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Fundamental Evolved Motives Meet Environmental Threats and Opportunities

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Abstract. We describe a program of research on the links between fundamental social motives and functionally relevant affordances (threats and opportunities related to those motives). The program began with a question about how basic cognitive processes (such as attention, encoding, and memory) might change as a function of motivational context (mating versus self-protection, for example). That question was extended to include the links between functionally relevant motives and a range of psychological processes and behavior, including economic decision-making, conformity, stereotyping, prejudice, and aggression as well as creativity and psychological well-being. It also led to the development of a scale measuring individual differences in fundamental motives, to explorations of commonalities in those motives across 42 different countries around the world, and to a series of studies of what we have termed "affordance management." The interlinked Fundamental Motives and Affordance Management theories have untapped potential for generating new research questions, and the discussion considers several important but not yet answered questions about how fundamental motives and affordance management processes work.

Is it possible to understand an individual human being's cognitive processes (including attention, memory, problem solving, and decision-making), and that person's relationships with other people, without asking what the human mind is designed to do? Likewise, is it possible to understand how the individual's cognitions and social relationships change over the lifespan, or how those thought processes and relationships sometimes break down into pathological patterns, without asking about ultimate functional design?

Before the 1990s, the vast majority of cognitive, developmental, clinical and social psychologists explored human thought, affect, and behavior without ever asking questions about ultimate function. As a result, findings in psychology's subdisciplines were largely unconnected to one another, and sometimes did not make sense in light of findings from related disciplines such as anthropology and evolutionary biology (Tooby & Cosmides, 1992; Kenrick, Sadalla, & Keefe, 1998).

The research program we describe here began with the assumption that cognitive processes were intrinsically linked to important functional goals (Kenrick, et al., 1998). This assumption led to a number of empirical questions: Would basic cognitive processes, such as attention, perception, and memory change depending on a person's functional motivational state (whether they were focused on self-protection or mating motives, for example) (e.g., Becker, Anderson et al. 2010; Becker, Mortensen et al. 2011; Becker, Mortensen, Anderson & Sasaki, 2014; Maner, Kenrick, Becker, et al., 2005, Miller, Maner, & Becker, 2010)? Would activating different functional motives change basic social

psychological processes (such as conformity or prosocial behavior) (e.g., Griskevicius, Goldstein, Mortensen, Cialdini & Kenrick, 2006)? These simple questions have led to a substantial body of empirical findings on various cognitive and social processes, and have been extended to applied topics such as consumer behavior, economic decision-making, aggression, prejudice, stereotyping, and psychological well-being (e.g., Ko, Neuberg, Pick, Varnum, & Becker, 2024; Krems, Kenrick, & Neel, 2017; Li, Kenrick, Griskevicius & Neuberg, 2012, Sng, Williams, Tsukamoto, & Neuberg, 2024; Varnum, Kirsch, Beal, Pick…Kenrick, 2025). They have also led to the development of a measure of individual differences in fundamental motives (Neel, Kenrick, White & Neuberg, 2016), and to a series of studies examining those motives across societies around the world (e.g., Ko, Pick, Kwon, Barlev, Krems, Varnum, …. & Kenrick, 2020; Ko, Kenrick, Becker, & Varnum, 2026), and how those motives changed (or remained constant) during the pandemic (Pick et al., 2022a; 2022b).

More broadly, this program of research has led to two heuristically fruitful theoretical perspectives – one an expansion of the classical hierarchy of needs to incorporate theory and research relevant to evolutionary life history (Cook, Krems, & Kenrick, 2021; Kenrick, Griskevicius, Neuberg & Schaller, 2010; Kenrick, Neuberg, Griskevicius, Becker & Schaller, 2010, see Figure 1), and the other a theory of how people perceive and manage threats and opportunities other people afford with regard to those motives (Becker & Neuberg, 2025; Neuberg, Kenrick & Schaller, 2010; Ko et al., 2024; Ko & Neuberg, 2025; Neuberg & Schaller, 2016; Pick & Neuberg, 2022; Varnum, Kirsch, Beal, Pick, Al-Shawaf, Ambrosio, . . . & Kenrick, 2025).

Theoretical Background

Our approach stems from a) emerging research from the latter half of the twentieth century suggesting that learning and cognition involved multiple domain specific systems for dealing with different life tasks (e.g., Sherry & Schacter, 1987), and b) a desire to organize findings from social psychology and connect them to wider developments in other areas of psychology as well as what was known about social behavior in other cultures and in other species (Kenrick, Neuberg, & Cialdini, 1999; Kenrick, Neuberg, Cialdini, & Lundberg-Kenrick, 2020).

Domain specificity. During the first part of the 20th century, psychologists generally accepted some version of John Locke's empiricist doctrine – that the mind was a blank slate at birth, upon which experience wrote. Associated with this view was the notion of "equipotentiality" of brain structures – that any part of a brain could be recruited for any function, so that even if one part of a brain was removed, other regions could take over its functions (Lashley, 1929). This approach was parsimonious, presuming that any kind of complex behavior could be understood as the result of interactions between an individual organism's experiences and the mass of unprogrammed neurons in that organism's brain.

How did experiences shape an organism's attention, perception, and memory, and lead to complex behaviors such as humans speaking French and playing the piano, or chickadees building architecturally sound nests and communicating threats to one another? A half century ago, the prevailing theory how environments have their effects was also quite parsimonious – via the simple processes of classical and operant conditioning

(Skinner, 1965). These two types of conditioning (associating reflexive responses such as salivation with previously neutral signals such as bells, and shaping voluntary behaviors via reward and punishment) have an additional desirable feature for a parsimonious theory of behavior: they are found across species, including not only chickadees and human beings, but earthworms and planarians as well. What separates humans from planarians, on this view of behavior, is mainly that we have 86 billion neurons to program, whereas the planarian has only twelve thousand.

