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Insight

Leveraging emotion-behavior pathways to support environmental behavior change

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ABSTRACT. Many global environmental threats are driven by human behavior and require behavioral solutions. Researchers in the environmental field have recently explored the behavioral sciences as core to changing behavior for conservation, yet leveraging human emotions remains an underused tool for behavior change compared to others like social norms. Humans experience a range of emotions that each cause distinct patterns of behavior depending on unique contexts that evolved over time; this presents an opportunity to leverage emotions to support behavior-change goals. The existing literature and models of behavior change offer minimal guidance about which specific emotions to use in which contexts and how those emotions might lead to certain behaviors. In the environmental field specifically, there have been mixed recommendations on using emotions, resulting from an incomplete understanding of the causal relationship between emotions, contexts, and environmental behaviors. We propose that adopting a functionalist approach, which describes emotions as functional states designed to produce outcomes in specific contexts, will help to unlock emotions as a tool for conservation. To demonstrate this approach, we identified fear, hope, the prospect of shame, pride, anger, and interest as particularly relevant for environmental behavior change. Based on an understanding of each emotion's function, we developed an emotion-behavior pathway that described the expected outcome of using an emotion in a particular context. Applying these emotional-behavior pathways can allow both researchers and practitioners to advance the science of shifting environmental behavior through emotion.

Key Words: *affect; behavior change; decision making; emotion; environment*

INTRODUCTION

The pace and scale of climate change, biodiversity loss, and natural-resource depletion threaten to cross planetary boundaries that support life on earth (Steffen et al. 2015). There is a growing recognition in the conservation field that not only is human behavior a root cause of environmental change but also that behavior change is critical for achieving environmental outcomes (Cinner 2018, Balmford et al. 2021, Nielsen et al. 2021). Whereas some researchers have explored applying key behavioral science tools to address these challenges, such as social norms and choice architecture, less work has been done to understand emotions as a powerful tool to drive behavior change for conservation.

Although there are many ways to conceptualize emotions, focusing on the function of emotions provides a way to understand the relationship between emotions and behavior change. This approach shares its roots with traditions in anthropology and psychology, using the evolved adaptive function of a cognitive system to understand and predict current behavior (Lazarus 1991, Russell 1991, Fessler 1999). We use the term functional approach to mean that emotions emerged through human evolution to serve a purpose; they formed over time, based on patterns of certain situations that produced certain outcomes relevant to our fitness as a species (Fessler and Haley 2003, Frijda 2007, Nesse and Ellsworth 2009, Lerner et al. 2015). Understanding current behavior also involves understanding the context in which it evolved and why. Whereas we recognize contexts today are different than they were in the past, our emotions have formed from similar elements in situations over time that have caused us to act, construct meaning, and respond adaptively to everyday life events and longer term goals (Tooby and Cosmides 1990, Lazarus 2001, Frijda 2004, Carver et al. 2014). Although some researchers perceive actions based on emotions as purely irrational decision-making patterns, the evolutionary emergence of emotions suggests that they exist to help us navigate the complexity of our environment and survive (Peters et al. 2006, Williams and DeSteno 2014, Lerner et al. 2015, Adolphs and Andler 2018). Because a functional understanding forecasts behavioral consequences for a given emotion, it presents an opportunity for us to leverage emotions to support behavior-change goals.

The functionalist approach is a motivational theory of emotion where emotion is understood to cause behavior (Dewey 1895, Tomkins 2008). Alternative formulations of emotion include constructionism, which claims that distinct emotions do not exist and are instead constructed from building blocks not specific to a given emotion (Barrett 2017), as well as appraisal theories of emotion, which focus on how emotions are generated through someone's interpretation and evaluation of their situation (Arnold 1960). However, more recent iterations of appraisal theories incorporate a motivational element, where emotions are paired with action tendencies (Lazarus 1991). Each of these approaches brings a unique perspective. Because the functionalist approach focuses on understanding the universal properties (Ekman and Keltner 1997), emergence (Nesse and Ellsworth 2009), and behavioral consequences (Fessler 1999) of each emotion, we find this approach particularly well suited for understanding how emotions shift environmental behaviors.

The academic literature in the social and behavioral sciences, including cognitive, social, and evolutionary psychology, as well as biological anthropology, includes a wealth of evidence for the functional underpinnings of various emotions (Lazarus 1991, Fessler and Haley 2003, Lerner et al. 2015, Adolphs and Andler 2018). However, this evidence has yet to be translated for behavior-change researchers and practitioners, linking certain emotions to behaviors and including a range of emotions. In the conservation

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field specifically, there have been mixed recommendations on using emotions, resulting from an incomplete understanding of the causal relationship between particular emotions, contexts, and environmental behaviors (e.g., Chapman et al. 2017, Nabi et al. 2018, Kidd et al. 2019, McAfee and Connell 2019).

