suspect that these broad themes would have emerged and survived with strong consensus, although several battles of specifics may have been joined, perhaps initiated by the question, “Maybe you’re correct, but how are you going to test that?”—a question to which I move next.

Method: The Need to Match Methods to Hypotheses

Great science requires not just strong theory but also methods for gathering the kinds of data needed to validly test strong theory. To its credit, the BIS research endeavor has been reasonably attentive to the benefits of a multimethod approach. It has used methods that aim to estimate pathogen loads in local environments, to experimentally activate disease-avoiding psychological systems in individuals, and to assess the chronic states of these systems in individuals. It has explored the effects of such states on immune activity, dispositional inclinations, cognitive decisions, affective reactions, and social behaviors at the level of individuals and, for some variables, at the level of populations as well.

That said, Tybur and colleagues (2014) and Hruschka and Hackman (2014) both make a compelling case for taking a closer look at exactly what the methods used in BIS research allow us to infer and what they do not. Tybur and colleagues overview the three most common classes of methods used to test BIS hypotheses—“priming” methods in which pathogen presence is experimentally made salient, individual differences in dispositionally held concerns with avoiding infection, and the use of cross-population correlations of pathogen rich-

ness and ostensive pathogen-avoiding mechanisms. Their analyses compel us to ask important questions. For example, do different pathogen-salience primes engage different, and functionally specific, avoidance strategies, or do they engage any number of strategies, the selection of which depends on other factors? What determines whether an experimental disease-salience prime operates as a “main effect” versus in interaction with individual dispositions? What exactly is the nature of such individual dispositions? Are there forms of disgust that relate specifically to pathogen-avoidance behaviors, but other forms of disgust that have no bearing on pathogen avoidance? And so forth.

Hruschka and Hackman argue that it is a very rocky road from cross-population correlations to inferences about the evolved psychology of individuals, illustrating their argument via critiques of previously published work by Thornhill, Fincher, and their colleagues. This was the place within the journal forum where I most regretted that these essays were not presented in the Roman Forum (or at least in a live, interactive symposium session), as I wanted to hear the responses of Thornhill and Fincher to the critique. (The interested observer should read Hackman & Hruschka, 2013a, 2013b; Thornhill & Fincher, 2013, 2014b.) To the credit of both Tybur and colleagues and Hruschka and Hackman, they provide productive suggestions for addressing the host of methodological challenges they raise.

I had two reactions to these articles, likely colored by my own BIS research, which has used all three methods analyzed by Tybur et al. First, my sense of the BIS research literature is that, riffing off of Gertrude Stein, “there is a there there” (or, if you prefer, “If it looks like a duck, swims like a duck, and quacks like a duck, then it probably is a duck”). That is, given the use of multiple methodological approaches to test BIS hypotheses, as well as many operationalizations within each of these methods, I would bet real money that there is indeed something we could call the BIS—that is, a system that is sensitive to heuristic cues to pathogen presence, that upon perception of these cues engages a set of computations aimed at assessing risk and the costs or benefits of alternative strategies, and that then initiates a suite of cognitive, emotional, behavioral, and perhaps societal-

institutional mechanisms designed to avoid current and prevent future pathogen threats.

Second, however, I am taken by their arguments and convinced that BIS researchers (myself included) could often do a better job selecting methods tightly appropriate to the specific hypotheses (and alternative hypotheses) we are (and should be) testing. Moreover, I agree that we would benefit by reconsidering the specificity of the conclusions we have drawn to this point. Although I am convinced there is a duck there, more careful attention to our selection of methods will strengthen the inferences we can draw and enhance our theoretical precision. Just as a great chef wants to know with some specificity the breed of duck she is about to cook—is it a northern pintail, a redhead, or a spectacled eider—we want to know with some specificity which mechanisms account for the interesting behaviors we observe, and under which circumstances and for which people they do so.

I suspect the other contributors will have reactions similar to mine, although I also suspect there will be cases in which quite serious debate would ensue regarding exactly what types of inferences can be drawn from specific methods in specific investigations. These would be worthy conversations.

Infrastructure: A Need to Reinforce the Social Scientific Context

Great science requires strong theory and valid methods for testing it. Great science also often requires a rich substrate of social and material resources.

I suspect that many of the contributors can share horror stories of submitted manuscripts misunderstood and viewed as “problematic” because of the evolutionary theorizing underpinning BIS hypotheses. New ideas nearly always confront resistance, yet the fact remains that the ideas and findings forming the foundation for this forum have indeed found their way into print. It is my sense that the substrate for performing and disseminating BIS work has been pretty good for a relatively young enterprise.

That said, I see a challenge—not from outside (or at least not any more than usual), but from *within*. Specifically, I worry about disciplinary ethnocentrism, a threat that all multi- and interdisciplinary endeavors potentially face. I sensed a bit of this in the tone of

several of the articles, and it is worth guarding against. We need to take care not to presume that researchers with different disciplinary backgrounds, aesthetics, and languages are unaware, conceptually sloppy, or otherwise misguided. BIS (or the pathogen disgust system, or PNI, or whatever we want to call this line of theorizing and research) is, and needs to be, a multi- and interdisciplinary effort. Researchers with different specific interests and foci—who, for example, study social behavior but not cytokine regulatory genes—are not generally dismissing the role of such genes as theoretically important, so let us not assume they are. Researchers from different disciplines—or even different traditions within the same discipline—often use different labels to refer to the same constructs, so let us not assume that they are ignorant at the conceptual level. There is much that different disciplines have to offer one another, but collaboration requires trust, open-mindedness, and patience if one is to reap its great rewards. I suspect that, in a face-to-face, interactive forum, with a group as well-intentioned as this one, there would be the opportunity to minimize these cross-disciplinary suspicions.

In Closing

I think the future is bright for research exploring the behavioral immune system as it connects to and integrates with theory on the immune system more broadly, as it deepens its analyses to better account for intriguing complexities, and as it takes stock of its methods for investigating the intriguing ways in which humans manage the threats posed by pathogens.

For scientists, the journal is a critical gathering place, one of the most important public spaces of academic life. When operating as a forum, its value is even greater, and I commend the editors for pulling together this marvelous set of thoughtful contributions. At the risk of wearing out the analogy of the Roman Forum, we have seen intellectual wares on display, and they are well worth the coin. We have also seen intellectual combat—direct and indirect—and we are better off for it. We have seen the past critiqued to create a stronger future. We have seen the scientific good enhanced.

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