This picture of a blank slate brain shaped by simple species-general processes of reward and punishment, though parsimonious, did not fit well with emerging data in the second half of the twentieth century. Sherry and Schacter (1987) reviewed evidence to indicate that birds and humans alike have multiple (and often functionally incompatible) memory systems. Birds have memory systems for navigation, used in migration; different systems for song-learning, used in territorial marking, mating, and intraspecies communication; different systems for remembering where they stored food for future use (sometimes in thousands of locations); and still different systems for learning to avoid toxic foods. Toxic food avoidance involves one-trial learning, and is not overwritten by later experiences (Garcia & Koelling, 1966; Rozin & Kalat, 1971). Such irreversible one trial learning would not work for remembering where nuts were hidden, or for recalling which ones were retrieved and which were not. Species typical songs, on the other hand, are typically only learned during a flexible critical early period (which would not work for learning the features of poisonous foods), and they are not erased (as are the locations of cached food that has been retrieved). Sherry and Schacter (1987) also reviewed evidence

from physiological psychology, such as split-brain research and links between damage to specific areas of the brain and particular linguistic abilities, to suggest that the notion of one big central conscious processor was no more likely for *Homo sapiens* than for Clark's Nutcrackers or Chickadees. Humans' ability to learn and remember faces, languages, or aversions to toxic foods are all different problems whose solutions do not follow the same rules, or use the same physiological systems.

Species-specific biases. Another problem for the blank slate view were findings that those simple processes of conditioning did not take the same form across species, but that instead different organisms are prepared to learn some types of associations rather than others, dependent on their own evolutionary history. As a simple example, rats (who are active at night and make minimal use of their poor vision in seeking food) easily learn to associate foods that made them nauseous with smell and taste cues, whereas quail (who eat during the day and use visual rather than olfactory cues in searching for food) more easily learn to associate nausea with visual cues (Wilcoxon, Dragoin, & Kral, 1971).

Given such findings, evolutionary theorists typically ask both about commonalities between species, and the unique features of a given species. Whales and bats share a number of characteristics with humans, such as internal gestation and nursing, living in social groups, and intraspecies communication, but humans don't have sonar (needed by bats and whales for navigating in low vision environments), and our ancestors could not fly or spend long periods underwater, as could bats or whales. Humans, unlike other mammals, on the hand, could throw stones at their prey and at their predators, and could speak with one another in very detailed ways about potential threats and opportunities,

including the pros and cons of different imagined strategies for dealing with those threats and opportunities.

Recurrent adaptive problems. In trying to understand why a given animal species learns, thinks, and behaves in the ways that it does, one approach taken by evolutionary theorists is to ask what are the recurrent problems confronted by a given species (as in rats seeking food at night, and quail seeking seeds during the day). We began by asking this question about human social behavior, initially as a means to organize the many diverse findings in social psychology (Kenrick, Neuberg, & Cialdini, 1999). A few years after that, we more formally laid out six domains of adaptive problems, fundamental goals, and evolved decision-constraints (Kenrick, Li, & Butner, 2003). In a later paper (Neuberg et al., 2010), we considered how each of the different motives is intrinsically connected to environmental threats and opportunities, or potential *affordances* (see Table 1, which combines aspects of similar tables from Kenrick et al., 2003, and Neuberg et al., 2010). And in another paper developing the theory, we attempted to integrate the idea of fundamental motives with considerations from life history theory and with Maslow's classic hierarchy of human needs (Kenrick, Griskevicius, Neuberg & Schaller, 2010; see Figure 1)

Table 1. Adaptive problem domains, goals, attunements for relevant affordances, and examples of evolved decision-constraints linked to each domain (based on Kenrick et al., 2003; relevant affordances based on Neuberg et al., 2010).

Social domain	**Fundamental Goal**	**Attunement for Relevant Affordances**	**Examples of Evolved decision-constraints**
Basic Survival	To meet immediate physiological needs (such as hunger, thirst, pain avoidance)	*Opportunities*: Food, water, shelter against extreme weather. *Threats*: Starvation, dehydration, poisonous animals and plants, disease.	Acquire as many resources as possible, take in as many calories as possible, keep your distance from potential sources of disease or poison or physical injury
Self-protection	To protect oneself and alliance members against threats from other human beings	*Opportunities*: Safety provided by others. *Threats*: Violence from outgroup members; Exploitation or violence from ingroup members.	Potential threats or costs will lead to reciprocal exchange of violence, particularly among non-kin
Affiliation	To form and maintain cooperative alliances (e.g., friendships)	*Opportunities*: Sharing of resources, receiving material or emotional support, enhanced self-protection, access to mates. *Threats*: Exposure to disease, cheating/free-riding,	Cooperation is more likely to the extent that others (a) share genes and (b) have reciprocally shared resources in the past, (c) have interdependent fitness interests

		incompetence, excessive demands.	
Status	To gain or maintain respect from, and power over, other group members	*Opportunities*: Status – enhancing alliances, improved access to resources and (for males) mating opportunities. *Threats*: Loss of status, social regard, status-linked resources and mates.	Males will take more risks to gain and maintain status.
Mate acquisition	To obtain a partner or partners who will enhance one's own fitness	*Opportunities*: Availability of desirable, opposite-sex others. *Threats*: Presence of desirable, same-sex competitors.	Females will be, compared with males, generally less inclined toward an unrestricted mating strategy (i.e., multiple mates, shorter courtship before sex).
Mate retention	To maintain a mating bond with a desirable partner	*Opportunities*: Long-term parental alliances. *Threats*: Sexual infidelity, mate poaching	Females will be inclined to break a bond if a partner compromises resources or if a high-status alternative is available. Males will be inclined to break a bond if a partner is sexually unfaithful or if there are physically attractive alternatives available.