Popular models of behavior change either (1) fail to explicitly integrate emotion, e.g., theory of planned behavior (Ajzen 1991), social cognitive theory (Bandura 1989), and social norms theory (Perkins and Berkowitz 1986); (2) fail to differentiate between emotions, e.g., the capability, opportunity, motivation, and behaviour (COM-B) model (Michie et al. 2011) and the transtheoretical model (Prochaska and Velicer 1997); or (3) focus on a single emotion, e.g., protection motivation theory (Rogers et al. 1983). An intentional approach, which uses existing theory on the function of emotions to reveal the why, would direct researchers and behavioral intervention designers to emotions most likely to lead to behavior change. A shift in thinking about emotions, from the general form of affect to emotions as functional states, requires the translation of emotions literature into actionable guidance. Fessler and Haley (2003) and Sabherwal et al. (2021) provide strong examples for how to use a functional argument about specific emotions, yet either do not conclude with actionable guidance or do so for multiple emotions. In this article, we demonstrate such guidance to support researchers and practitioners and advocate for further translation of this literature to other emotions and the contexts that elicit them.

EMOTION-BEHAVIOR PATHWAYS FOR CONSERVATION

To demonstrate the utility of conceptualizing emotions and their behavioral consequences, we first created a long list of candidate emotions mentioned in emotion compilations (Lazarus 1993, Barrett et al. 2016, van Kleef et al. 2016). From that list, we selected six emotions that we believed either to have been applied, or to have significant opportunity for application, in prompting environmental behavior change: fear, hope, the prospect of shame, pride, anger, and interest (Table 1). These emotions span several dimensions, such as positive versus negative valence and social versus individual focus. In analyzing each emotion, we describe an emotion-behavior pathway that demonstrates the expected outcome of using an emotion in a particular context. These pathways can serve as actionable starting points for testing and implementing different emotion-based interventions to increase our impact on behavior change for conservation. It is important to recognize the selected emotions as illustrative rather than exhaustively describing all emotions relevant for environmental behavior change. The pathways focus on showing the functional mechanism of each emotion with examples, rather than how to elicit each emotion. We hope that these pathways will prompt further work in more fully describing the range of emotions, as well as providing specific guidance for each.

Fear motivates people to avoid risks when they experience uncertainty or an immediate threat

Fear's main function as an emotion is to help people avoid harm and risks in the near or immediate future, triggering an intense fight-or-flight response (Öhman 1993, Condon et al. 2014, Nabi et al. 2018). Various studies have found that eliciting fear leads to less risky decision making and more pessimistic views of situations, increasing the perception of risk (Hargie 2010, Xie et al. 2011). For example, when people were presented with scenarios where they experienced natural and technological hazards such as landslides or gas explosions, researchers found that loss-based emotions such as fear were correlated with prevention strategies (Xie et al. 2011). Another laboratory study found that when fear appeals were used alongside information about CO_2 levels that the messages caused people to think more deeply about energy conservation, especially when paired with compelling research (Meijnders et al. 2001).

Researchers examining the use of fear on environmental challenges have observed that fear works best for short-term concerns when there are identifiable and immediate threats, such as imminent resource scarcity (Öhman 1993, O'Neill and Nicholson-Cole 2009, Murphy and Murphy 2012, Smith and Leiserowitz 2014). For fear to be most effective, people need to believe that the threat to them is severe, that they are vulnerable to this threat, and that they can take action to mitigate that threat (Witte and Allen 2000, O'Neill and Nicholson-Cole 2009, Hargie 2010, Nabi et al. 2018). A meta-analysis of 100 papers using fear appeals for public health interventions describes a reliable, positive effect for fear appeals on attitudes, intentions, and behavior, especially when paired with high-efficacy messages (Witte and Allen 2000). Fear appeals that do not follow these guidelines may cause people to distance themselves from the problem, feel helpless, or disengage altogether (O'Neill and Nicholson-Cole 2009, Smith and Leiserowitz 2014, Weinstein et al. 2015, Nabi et al. 2018). As a result, fear must be used in specific contexts that focus on reducing harm in the near term. Fear may pair well with the emotion of interest to draw attention (O'Neill and Nicholson-Cole 2009, Westoby and McNamara 2019) or hope to help individuals start a new preventative action (Nabi et al. 2018).

