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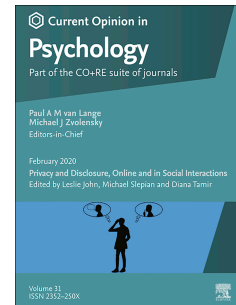
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The evolutionary psychology of climate change behaviors: Insights and applications

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The evolutionary psychology of climate change behaviors: Insights and applications

Abstract

We examine climate-related activities through an evolutionary psychology lens, zooming in on factors that motivate or discourage people to behave sustainably to mitigate climate change. Complementing current knowledge, we discuss five core ancestral psychological motivations that shape people's environmental decisions in fundamental ways. We review recent studies that explore how evolved psychological mechanisms related to self-interest, status, self-protection, temporal discounting, and social imitation can be used to promote pro-environmental behavior. We discuss potential strengths and limitations of evolutionary-based behavioral interventions, and briefly reflect on outstanding research questions that can further the integration of evolutionary approaches into mainstream environmental psychology.

Key words: climate change, evolutionary psychology, pro-environmental behavior, status, temporal discounting

Climate change is likely to have devastating social, health and environmental consequences [1]. These impacts, however, could be limited by reducing anthropogenic greenhouse gas emissions [2]. Although many lifestyle choices have the potential to reduce personal annual emissions [3], getting people to act in pro-environmental ways is not an easy task. Indeed, despite many people declaring to be concerned about climate change [4], only a fraction engage in sustainable actions [5].

The gap between pro-environmental attitudes and behaviors is commonly observed [6, 7]. Social and environmental psychologists have dedicated much effort to bridging this gap by studying the forces that motivate pro-environmental behavior [8]. These research programs, nevertheless, have focused mostly on proximate motivations such as environmental values, social norms, and monetary incentives [8,9,10,11]. Yet it is also important to figure out where these motives come from and in what contexts they are relevant. In light of this, the current piece aims to complement the literature by taking an evolutionary psychology perspective on environmental behavior, asking questions about the deeper motives driving people's environmental choices, and how people can be "nudged" to behave more sustainably.

1. Evolutionary psychology and climate change

Evolutionary psychology assumes that many of our psychological and behavioral tendencies have been shaped in a functional, adaptive way by the forces of evolution via natural selection [12]. For example, our appetite for sweet and fatty foods is a psychological adaptation that has been selected, because it enabled our ancestors to survive in environments that were (often) calorie-poor [12,13]. An important insight from evolutionary psychology is that strategies aimed at changing behavior might not be as effective when those strategies are mismatched with the ancestral motives driving the problematic behavior [13]. For instance, educating people to avoid junk food because it affects their health may be less effective than

making vegetables and fruits taste sweeter. Thus, by studying the relevant ancestral motivations that guide people's environmental choices we may be able to come up with new interventions [14]. Admittedly, using an evolutionary lens is a relatively recent approach to study environmental behavior, but it is already generating a reliable body of knowledge. Yet apart from a few notable exceptions [15,16,17,18], there has not been a review of the recent literature, which we attempt to do here. We structure this brief review by linking recent findings on pro-environmental behavior to five core evolved psychological motivations (Table 1).

2. Self-interest: Selfish environmentalists

Organisms are adapted to prioritize their own outcomes over those of others, and humans are no exception. Self-interest is a strong motivation underlying much of people's environmental decisions [16]. Yet in the long run people's self-interests can jeopardize collective efforts to mitigate climate change. Indeed, understanding climate change as a global social dilemma implies that it can only be solved if countries (and their citizens) do what is right for the collective good and commit to drastically reducing their emissions [19]. However, while cutting down emissions might seem rational from a collective perspective, asking people to depart from doing what is good for them is exceedingly difficult. Insights from evolutionary-informed literature suggest that we might need to do just the opposite; harnessing people's self-interest to motivate pro-environmental action [20].

Inclusive fitness theory [21], often referred as kin selection theory [22], posits that humans are predisposed to ensure the survival and replication of their genes which they share with kin. Individuals, therefore, are likely to cooperate more with those that share more of their genetic makeup. In terms of motivating pro-environmental action, this suggests that people will change their behavior if their long-term genetic interests are at stake. Indeed, previous research has shown that stressing the negative consequences of environmental

problems for their children (i.e., their genetic future) increases pro-environmental intentions by activating kin care motivations [23*]. Similarly, emphasizing self-interest – either economic, health-related, or genetic – has been shown to reduce drivers’ engine idling at long wait stops [24*], and persuasive strategies using kinship-based appeals positively influence animal conservation efforts, especially among those who express low levels of environmental concern [25]. This latter result is relevant because it speaks to the effectiveness of kinship-based appeals. Indeed, recent models posit that appeals emphasizing people’s selfish concerns attract a broader audience than global, environmental appeals to promote climate change action [20].