Parental /family care	To promote the survival and reproduction of individuals carrying one's genes	*Opportunities*: Enhanced reproductive fitness. *Threats*: Especially high costs imposed by children.	Familial provision of resources and care will follow the order (a) self > siblings; (b) own offspring > stepchildren

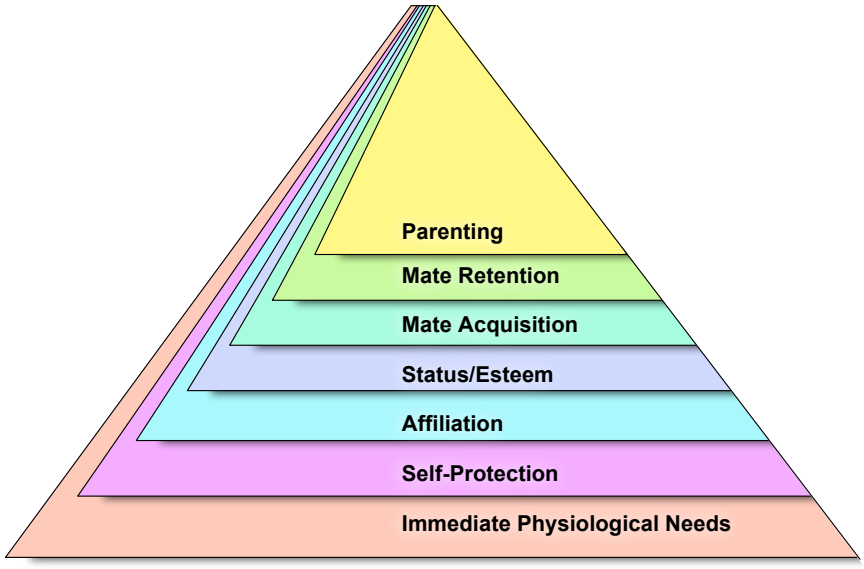

Figure 1: Hierarchy of Fundamental Motives. This figure is from a paper integrating traditional ideas from Maslow's hierarchical view of human needs with subsequent developments in life history theory. Motives are presumed to unfold developmentally from the bottom (babies are not concerned with status or mate acquisition, for example). Once a motivational goal system has developed, it does not disappear but is

activated when relevant environmental threats and opportunities are salient (from Kenrick, Griskevicius, Neuberg, & Schaller, 2010).

To summarize briefly, our model proposed that proximate processes could be better understood by considering the fundamental problems confronted by human ancestors living in social groups – to survive, protect oneself from exploitation by other people, form cooperative alliances, gain respect of other group members, find mates, maintain long-term mating relationships, and care for offspring and other kin.

Links between motives, cognition, and development. Confronting threats or opportunities related to any of these motives was hypothesized to trigger the operation of a specific motivational system which influenced attention, encoding, memory, and choice of behavioral strategies. Which system is currently active depends partly on one's life history stage (e.g., pubescent vs. pre-pubescent, in a long-term relationship vs single, nonparent vs parent vs grandparent), relevant individual differences (e.g., male vs female, formidability, attractiveness), as well as on salient threats or opportunities in the current environment (e.g., high ratio of members of the other sex, presence of threatening members of an outgroup, presence of children). Prioritizing our responses to those threats and opportunities—which often includes seeking new information about what a target or situation affords—are the subject of what we have termed "affordance management."

Thinking in terms of fundamental motives and their associated affordances has generated several lines of research. We will focus on five categories of findings in the remainder of this paper:

1. How functional problems lead to biases in attention, encoding, retrieval, and downstream behaviors
2. Fundamental motives and economic decision-making
3. Fundamental motives, self-actualization, and positive well-being
4. Individual differences and cultural variations in fundamental motives
5. Examining variations in adaptive threats and opportunities in the environment

Following this, we will briefly discuss remaining empirical and theoretical questions raised by thinking about fundamental motives and affordances.

Functional biases on cognition and behavior

Within the subdisciplines of cognitive psychology and social psychology, there was a generally shared assumption that basic cognitive processes were "domain general." That is, processes such as attention, encoding, perceptual contrast, and memory were expected to follow the same general principles regardless of content; person perception, for example, could be presumed to follow the same rules involved in processing simple shapes and written words (Glass & Holyoak, 1986; Markus & Zajonc, 1085; Wyer & Srull, 1986). There was a budding interest in the role of how affect and motivation influence cognition, but affect was generally conceived in simple non-adaptationist ways (e.g., as generalized "arousal" and "valence") and the motives of interest tended to be either content-free/epistemic (e.g., the motivation to come to a decision, or to be accurate; Kruglanski & Freund, 1983; Neuberg & Fiske, 1987) or to feel good about oneself (e.g. Achee, Tesser & Pilkington, 1994; Kunda, 1987; 1990).

Some early findings suggested that perceptual contrast did not follow domain general principles but was biased in functionally significant ways. Men, but not women, showed a contrast effect in judgments of female targets as less attractive after seeing attractive women, but seeing successful women had no influence on their judgments of other women presented later. Women showed the reverse effect, contrasting their judgments of male targets after seeing successful, but not attractive, men (Kenrick, Neuberg, Zierk, Krones, 1994). And results for both sexes were flipped when participants rated themselves (Gutierres, Kenrick & Partch, 1999). We thus began to ask whether other simple cognitive biases might vary as a function of functionally relevant content. A particular appeal of studying basic cognitive processes such as attention and perception is that participant responses in such tasks are often rapid and automatic, with measurements that should be less subject to reporting biases that might influence people's responses to questionnaires. That is, people might consciously manage their self-presentations in responses to questionnaire items about their sexual interests, but such self-presentation biases should be less problematic if one were directly tracking eye movements, or testing whether or not a participant was able to remember having seen a particular face previously. Several studies examining different aspects of functionally motivated basic cognitive processes are summarized below.