Hope motivates people to start a behavior when they can achieve a desired outcome while facing a threat

Hope functions by motivating people to try something when facing a challenge that they feel they can overcome (Lazarus 1993, 2001, Chadwick 2015). It is an emotion that encourages people to take action and persevere because of its future- and goal-oriented nature (Snyder et al. 2002, Chadwick 2015). Hope further works through a perception that there is self or collective efficacy to achieve a future, desired state. This has resulted in hope leading to support for and action on social, political, and environmental activism among people in Europe and the United States in a series of questionnaire studies and experiments (Ojala 2012, 2015, Greenaway et al. 2016, Kleres and Wettergren 2017, Wlodarczyk et al. 2017), lasting goal motivation among university students who watched a series of media narratives (Prestin 2013), waste reduction among students during lab experiments (Peter and Honea 2012), and stated policy support for climate-change action among Americans in a national survey (Smith and Leiserowitz 2014, Feldman and Hart 2018). Studies suggest that hope is most effective when there is both a realistic understanding of current threats and a genuine belief that those threats could be mitigated; otherwise, presenting hopeful messages can lead people to underestimate threats and become complacent in taking action (Swaisgood and Sheppard 2010, Hobbs 2013, Hornsey and Fielding 2016, Nabi et al. 2018). Moreover, people need to believe that they are part of the solution for overcoming threats and have the self-efficacy to do so. Hope encourages people to act because they think they can and should do something about the threat, not because they think others will take action to reduce the threat.

Table 1. Emotion-behavior pathways and examples for six emotions relevant for environmental behavior change.

Emotion	Emotion-behavior pathway	Examples
Fear	Fear motivates people to avoid risks when they experience uncertainty or an immediate threat.	Fear appeals in public health campaigns reliably drove changes in attitudes, intentions, and behavior, especially when paired with high-efficacy messages (Witte and Allen, 2000). Similarly, people who experienced scenarios of natural and technological hazards experienced loss-based emotions such as fear, and pursued prevention strategies (Xie et al. 2011).
Hope	Hope motivates people to start a behavior when they can achieve a desired outcome while facing a threat.	Hope led to action on social, political, and environmental activism among people in Europe and the United States in a series of questionnaire studies and experiments (Ojala 2012, 2015, Greenaway et al. 2016, Wlodarczyk et al. 2017, Kleres and Wettergren 2017).
Prospect of shame	The prospect of shame motivates people to avoid a socially undesirable action when others might find out.	Avoiding shame in behavioral games led to higher contributions in these games (Jacquet et al. 2011). Similarly, aversion to shame resulted in people voting to prevent others from seeing them as a non-voter (Panagopoulos 2010).
Pride	Pride motivates people to show others what they have done when they have engaged in reputation-enhancing behavior.	Pride boosted voting among high-propensity voters in social settings (Panagopoulos 2010) and consuming green products in online experiments to show commitment to a green identity (Antonetti and Maklan 2014, Schneider et al. 2017).
Anger	Anger motivates people to confront others when they experience or witness something that goes against their values.	Anger led people to take a cost on themselves to punish those who hurt them (Drouvelis and Grosskopf 2016) or even anonymous others (Nelissen and Zeelenberg 2009) in behavioral games.
Interest	Interest motivates people to seek information when something is novel and complex.	Interest focused and maintained attention in the classroom (Ainley et al. 2002, Hidi 2006, Harackiewicz et al. 2016) and was strongly correlated with engagement on topics such as national policies for climate change as well as perceived risks and hazards when people were surveyed (Sjöberg 2007, Smith and Leiserowitz 2014).

The prospect of shame motivates people to avoid a socially undesirable action when others might find out

The prospect of shame functions as a motivation for avoiding the negative social judgment for engaging in socially undesirable behavior (Gilbert 1997, Fessler 1999). This is because the experience of shame itself is highly aversive, making shame an internal subjective penalty for violating a norm (Smith et al. 2002). When an actor is considering whether to engage in a counter-normative behavior, the aversive prospect of experiencing shame reduces the actor's interest in engaging in it (Elster 1998). This results in the actor preserving a positive social standing and avoiding negative social sanctioning. Vignette experiments in the United States, India, and Israel demonstrate that beliefs about what actions are shameful closely track how negatively someone would feel if others found out they engaged in the action (Sznycer et al. 2016). Evidence from 15 small-scale societies shows that this pattern holds for a variety of cultures, from hunter-gathers to large-scale societies (Sznycer et al. 2018). Behavioral economic game experiments find that it is precisely this devaluation from others, rather than the wrongdoing itself, which evokes shame; shame avoidance is calibrated to avoid social judgment rather than wrongdoing (Robertson et al. 2018). Behavioral games find that the prospect of the shame of others finding out that one is not contributing to the group can itself motivate contribution (Jacquet et al. 2011). Behavioral interventions to motivate other pro-social behaviors such as voting come to a similar conclusion, finding that the threat of others finding who has not voted can motivate voting (Panagopoulos 2010). In this way, evoking the prospect of shame can increase socially desirable behavior.

