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Evolutionary Psychology Meets Socio-Ecological Psychology: The Motivational Psychologies of Disease-Avoidance and Parental Care

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Abstract

Specific features of ancestral ecologies had implications for the evolution of psychological mechanisms that regulate specific aspects of human cognition and behavior within contemporary ecologies. These mechanisms produce predictably different attitudes, judgments and behavioral dispositions under different circumstances. This article summarizes two illustrative programs of research—one that focuses on the evolved psychology of disease-avoidance and its many implications, and the other that focuses on the evolved psychology of parental care-giving and its many implications. These programs of research exemplify the generative utility of evolutionary psychological conceptual methods within the domain of socio-ecological psychology.

Keywords: evolutionary psychology; socio-ecological psychology; disease avoidance; behavioral immune system; offspring care; parental care

1. Introduction

Research in socio-ecological psychology identifies ways in which people's cognitions and actions differ depending on the ecological circumstances that they inhabit. Those ways are many and varied [for examples see [1-3]), and many additional such phenomena will surely be discovered in the future. In order to facilitate this discovery, it is useful to employ conceptual tools that generate hypotheses regarding specific ecological circumstances that might influence specific psychological tendencies of people who occupy those ecological circumstances. Exactly such tools can be found within evolutionary psychology.

Whereas socio-ecological psychology is defined by inquiry into particular kinds of variables (features of individuals' ecological circumstances) and phenomena associated with those variables, evolutionary psychology is *not* defined by any particular set of variables or domain of phenomena; it is instead defined by a conceptual methodology that can be applied to any domain of inquiry within the psychological sciences. This methodology is characterized by logical principles that, when deployed rigorously, can generate novel hypotheses about psychological phenomena in contemporary human populations—including hypotheses (and consequent empirical discoveries) about specific ways in which people's cognitive and behavioral tendencies are influenced by specific features of their ecological circumstances [4,5].

This article is designed to highlight the generative utility of an evolutionary approach to socio-ecological psychology, with an illustrative focus on two specific research programs at the intersection of evolutionary psychology and socio-ecological psychology.

2. Evolutionary bases of psychological responses to ecological circumstances

In remarking upon the conceptual kinship between socio-ecological psychology and evolutionary psychology, Oishi and Graham [6] observed that a defining feature of evolutionary psychology is a focus on the ecological circumstances of ancestral populations. Indeed, a typical first step toward hypothesis-generation within an evolutionary psychological framework is the identification of some specific fitness "problem" (e.g., a reproduction-relevant peril to be avoided or opportunity to be seized) that existed within an ancestral ecology [4]. Subsequent steps include identification of plausible behavioral "solutions" to that problem (e.g., specific behavioral responses that might have mitigated that peril or enhanced access to that opportunity), and the further identification of psychological adaptations (e.g., specific cognitive responses to specific categories of perceptual stimuli) that might plausibly have evolved as a means of facilitating those reproductively beneficial behavioral responses.

Those are just the first few steps. Additional conceptual methods can then be employed to generate additional, more nuanced—and readily testable—hypotheses about psychological responses in contemporary human populations inhabiting contemporary ecologies [4]. For instance, evolutionary cost/benefit analyses can identify plausible biases in people's sensitivities to specific categories of perceptual stimuli (biases that may have been adaptive in ancestral ecologies), which serve as a principled basis for hypotheses predicting responses to the sorts of stimuli that people encounter in the here-and-now [7]. Cost/benefit analyses can also yield insights about the flexibility and context-contingency of these stimulus-response relations, leading to additional hypotheses specifying additional features of contemporary ecological circumstances that may moderate the strength of individuals' responses to those stimuli [4,5].

Thus, the conceptual methods of evolutionary psychology are characterized by close attention to individuals' ecological circumstances. Thoughtful speculation about *ancestral* ecologies serves as the conceptual foundation for the discovery of testable hypotheses; and many of these resulting hypotheses identify specific ways in which people's cognitions and actions vary depending on the *contemporary* ecologies that they inhabit.

The following two sections provide brief summaries of two programs of research that illustrate the generative utility of this evolutionary approach to socio-ecological psychology. One program of research focuses on a specific feature of humans' natural ecology: disease-causing pathogens. The other focuses a specific feature of humans' social ecology: children.

3. The behavioral immune system

A persistent feature of the ecologies inhabited by ancestral populations was the presence of pathogens. Evolved solutions to this problem include not only immunological mechanisms (which respond defensively to pathogens detected within the body), but also a complementary set of psychological mechanisms that, by regulating behavior, inhibit contact with pathogens in the first place. These psychological mechanisms can collectively be considered a kind of "behavioral immune system" [8,9].