Attention and Mating Goals.

In one study, people viewing a crowd with attractive and unattractive faces estimated that the faces were more attractive when a) they had only a short time to look at a large crowd of faces, and b) the crowd was composed of female faces. We hypothesized that this might

be due to selective attention to the attractive women when there was limited time to look at all the faces. This was confirmed directly by another study in which participants wore eye-trackers and were found to devote more time looking at the attractive women as compared to the average women. Relatively greater attention to attractive women was found more among males who were *not* in a committed relationship, suggesting that such attentional processes served mate acquisition motives. However, the tendency to attend to attractive women was stronger for females who *were* in committed relationships, suggesting that women's attention to other attractive women was linked to a mate retention motive, related more to scanning for potential competitors (Maner, Kenrick, Becker, Delton, Hofer, Wilbur & Neuberg, 2003).

Encoding Threats to Self-Protection.

Close your eyes for a second and think of an angry face. When participants in one study were asked to spontaneously imagine an angry face, 75 percent thought of a man. This is not because they thought of some man they know; when asked who specifically they had imagined, they frequently envisioned a complete stranger. And this is not because men are the default human beings; when asked to think of a happy face, 61 percent thought of a woman (Becker, Kenrick, Neuberg, Blackwell, and Smith, 2007). When other participants were shown photos from Ekman and Friesen's classic *Pictures of Facial Affect* (1975) and asked to decide as rapidly as possible whether a face was showing an emotion, people were faster and more accurate, if the face was that of an angry male (as compared to an angry female). On the other hand, people were faster and more accurate, in identifying a happy expression on a female face. We reasoned that this was an adaptive bias in that

males have, throughout human history been more physically dangerous (Daly & Wilson, 1988; 1994).

We also reasoned that this rapid recognition of anger on male faces not due to a culturally learned association between masculinity and anger or between femininity and happiness. Instead, we hypothesized that it was due to the fact that some of men's facial features, such as larger, heavier eyebrows and thinner lips, exaggerate expressions of threat (Darwin, 1872). Women by contrast have facial features associated with happiness, such as relatively larger eyes and arched eyebrows. To test this hypothesis, participants were shown computer-generated androgynous faces, identical except that they were attached to either a masculine appearing body wearing a suit jacket and tie, or a feminine appearing body wearing a feminine blouse. On a masculine body, the androgynous faces were in fact judged as masculine, but not as angry, and on a feminine body, the same face was judged as feminine, but not as happy. On the other hand, manipulation of the eyebrow ridge to look more masculine resulted in less influence on masculinity judgments than did the clothing, but it did lead to a significant increase in judgments of anger on the face. These studies and others (e.g. Becker, Rheem, Pick, Ko & Lafko, 2019; Becker Neel & Anderson, 2010) underscore the ways in which cognitive methods can be leveraged to generate falsifiable hypotheses about the interplay of signaling and encoding proclivities—a *coeveolutionary* psychology of affordances.

Motivated Perception of Emotion in Others.

A study by Maner and colleagues (2005) examined how activating different motives might alter the perception of emotions in other people's faces and do so in functionally biased ways. In this study, participants watched either a frightening film (a male aggressor stalking a woman), a romantic film (two attractive people falling for one another and having their first kiss), or a neutral clip. They were then shown faces of men and women who had been pre-rated as either highly attractive or average in attractiveness, and whose features were either African American or European American. Although the target faces were chosen because they were not expressing particular emotions, participants were led to believe that the people in those photos may have been attempting to "conceal" their response to an emotional stimulus. The participant's task was to act as an amateur psychologist and try to use subtle facial muscular cues to infer whether the target individuals were suppressing an emotion, and if so, what that emotion was. It was expected that participants in a self-protective frame of mind (after watching the frightening film) would perceive anger in target faces, rather than projecting their own fear; but that that bias should be focused on outgroup males—who, historically, have been more likely to pose threats (McDonald, Navarrete, & Van Vugt, 2012; Wrangham & Peterson, 1996). On the other hand, participants in a romantic frame of mind (after watching the romantic film) were expected to project sexual motivation onto targets, but that projection was expected to occur only for male participants, and only when they were viewing attractive female targets, a prediction based on previous research applying ideas of sexual selection and differential parental investment (e.g., Kenrick, Sadalla, Groth, & Trost, 1990; Buss & Schmitt, 1993).

Results were consistent with those predictions. After the threat priming movie, participants selectively projected anger onto male faces from a racial outgroup (African-American), but not onto women or ingroup male targets. The romance prime produced a different pattern: men projected sexual interest onto female faces, but only if those faces were physically attractive (and independent of the faces' race) (Maner et al., 2005). These findings suggest that perception can be altered by functionally relevant states, in ways biased to reap benefits of potential opportunities and to avoid threats afforded by those we are perceiving.