Pride motivates people to show others what they have done when they have engaged in reputation-enhancing behavior

Pride functions by getting people to engage in and demonstrate to others that they have performed a socially valued or prestigious act (Fessler and Haley 2003, Williams and DeSteno 2008, Tracy et al. 2010, Horberg et al. 2011, Weidman et al. 2016). People will spend time and energy on something to boost their social status and prestige among others to signal that they are doing behaviors deemed important by relevant social groups. Importantly, pride can motivate actions that are socially valued, even if the actor is not consciously calculating how others will perceive it. This emotion has helped to boost a range of behaviors such as voting among high-propensity voters (Panagopoulos 2010), and athletic and academic performance among experiments with adults and students (Weidman et al. 2016). Pride has also been a factor in affecting environmental behavior among a diverse set of adults in different countries such as consuming green products in online experiments (Antonetti and Maklan 2014, Schneider et al. 2017), conserving natural resources during self-reported experiences over several days (Bissing-Olson et al. 2016), or protecting species of flora and fauna in social marketing campaigns (Butler et al. 2013). Pride, especially in social contexts, allows people to affirm their shared values and beliefs, while also displaying their competence in doing socially valued behaviors.

Anger motivates people to confront others when they experience or witness something that goes against their values

Anger functions as a motivation for negative sanctioning of norm-violating behavior (van Doorn et al. 2014). This serves two purposes: first, it allows the individual to credibly signal that they will not tolerate being exploited in the future (Guala 2012); second, it stabilizes a norm within a community by both broadcasting what is acceptable in this social context (Barclay 2006, Kurzban et al. 2007, Cushman 2013, Jordan et al. 2016) and shifting incentives to create a cooperative equilibrium (Boyd and Richerson 1992, Sigmund et al. 2010, Chudek and Henrich 2011).

Across cultures, anger is recognized as an expression of a perceived norm violation (Ekman 1992). This emotional response signals the belief that someone else is responsible for an unfair outcome, broadcasting the relevant social norm for a given context (van Kleef et al. 2016). Experimental economic games

find that experiencing anger causes individuals to punish perpetrators to restore fair outcomes, both when they (Drouvelis and Grosskopf 2016) or others (Fehr and Fischbacher 2004, Nelissen and Zeelenberg 2009, Jordan et al. 2016) are wronged. In the climate context, messaging experiments have found that prompting people to consider the collective anger experienced around climate increase people's belief that those around them are taking action to fight climate change (Sabherwal et al. 2021). Consistent with this account, when someone socially sanctions another for anti-environmental behavior, this leads to an increase in pro-environmental behavior, such as using less electricity (Bloodhart and Swim 2013). This same behavior is observed in behavioral economic games, in which participants anticipate anger if they violate a norm (Fehr and Gächter 2000) and are therefore motivated to conform to the norm to avoid anger-driven punishment (Fehr and Gächter 2002). Anger can therefore maintain prosocial norms without top-down enforcement.

Interest motivates people to seek information when something is novel and complex

Interest is an emotion that causes people to pay attention to something and facilitates learning and exploration. People are drawn to new or complex things and ideas but also want to understand them; when both of these conditions are met, people feel intrigued instead of confused or overwhelmed (Silvia 2008). Interest causes people to approach what they find interesting, whether they are people, places, things, or experiences, and it helps to increase current knowledge (Fredrickson 1998, Silvia 2008). Researchers suspect that interest may help people generate new ideas during problem-solving, focus their attention on important tasks, and build a wide range of skills over their lifetimes (Silvia 2008, Campos and Keltner 2014). Scholars in the education field have long studied the role of interest and its connection to learning, and several studies have shown that interest is key to focus and maintaining attention in the classroom (Ainley et al. 2002, Hidi 2006, Harackiewicz et al. 2016). A media study combining lab experiments and records of over 20,000 conversations further found that a piece's interestingness led to more mentions and shares online (Berger and Iyengar 2013). This emotion has further been shown to be strongly correlated with engagement on topics such as national policies for climate change as well as perceived risks and hazards when people were surveyed (Sjöberg 2007, Smith and Leiserowitz 2014). As a result, the ability to generate and maintain interest can encourage people to explore concepts they had not considered before.