Ample research reveals that people are adept at detecting potentially infectious things, and avoiding them. For instance, perceivers are able to distinguish sick people from healthy people based on subtle differences in physical appearance and body odor [10-12]. Once detected, ostensibly infectious things elicit a distinct emotional response—disgust—that motivates behavioral avoidance [13,14]. People also exhibit enhanced memory for infectious things [15],

which may help limit future contact too. Additional lines of research have linked the behavioral immune system to many additional judgments, attitudes, and behavioral dispositions (for reviews, see [14,16,17]). Consistent with the implications of evolutionary cost/benefit analyses, these responses are elicited not only by things that pose a real infection risk but also by predictable categories of things (including people) that pose no extraordinary infection risk at all; and these responses are especially likely to occur under ecological conditions in which perceivers are—or merely perceive themselves to be—especially vulnerable to infection.

For instance, because close interpersonal contact can (sometimes) pose an increased infection risk, when people feel vulnerable to infection they consequently feel more crowded in socially dense situations and are more reluctant to engage in affiliative behavior [18,19]. (Additional research reveals that the threat of disease has a more complex set of implications within the specific domain of mating relationships [20-22]). Vulnerability to infection may also lead people to avoid even indirect forms of interpersonal contact—as indicated by reduced willingness to purchase pre-owned consumer products [23].

Some people pose greater infection risk than others, and this threat may be tacitly (and sometimes inaccurately) connoted by non-normative appearances and behaviors. Consequently, when people feel more vulnerable to infection, they are more prejudiced against people who are perceived to be "different" in some way [24,25]. These prejudices manifest in many ways, including more avoidant responses to people with anomalous physical appearances, and more xenophobic responses to immigrants [26-29]. The perceived threat of disease also amplifies negative responses to non-normative actions—as indicated by the expression of more highly conformist attitudes, increased vigilance for others' non-normative behaviors, and greater moral condemnation of those norm violations [30-32]. These latter sets of findings suggest implications for conservative (rather than liberal) sociopolitical attitudes more generally: Heightened sensitivity to the threat posed by infectious diseases is associated with authoritarian attitudes, endorsement of conservative ideologies, and support for conservative candidates in political elections [33-36].

Although most of these findings reflect variables operationalized at an individual level of analysis, analogous findings have emerged from studies that focus on population-level outcomes—which manifest as cross-cultural differences—associated with different ecological regions worldwide (for reviews see [37-39]). For instance, within ecologies characterized by greater pathogen prevalence, human populations are characterized by more cautious interpersonal behavior, attitudes and values that more strongly encourage conformity to existing norms, and higher levels of authoritarianism [40-45]. These findings represent a showcase example of how the evolutionary framework underlying research on the "behavioral immune system" also contributes to research within socio-ecological psychology.

4. The parental care motivational system

Reproductive fitness is affected not merely by an individual's own survival and eventual success at producing offspring, but also by the survival and reproductive success of those offspring. Primate offspring—especially human offspring—are slow to mature. Thus, a persistent "problem" within ancestral ecologies was the presence of immature offspring in need of protection and care. As a consequence, there evolved psychological mechanisms that are sensitive to perceptual cues connoting this need, and that regulate protective and care-giving responses accordingly. These psychological mechanisms can collectively be considered a kind of parental care motivational system [46].

Although the manifestations of these mechanisms is most obvious in people who actually are parents [47], they characterize all normally-developing human beings. Even non-parents exhibit enhanced recall for things that, when encoded into memory, are evaluated according to their relevance to the task of parental care-giving [48]. And whether they are parents or not, people are perceptually sensitive to stimuli that are diagnostic of vulnerable young children, and respond positively to those stimuli [49]. As a consequence, the parental care motivational system may be triggered by the perception of any young child and also by other things—baby-faced adults, kittens and puppies—that merely mimic the superficial features of human infants [50,51]. The parental care motivational system may also be activated whenever people occupy—or simply imagine themselves occupying—some sort of care-giving role. (These mechanisms are inhibited under predictable circumstances too. For instance, the activation of mating motives inhibits a nurturant response to infants [52].)