Functional disjunctions between attention and memory

We noted earlier that people exposed to groups of women paid selective attention to the physically attractive women in those groups, and further that when attentional resources were limited, they also overestimated the prevalence of good-looking women in a crowd (Maner et al., 2003). Participants in that same series of studies were also found to selectively remember the good-looking women they had seen. This seems unsurprising, because you are more likely to remember any stimulus to the extent that you attended to it. Men looking at crowds of other men did not selectively look at the good-looking men, and neither overestimated the prevalence of good-looking men in crowds, nor did men selectively remember handsome male faces in a later recall task. However, there was an interesting anomaly in those studies. Unlike men, women did selectively gaze at the faces of the better-looking men in a crowd, but they did not later overestimate the prevalence of handsome men, nor did they selectively remember those handsome men. A later study found that ovulating women were especially likely to gaze at relatively handsome men, but

again, not to later remember those men's faces (Anderson et al., 2010). For women, there seemed to be a disjunction between attention and memory.

In contrast, other studies found an opposite disjunction for people exposed to potentially threatening men's faces (Becker et al., 2010). In one study, participants eye movements were tracked while they were looking at men and women from in-groups or out-groups. When later given a surprise recognition test, participants who had been induced to feel self-protection motivation remembered outgroup male faces better, even though they had not spent more time looking at them. That is a striking dissociation: more encoding efficiency without more overt gaze.

From the perspective of affordance management, both of these disjunctions make sense. Staring down a potential aggressor is dangerous, whereas a quick information-gathering glance is not an invitation to escalate. Because remembering a potential aggressor would be important, it was make sense that such quick gazes involve focused attentional resources. In contrast, a woman gazing at an attractive man might increase his inclination to introduce himself. If he does not, however, no further cognitive processing is warranted. From an evolutionary perspective on mating, the sex differences in cognitive processing make sense in terms of greater female selectivity regarding mates, and consequent higher incentives for males to deeply process any potential mating opportunities from the onset. In a related finding, faces with physical disfigurements were especially likely to hold participants' attention, particularly when those participants had been primed earlier with disease cues. However, later tests of memory for disfigured faces revealed that this attention did not translate into better memory for those faces (Ackerman,

Becker, Mortensen, Sasaki, Neuberg & Kenrick, 2009). Since a disfigured face will presumably still be disfigured in the future, there is no need to commit its features to memory.

This general line of research found a number of other functionally sensible biases in basic cognitive processing (e.g. Ackerman et al., 2006; Shapiro et al., 2009). For example, when participants were exposed to pairs of faces showing either angry and neutral expressions, or happy and neutral expressions, anger on a female face was mistakenly attributed to the neutral male near her (but did not get similarly misattributed from a male to a female face). The reverse was true for happy expressions (which were more likely to be attributed to females presented alongside happy males) (Neel, Becker, Neuberg & Kenrick 2012).

These biases extended beyond basic cognitive processes to self-perception and social behaviors as well. For example, people primed with disease cues were likely to perceive themselves as being more introverted (Mortensen, Becker, Ackerman, Neuberg, & Kenrick, 2010). This would make adaptive sense because it could lead to avoidance of social contacts that might risk exposure to communicable pathogens. People primed with self-protective threats were more likely to conform to group opinions, which would be adaptive if one's group were under threat, in which case, standing alone would have reduced one's safety. In contrast, mating motivation induced women to conform more, but men to conform less (Griskevicius, Goldstein, Mortensen, Cialdini & Kenrick, 2006). Mating motivation also increased men's, but not women's, performance on creativity tasks. These latter two findings are consistent with predictions derived from considerations of sexual

selection and differential parental investment (Griskevicius, Cialdini & Kenrick, 2006): females across many vertebrate species are choosier about mating, leading males to compete with one another to be chosen.

Fundamental Motives and Economic Decision-making

In another line of research, our team considered how the findings on functional biases in basic cognitive processes might have implications for consumer behavior and economic decision-making (e.g., Griskevicius & Kenrick, 2013; Sundie, Cialdini, Griskevicius & Kenrick, 2012).

Marketing and management researchers have imported social psychology research on persuasion and social influence from Cialdini (2021), who laid out a small number of commonly used influence heuristics. Cues associated with reciprocity, authority, scarcity, liking, consistency, social proof and unity have been found to increase people's tendencies to comply with various types of requests or persuasive messages. Although those powerful heuristics were widely assumed to work across contexts, we reasoned that their effectiveness might wax and wane depending on which functional motive was currently salient (Sundie et al., 2012). In a series of experiments designed to test this idea, people were exposed either to a message framed in terms of scarcity or social proof (Griskevicius, Goldstein, Mortensen, Sundie, Cialdini & Kenrick, 2009). For example, a restaurant or vacation destination might be described as either a rare gem known only to a few (scarcity) or as exceptionally popular (social proof). Before evaluating the scarce or popular products or destinations, participants watched a short video or read a story designed to arouse

either self-protective or short-term mating motivation (for example, imagining themselves alone in a dark house at night without a phone, hearing someone break in, and then seeing a shadow appear in one's doorway, *versus* imagining themselves having a romantic experience with someone with whom they had a strong mutual attraction while on a vacation at the beach). For participants in the self-protective condition, appeals to popularity enhanced the desirability of products and destinations, whereas appeals to scarcity decreased those products' desirability (compared to no-motive controls). This finding fits with results discussed above on conformity, and with adaptive logic that, when under threat, it makes functional sense not to separate oneself from the larger group. The exact reverse occurred for participants in the romantic motivation condition – appeals to popularity reduced the desirability of products or destinations, whereas appeals to scarcity enhanced their desirability. Thus, it appears that, rather than being domain-general in their application, persuasion heuristics are also differentially applicable dependent on functional motivational context.