CONCLUSION

Behavior change is vital for achieving conservation outcomes. The deliberate application of human emotions provides a relatively untapped source of potential in driving this change. Knowing how to leverage specific emotions in specific contexts allows for the design of more effective campaigns to realize conservation goals. The functionalist perspective outlined here suggests that advice on applying emotional appeals can be improved by providing specific, actionable, context-specific guidance.

There are several future directions for continuing to learn about emotions for conservation behavior change. To build more reliable emotion-behavior pathways, target emotions require experimental field testing in a greater set of environmental and social contexts, recognizing their intersection with other behavior-change tools. For example, many emotions are deeply social; they are either caused by those around us or have consequences for how we interact, offering us deeper insight into social interactions (Griffiths and Scarantino 2001, Panagopoulos 2010, Heerdink et al. 2013, van Doorn et al. 2015, Drouvelis and Grosskopf 2016). When we design behavior-change interventions with emotions, we can apply lessons learned from social and informational interventions as well. As our understanding of emotions and behavior further develops, this creates the opportunity for greater research into how different emotions may interact together to yield patterns of behavior distinct from any single emotion. Concepts such as emotional flow may help to describe the ways that the sequencing of emotions like fear and then hope can be particularly powerful (Nabi et al. 2018). Moreover, emotions vary in their persistence over time; some emotions like fear serve us immediately in the moment (Witte and Allen 2000), whereas others like hope may stay with us while we pursue our goals (Prestin 2013). Even so, it is best to leverage emotions close to when the desired behavior occurs to maximize their effect. And if we consider an emotion's persistence as part of its adaptive function, then we can match it to the appropriate context.

Finally, those who seek to inspire behavior change must be mindful of the ethical and moral dimensions of their work. Behavior-change interventions have received attention and guidance from researchers in recent years, concerning how to avoid ethical pitfalls, particularly surrounding concepts of liberal paternalism involved in so-called nudging (White 2013, Sunstein 2016). Whereas this guidance rarely addresses emotions specifically, the same principles apply: it is important to retain free choice and promote well-being as much as possible when designing behavior-change programs (White 2013). Such decisions can be informed by scholars who have explored how cultural translations, display rules, and power dynamics for different emotions shape our understanding of them (Peterson 2006, Safdar et al. 2009, Koopmann-Holm and Matsumoto 2011). Their insights guide us to think about the differences across status variables such as age, gender, and ethnicity in expressing certain emotions (McConatha and Deaner 1994, Shields et al. 2006, van Kleef et al. 2016) and the cultural biases for and against showing certain types of emotions in different cultures, such as individualistic and collectivist expressions of joy and anger (Matsumoto et al. 2008). It is also worth exploring how emotion-behavior pathways may replicate across cultures and geographies. For example, an emotion like shame has a robust evidence base to show it exists in many cultures (Sznycer et al. 2018); yet for other emotion-behavior pathways, similar evidence has yet to be demonstrated. We recommend using caution and developing a deep understanding of the behavioral context before testing out the application of any emotion. Adding emotional appeals to our toolkit offers new strategies while also being equally subject to ethical and cultural considerations.

The emotion-behavior pathways demonstrated here are far from exhaustive and instead are intended to demonstrate how a deeper, functional understanding of each emotion can be leveraged into more effective conservation behavior-change programs. We focused on the what and why of emotions in this paper rather than the how of designing behavior-change interventions to elicit certain emotions. We encourage readers to explore resources on behavioral design and social marketing for ways to incorporate

the pathways we have listed here into their behavior-change work (e.g., Michie et al. 2011, Green et al. 2019, Thulin 2020). There are many different tactics and strategies that incorporate emotions. The best ones to use will depend on the chosen target behavior, actors, and context. An important future direction for researchers at the intersection of behavior and the environment is to continue to test and grow the set of emotions identified here and provide a more complete taxonomical account of the emotion-behavior pathways relevant for environmental behavior. Such guidance on emotions would support conservation researchers and practitioners in developing and testing more efficient and effective environmental behavior-change programs.

Responses to this article can be read online at:
https://www.ecologyandsociety.org/issues/responses.php/13363

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