2.2. Status: Keeping up with the environmentalists

In most species, attaining status and higher social rank is linked with many evolutionary benefits [26]. Humans – again – are no exception [27,28]. Because of this, our psychology is likely to have evolved to be motivated to seek and display status [29]. Indeed, costly signaling theory argues that organisms develop costly traits to signal their non-directly observable qualities to potential partners [30], and when applied to humans, this theory suggests that social status could also serve as a signal of a person’s relevant underlying qualities [16,31]. Although social status is often communicated via displays of wealth, some research lines have pointed out that behaving cooperatively and sustainably could also help individuals to attain and signal status [32,33,34*], and thus, interventions based on status motives might encourage people to “keep up with the environmentalists.”

Recent literature indicates that consumption of sustainable products increases perceptions of consumers’ social status ([32], but see [35]). Contrary to early findings (e.g., [33]) this is not affected by product price, but rather linked to people’s perceptions that sustainable consumers are more prosocial [32]. Importantly, individuals do not only perceive those who behave pro-environmentally as more prosocial, but also favor them as partners in

social interactions [34]. Similarly, in romantic contexts, communicative signals of a pro-environmental lifestyle increase romantic attractiveness of senders. Both male and women tend to rate opposite-sex individuals as more attractive long-term partners when they consume sustainable products [36], and (male) owners of such products are perceived to be altruistic, and committed parents and partners [37*].

Admittedly, most of these findings rely on perceptions and expectations of the signalers' behavior, rather than actual behavior. For instance, although people known to be environmentalists are expected to be more cooperative, they do not contribute more in experimental public goods games than regular folks [34]. It has been proposed that this difference between cooperativeness expectation and the actual cooperation derives from the (lack) of visibility of the cooperative act. Indeed, people report higher willingness to pay for green products that are costlier than non-green counterparts when such decisions are made publicly [38]. Similarly, individuals donate more to environmental charities when their actions are public, and they donate even more when observed by someone with whom they will have future interactions [39*].

2.3. Sensing climate change dangers

Climate change is often perceived as a distant, slow-moving problem that fails to trigger our evolved, acute threat-detection system. People usually only become aware of such problems via modern information channels. Yet ancestral humans relied on immediate, environmental cues (such as a drought or bushfire) to evaluate potential environmental threats. According to evolutionary mismatch theory [13], the global and slow-moving nature of climate change fails to activate an immediate self-protection response, making it less likely for people to adapt their behaviors. That being said, offering immediate cues that can be detected via our primary sensory mechanisms – through smells, vision, and sounds – can overcome the mismatch by increasing the effectiveness of environmental communications.

For instance, energy research shows that visualization of thermal energy increases householders' willingness to engage in energy-saving behaviors [40,41]. Moreover, literature suggests that sensory information can also help to achieve cleaner public spaces, and reduce plastic pollution. Just the smell of cleaning products in trains decreases littering [42], and consumption of bottled water is likely to decrease if subjective judgments of tap water taste and odor are improved [43].

Climate change actions can also be triggered by evolutionarily old emotions that humans experience via their physical senses. Specifically, disgust-based persuasive strategies seem to be an effective way to modify unsustainable eating patterns by activating self-protection needs [44]. For instance, pairing meat products with evolutionary relevant threats such as pathogens negatively affects attitudes to consume meats [45*]. At the same time, feelings of disgust are an important obstacle to overcome for the acceptance of sustainable food innovations such as lab-grown meat [46] and edible insects [47]. For example, recent developments on the study of acceptance of lab-grown meat show that its perceived unnaturalness elicits feelings of disgust which in turn reduce the willingness to consume and buy it [46].

2.4. Temporal myopia: Climate change feels too far away

Many organisms, including humans, typically engage in temporal discounting, which refers to the tendency to prefer immediate rewards over distant, uncertain ones [48,49]. Considering that the more an individual delays rewards, the bigger is the chance that such benefits will not be longer available, our psychology probably evolved to bias decision-making to devalue future gratification [48], This tendency to discount the future, however, might interfere with environmental policies requesting people to behave sustainably to prevent potentially adverse environmental outcomes of climate change. A recent study showed that people report less concern about and willingness to prevent an environmental

issue when the issue is phrased as occurring later in time, further away, and when there is less certainty that the environmental problem will eventually happen [50*]. Similarly, activating feelings of uncertainty in people makes them discount the future more in their environmental decisions [51*].