In another series of experiments, our team asked whether a well-known behavioral economic bias – loss aversion – might likewise get turned on and off depending on functional motivational context (Li, Kenrick, Griskevicius, & Neuberg, 2012). Loss aversion is the tendency to weight losses more heavily than equivalent gains (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981). For example, losing $100 moves one further from a neutral affective state than does gaining $100. Participants in the Li et al. (2012) studies were asked to assess the relative impact of various types of gains and losses (of money, or mate value, or status, for example), after they had first been put into either a short-term

mating or a self-protective motivational state. Participants in a self-protective state showed enhanced tendencies to weigh losses more heavily than gains. Short-term mating motivation also enhanced loss aversion in women. In men, however, short-term mating motivation flipped the results, erasing loss aversion, and for romantically motivated men, gains were weighted more heavily than losses. These findings fit with early results on creativity and conformity, and also with predictions based on considerations of sexual selection and differential parental investment (Li et al., 2012).

Sundie et al. (2011) examined the influence of mating motives on another aspect of economic behavior - conspicuous consumption. Participants in this series of studies were asked to make various choices about spending money in conspicuous versus non-conspicuous ways (e.g., purchasing designer sunglasses versus durable household goods). Mating motivation was activated either by reading a romantic story or viewing attractive members of the other sex. Results indicated that mating motivation enhanced conspicuous spending only among men adopting a short-term (unrestricted) mating strategy, particularly when they were focused on opportunities to engage in short-term relationships. In one study in the series, people's perceptions of other people's conspicuous spending were measured, and it was found that behaviors such as spending money on a flashy sports car (versus a modest yet reliable compact sedan) led to a man being rated as a more attractive for a date, but not as a long-term mate. For related findings, see Griskevicius et al., 2007; Griskevicius, Tybur, & Van den Berg, 2010; Huang, Ackerman, & Sedlovskaya, 2017).

Fundamental Motives, Well-being, Self-actualization, and Meaning in Life

In one paper, our team suggested an updating of Maslow's classic hierarchy of human motives to reflect the following half century's developments in evolutionary biology, anthropology, and psychology (Kenrick et al., 2010). That paper included the figure reproduced here (in Figure 1). One aspect of that reconceptualization has been especially controversial – replacing "self-actualization" with "parenting" motivation at the top of the pyramid. In one of several commentaries published alongside the original paper, Kesebir, Graham, and Oishi (2010) suggested that this change was a drawback to the new pyramid, removing what they argued was a uniquely human motivation, and a pillar of Maslow's hierarchy. When the paper received some coverage in the popular press, some of the letters to editor to the *New York Times* were more emphatically hostile about replacing self-actualization with the mundane motivation "to breed" as one letter-writer put it.

As we noted in the original paper and in response to the original commentaries, however, the reconceptualization was meant to yield a model of universal motives consistent with evolutionary life history, not to deny that human beings do experience so-called higher motives such as the desire to develop one's unique artistic, philosophical, or scientific talents. But we also suggested that those higher motives did not exist outside the realm of evolutionary biology, somehow having no connection at all to survival and reproduction. Instead, we argued that the motive for self-actualization was intimately linked to more universal adaptive motives.

In a test of this line of reasoning, participants in one series of studies were given Maslow's definition of self-actualization, and asked "if you were self-actualizing (i.e., realizing fully your own potential) right now, what would you be doing?" (Krems, Kenrick, & Neel, 2017). Participants had no difficulty answering this question—they responded with pithy ideas, such as "*getting a 4.0 and studying for my exams*," "*working on my PhD in biology*," and "*writing the great American novel*." Next, they were asked to consider the extent to which their answers reflected concerns with self-protection, disease avoidance, affiliation, status-seeking, mate acquisition, mate retention, or kin care (with descriptions of each motive in simple language, such as "making friends and allies, maintaining friendships, being accepted, being part of a group" for affiliation). For both college students and an adult sample from the broader United States, self-actualization was linked most strongly to status and secondarily to affiliation. In one study in the series, participants were asked about self-actualization alongside other forms of well-being commonly studied by positive psychologists: eudaemonic well-being (or finding meaning and purpose in life), hedonic well-being (maximizing the ratio of pleasurable to unpleasurable experiences in one's life), and subjective well-being ("maximizing the extent to which your life, work, health, and social relationships are desirable, enjoyable, and valuable"). Again, self-actualization was linked to status—but the other forms of well-being were more closely linked to affiliation. Moreover, mating motivation was more closely linked to each of the forms of well-being for males than for females. These findings do not suggest that the higher-order motive of self-actualization is nonexistent; rather, they simply suggest that even lofty motivations are not completely disconnected from the realm of evolutionary

biology. Broader links between fundamental motives and various aspects of well-being and human potential are considered in Kenrick & Lundberg-Kenrick, 2022).

Individual differences and cultural universals in fundamental motives

From a life history perspective, fundamental motives are not only activated by immediate context (as discussed in the findings above), but are also linked to developmental phase and relevant life history variables (such as gender and parenting status). In another line of research, participants were asked to rate themselves on a series of items intended to reflect individual differences in chronic motives (Neel, et al., 2016). For example, "I think a lot about how to stay safe from dangerous people" was an item intended to reflect Self-Protection, "I am interested in finding a new romantic/sexual partner" to reflect Mate Seeking, and "caring for family members is important to me" to reflect Kin-Care. Factor analyses suggested that each of the motives listed in Figure 1 was distinctly measured by the intended items, although several of the motives broke down into two or three sub-factors (for example Affiliation yielded separate sub-scales for Affiliation – Group (e.g., "I like being part of a team"), Affiliation- Exclusion Concern (e.g., "I worry about being rejected") and Affiliation-Independence (e.g., "I would prefer to spend time alone than to be surrounded by other people."). Kin Care items reflected sub-factors for Kin-Care Family and Kin-Care Children. These factors were sensibly connected to other established measures of similar constructs (e.g., Self-Protection correlated .38 with the Belief in a Dangerous World scale, and Affiliation (Group) correlated.41 with Extraversion (from the Big Five) and .45 with agreeableness, but negatively with Neuroticism (-.22)). Mate Seeking was higher in males, but was strongly negatively correlated with being in a romantic

relationship. The scales also related sensibly with "life data" or behaviors that had occurred in the past (e.g., self-protection was related to having taken a self-defense class, and with having a home security system).