Thus, "parental" inclinations are context-contingent—either exaggerated or inhibited under predictable ecological circumstances—with consequences for a wide range of judgments and dispositions that, in ancestral ecologies, were associated with the protection and/or nurturance of offspring. For instance, protection of offspring is likely to have been abetted by increased vigilance for and aversion to potentially harmful objects and activities. Consequently, under circumstances that activate the parental care motivational system, people are more risk-averse in their attitudes and decisions [51,53-56]. (A subset of these findings are moderated by sex differences. Specifically, for particular kinds of tasks in which risk-aversion is defined by a preference for smaller immediate rewards rather than potentially larger future rewards, the typical risk-aversion effect is found among women but not men [56]). This protective inclination has implications for inter-group prejudice: Under conditions in which ethnic out-groups are perceived to pose a threat, activation of the parental care system leads to increased prejudice against those out-groups [57]. There are implications for moral cognition too [58-60]. For example, when parents are reminded that they are parents—a circumstances that makes their care-giving responsibilities more salient—they consequently judge other adults' norm violations more harshly [58]. (This typical effect is reversed when judging transgressions perpetrated by young children, in which case activation of the parental care motivational system predicts more forgiving judgments instead [60]). And, just as activation of the behavioral immune system inclines people toward more conservative political attitudes, so too does activation of the parental care system [61,62]. Recent studies also reveal additional cognitive and behavioral consequences, including implications for individuals' self-concepts [63], mate preferences [59], and for *grand*parental care-giving behavior too [64].

Although some of these findings reflect variation in individuals' socio-ecological context (e.g., differences between people who and do not occupy a parental care-giving role), the thematic connection to socio-ecological psychology may not be as transparent as it is for work on the behavioral immune system. For instance, whereas there is an extensive body of research linking regional variation in pathogen prevalence to cultural differences (summarized above) there has not yet emerged an analogous literature documenting cultural differences attributable to regional variation in activation of the parental care motivational system. Such effects might plausibly exist. Different regions are characterized by different birth rates and by different child-care practices. Consequently, people in some places may be more regularly exposed to infants or more readily called upon to care for young children (even if those children aren't their own)—and so may be more chronically prone to activation of the parental care motivational system, with possible population-level consequences. Rigorous research into this possibility might

potentially complement existing research that locates human cultural variation within a behavioral ecological framework [5].

5. Reciprocal effects on socio-ecological habitats

Socio-ecological psychology is defined not only by inquiries into ways in which individuals' cognitions and actions are influenced by their ecological habitats, but also by the ways in which those cognitions and actions exert reciprocal influence on ecological habitats [6,65]. Therefore, it's worth pointing out that the psychological outputs of both the behavioral immune system and the parental care motivational system can have downstream consequences for socio-ecological habitats. For instance, both systems have implications for consumer behavior [23,56,66] which, when manifest across large numbers of people, has economic and societal consequences. These systems also have implications for sociopolitical attitudes [28,36,61] that can influence public policy in ways that have profound and enduring consequences on the social and/or natural ecologies that humans inhabit.

6. Conclusion

This brief review focused on two research programs within evolutionary psychology that overlap with the research agenda of socio-ecological psychology. Each program of research emerged from the identification of a specific fitness problem within ancestral ecologies, and from the identification of psychological mechanisms that plausibly evolved to regulate behavioral solutions to that problem—mechanisms that, in contemporary human populations, predictably produce different psychological outputs under different ecological circumstances. Ancestral ecologies were characterized by many additional fitness problems too, resulting in the evolution of many additional psychological mechanisms regulating behavioral solutions to those problems, with additional implications for variable responses across variable circumstances. For example, motivational mechanisms that evolved to regulate mating behavior in ancestral ecologies have a wide range of cognitive and behavioral consequences in contemporary ecologies, which can vary depending on the sex ratio within the local population [5]; and motivational mechanisms that evolved to regulate foraging behavior in ancestral ecologies also have many different psychological implications within contemporary ecologies, which can vary depending on the perceived availability of resources within those ecologies [5]. Those findings, like so many of the findings associated with the behavioral immune system and the parental care motivational system, have emerged—and will continue to emerge—from research projects informed by the conceptual principles of evolutionary psychology.

An evolutionary framework is certainly not the only means of generating hypotheses within socio-ecological psychology. Nor should it be. (The evolutionary framework is rigorously constrained by its underlying logical principles; and there are some contemporary psychological responses to contemporary human ecologies that cannot be readily predicted by a conceptual analysis that logically commences from a focus on fitness problems faced by our ancestors in ancient ecologies.) But this evolutionary framework does provide its users with an exceptionally handy set of tools to complement whatever other tools might exist in one's conceptual toolbox. By familiarizing themselves with the conceptual tools of evolutionary psychology [4], and by using those tools wisely, researchers are likely to make many additional discoveries about the causal relationships between ecological habitats and the people who inhabit them.

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