Although people value present rewards more than delayed ones [52], this tendency partly depends on situational factors and ecological cues (e.g., [53]) that can – to a certain extent – be harnessed through climate action interventions. For instance, regular exposure to nature – compared to exposure to urban environments – reduces temporal discounting rates [54,55]. Importantly, recent research suggests that this may have implications for environmental decision-making. When exposed to pictures of natural environments, for example, people prefer to wait longer for experiencing improved air quality [56].

2.5. Social imitation: Climate role models and norms

Humans are social animals. As resource scarcity and uncertainty probably characterized the environments in which ancestral humans lived, adaptations to copy, learn from and follow others are likely to have provided them with many evolutionary advantages [57]. Indeed, cultural evolution theories posit that social learning evolved to minimize the costs of trial-and-error learning [58]. In terms of climate action, however, the tendency to imitate others might backfire. Descriptive social norms – that is, norms based on perceptions of what most others are doing – can be effective in promoting sustainable behavior when the majority of people indeed behave sustainably (e.g., [59]), but the opposite happens when the majority does not. For instance, the presence of others can sometimes increase people's tendency to over-purchase food and lead to greater food waste [60]. That being said, our evolved tendency to copy others and follow role models can also be used to favor climate action. For instance, greater perceived scientific consensus about climate change leads people to give more priority to tackling climate change [61]. Moreover, meta-analytical evidence

indicates that descriptive norms are positively associated with engagement in climate change adaptation actions [62*]. People also adhere to a similarity and ingroup bias in what behaviors they copy. For example, perceiving that close friends and family members care about climate change reduces the gap in climate change beliefs between conservative and liberal voters [63], and research shows that people are more willing to reduce their energy consumption if they strongly identify with a group that is concerned about such matters [64*].

3. Limitations and future developments on a functional approach to climate change.

Although each of the aforementioned ancestral motivations provide potential venues to develop interventions to increase climate action, they should be activated in the right context to be effective. Take the status-motive, for instance. In an effort to attain a green reputation, people, in some cases, purchase more recyclable shopping bags than they really need [65]. Signaling a green reputation might be more relevant for certain people [66], and people are more inclined to show off their green credentials in public settings [67]. Thus, designing effective interventions based on these ancestral motivations necessarily involves reflecting on which contexts these motives are activated, what kind of behaviors they aim to tackle, and at whom they will be targeted. Failing to reflect on these issues might diminish the interventions' impact, or be even counterproductive.

In this short article we reviewed recent literature that either implicitly or explicitly used an evolutionary psychology lens to study climate-relevant behavior. Although much has already been achieved, multiple research questions remain unanswered. For instance, could interventions benefit from harnessing two evolved mechanisms simultaneously, for instance, watching your children showing disgust when eating meat? Moreover, future research could also study interventions – and their impacts – longitudinally, as done elsewhere in the context of the impact of greening schoolyards on children's social and cognitive development [68].

Finally, as most of the research we discussed has been conducted with self-reports, an important question is how these effects generalize to actual behaviors? These and other questions are, to our thinking, of uttermost importance for the integration of evolutionary approaches into mainstream environmental psychology.

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Building on previous literature on social norms and social identity theory, this article shows that individuals are more likely to engage in pro-environmental behavior when they perceive that their in-group members care for the environment. Moreover, this occurs especially among people (i) who do not strongly care about the environment themselves, and (ii) among those who strongly identify with their groups.

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Table 1. Evolved motivations behind people's environmental behavior and key related evolutionary theories

Evolved motivation	Key evolutionary theories	Research example
Self-interest	Inclusive fitness theory [21], Kin selection theory [22]	Kinship-based appeals decrease vehicle pollution via reducing idling traffic [24*]
Status	Costly signaling theory [30]	Donations to environmental charities are higher when made publicly [39*]
Sensing	Disgust [69], Evolutionary mismatch hypothesis [13]	Disgust-based persuasive messages about the meat industry reduce intentions to eat meat [45*]
Temporal myopia	Temporal discounting [48], Life history strategies [53], Biophilia hypothesis [70]	Nature exposure reduces discounting rates on environmental choices related to air quality [56]
Social imitation	Cultural evolution theory [71]	Descriptive norms are positively associated with engagement in climate change adaptation actions [62*]