That scale has been administered to several thousand participants across 42 different countries around the world, indicating theoretically sensible differences in the extent to which people prioritize various fundamental social motives – including large sex differences in self-protection, mate seeking, and kin care, as well as differences in the strength of motives at various life phases (i.e. single adults vs. those in committed relationships vs. parents). At the same time, that work has indicated broad similarities in average motivational profiles for men and women and across life phases (Ko, Pick et al., 2020; Ko, Kenrick, Becker & Varnum, 2026; Pick et al., 2022a,b). One strikingly consistent finding is that on average, people in every society from which we have gathered data report stronger kin-care motivation than mate-seeking motivation (Ko et al., 2020; Pick et al, 2022b). This pattern holds even for single people and for college age males (Ko et al., 2020). Further, although changes in ecological affordances, such as the COVID-19 pandemic led to sensible shifts in people's motives, namely an increase in disease avoidance, kin-care remained on average a far stronger motivation priority (Pick et al., 2022b). Importantly, greater kin-care motivation associates with higher life satisfaction and lower levels of depression and anxiety (Ko et al., 2020; Pick et al., 2022a,b). Taken together, these findings suggest that fundamental motives are both flexible in terms of their calibration to individual differences and ecological affordances, but also fairly universal in terms of general prioritization.

Adaptive threats and opportunities in the environment

From the affordance management perspective, the mind's job is to identify and then manage the opportunities and threats afforded by our physical and social environments, so that we may effectively exploit the potential opportunities and mitigate the potential threats. This means determining, for example, both whether the ground before us is *terra firma* (versus something perhaps less stable) and whether the new acquaintance before us is *persona firma* (versus someone perhaps less stable).

Importantly, the opportunities and threats afforded by the environment exist *in the interaction* of the capacities, goals, needs, desires, and vulnerabilities of the perceiver and the objective features of the environment (Gibson, 1979; McArthur & Baron, 1983). The loose sand of the ground before us is of little matter if we're on a leisurely stroll enjoying the sun setting over the ocean's horizon, but could constitute a threat if we need to run with speed to escape a predator; the potential lack of emotional stability of a new acquaintance matters little if she's simply a conversation partner at a friend's party but could constitute a threat if she's a candidate to become one's partner in a new business venture.

One line of work in this vein focuses on how the affordances others provide for us vary as a function of relatedness and may shape our strategies when interacting with them to accomplish our goals (e.g., Sng, Choi, & Ackerman, 2025). A highly consistent finding in the behavioral sciences is that human males generally engage in more frequent direct aggression than females (e.g., Daly & Wilson; 1988; Varnum, et al., 2025). These differences make sense given sex differences in average size and formidability, as well as

obligate parental investment and reproductive potential, all of which make direct aggression more costly from a fitness standpoint for females than males. However, most of this work has examined behavior occurring between people who are not highly related. In the context of kin relationships, e.g., those between siblings, inclusive fitness may change the calculus for females in terms of the costs and benefits of direct aggression for attaining resources, status, or to accomplish other goals. The physical safety threat affordances that a large muscular man poses for a woman who is his sister may be quite different than for a female acquaintance, and so his sister may be much more likely to engage in direct aggression than is a female stranger in a self-protective state

Indeed, in multiple US samples and in 23 other countries around the world, although men report greater frequency of mundane forms of direct aggression toward non-kin than do women, these sex differences are absent or reversed when the target is a sibling (Kirsch et al., 2024; Varnum et al., 2025). We find this not only when examining reports of childhood behavior but adult behavior as well. Why might this be? We have argued that in situations in which an individual shares a high proportion of genes with another person, inclusive fitness may limit the extent of escalatory retaliation for moderate forms of aggression and reduce the likelihood that such behavior would lead to a refusal to cooperate or behave in a prosocial fashion toward one in the future. Thus, the relatively low risk of reducing one's direct fitness interest from aggressing toward a sibling may level the playing field between the sexes so to speak.

A separate line of work, also inspired by an affordance management perspective, finds that people who live in ecologies where there are more (relative to fewer) kin are more likely

to endorse fighting to defend one's group, and support going to war for one's country (Sng, Choi, & Ackerman, 2025). The broad argument is that aggression here functions to protect and defend one's kin from threats. Hence, the perspective highlights the importance of considering the relationship between the actor and recipient, when thinking about the psychology of aggression.

The capacities of physical and social environments to provide opportunities or inflict harms are often difficult to identify through simple observation. In our social environments, for example, some characteristics of other people can only emerge under very specific circumstances (e.g., bravery) and the discovery of other characteristics often can't occur until long after the behavioral act has passed (e.g., dishonesty). Moreover, people sometimes seek to mask their characteristics or intentions toward us (e.g., Merrell, Choi, & Ackerman, 2024). One implication of this is that we often need to actively interact and engage with an object or person to determine whether they might afford us opportunities or threats relevant to our current capacities, goals, desires, needs, and vulnerabilities (Gibson, 1979; Pick & Neuberg, 2022). Just as we may tentatively poke at the ground with our toes to determine its solidity and ability to bear our weight, we may question the potential business partner about her experiences with stressful situations and assertively challenge her answers to assess her ability to bear the weight of the business role.

Of course, we are often limited in our ability to poke and prod others, and, instead, are constrained to merely observe. In these cases, we rely upon available cues imperfectly associated with the potential threat and opportunity affordances.

These perceptual and inferential processes can be seen operating in some of the research discussed above, as when the attractiveness of people who draw our attention depends on their sex and our current mating goals and relationship status (Maner et al, 2003). In can also be observed in people's default inclinations to stereotype others and engage with them in ways driven by their prejudices. In various studies, we have employed the affordance management approach to better understand the nature of stereotyping and the forms taken by stereotypes, prejudices, stigma, and discrimination (for reviews, see Neuberg et al., 2020; Schaller & Neuberg, 2012; Sng, Williams, & Neuberg, 2017). We have explored, for example, why some features (e.g., sex, age, race/ethnicity, outgroup status, sexual orientation, diseasiness, body shape) are universally employed to stereotype and draw inferences about others; why the encoding of others is especially likely to occur at the intersection of some of these dimensions (e.g., Sex-Age; Sng et al, 2020); and why people possess qualitatively distinct kinds of "prejudices" toward different kinds of groups (e.g., fear prejudice, disgust prejudice, anger prejudice, envy prejudice, and mixes/ambivalences of these; e.g., Cottrell & Neuberg, 2005).

Ecology stereotypes and their implications for better understanding race and other stereotypes.

All organisms, including humans, face trade-offs in how to invest their energy and effort toward accomplishing their adaptive goals. Effort invested in producing new offspring cannot simultaneously be invested in caring for existing offspring; one cannot spend the same calorie twice. Life history theory (Charnov, 1993; Kaplan & Gangestad, 2005; Stearns, 1992) provides a framework for exploring these trade-offs and has roughly characterized

life history strategies—broadly integrated, interdependent suites of traits and behaviors—along a continuum ranging from "fast" to "slow" (Ellis, Figueredo, Brumbach, & Schlomer, 2009). An organism manifesting a fast life history strategy[1] will tend to have its first sex earlier in life, be more promiscuous, have more offspring, be more impulsive, take more risks, and generally be more present-focused; an organism manifesting a slow life history strategy will tend to delay its first sex until later in life, have fewer offspring but be more invested in them, be less impulsive, take fewer risks, and generally be more future-focused (e.g., Brumbach, Figueredo, & Ellis, 2009; Ellis, 2004; Griskevicius, Tybur, Delton, & Robertson, 2011).

These behaviors have important affordance implications for social perceivers. Depending on our own goals, it is important to know whether a person we're engaging with is inclined toward short- versus long-term mating, toward impulsivity versus predictability, toward education and career accomplishment versus aggressive means of acquiring resources, and the like. In the absence of direct information, how can we gain information about such affordances?

Knowledge of a person's developmental and current ecology should be useful because certain ecological features actually do alter the likelihood that individuals adopt different

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[1] We note the debate around the coherence of human life history strategies (Del Giudice, 2020; Sear, 2020) and evidence that strategies may not be unidimensional (e.g., Manson & Kruger, 2022; Richardson et al., 2017). That said, our focus below is on *perceptions* of *others'* life history, which does seem to cohere as a one-dimensional "fast" strategy stereotype (Sng et al., 2024).

life history strategies (Brumbach et al., 2009; Chua et al., 2017; Copping et al., 2013; Figueredo et al., 2005; Mishra et al., 2017; Simpson et al., 2012). “Harsher” ecologies—those that are more resource-poor, unpredictable, and in which extrinsic causes of mortality are relatively high—tend to lead the individuals within them to adopt faster life history strategies. “Hopeful” ecologies—those that are more resource sufficient, predictable, and in which extrinsic causes of mortality are relatively low—tend to lead the individuals within them to adopt slower life history strategies.

Given that ecology shapes people’s life history strategy, and life history strategy shapes behavior in affordance-relevant domains, ecology might be a highly useful (if imperfectly diagnostic) cue for predicting the behavior of others. Our ancestors who were attuned to cues of ecology, and who used this information to make inferences about the behaviors of others tied to life history strategy, would have been better able to predict others’ behavior, and thus have a fitness advantage over those less attuned to the effects of ecology. If so, we might expect humans to possess what we call “ecology stereotypes”—stereotypes about the behavioral inclination pulled for by certain ecologies (Neuberg & Sng, 2013).

And they do (Sng, Williams, Tsukamoto, & Neuberg, 2025; Williams, Sng, & Neuberg, 2016). Across societies (United States, India, Japan, Romania, the United Kingdom), people strongly stereotype those who live in harsh and unpredictable ecologies (relative to more “hopeful” ecologies) as being more inclined toward “fast” and present-focused behaviors—impulsivity, sexually unrestrictedness, opportunism, and lesser investment in their own education and in their children. These stereotypes are robust against

demographic variation and general valence biases, and are distinct from social class stereotypes.

Importantly, these ecology stereotypes may underlie stereotypes typically presumed to be based on race or certain other demographic categories. In the U.S., for instance, Black and White Americans are nonrandomly distributed across ecologies; comparatively, Black Americans are somewhat more likely to be raised and currently reside in harsher ecologies. Thus, common stereotypes of Black Americans in the U.S. that include the "faster" traits may reflect not race, *per se*, but rather the confound within the U.S. between race and residential ecology. One implication of this is that when information about both race and ecology are available to perceivers, inferences may be driven by the ecology information. Indeed, there are good reasons for social perceivers to privilege ecology information over race information in making inferences about individuals, as the effects of ecology are likely more causal of and proximal to actual behavioral inclinations than race, per se.

This is the case. Although Black Americans are stereotyped as possessing faster traits than White Americans in the absence of ecology information, the availability of ecology information overrides race information: Black people *and* White people presented as coming from harsher ecologies are similarly stereotyped as "fast"; Black people *and* White people presented as coming from more hopeful ecologies are similarly stereotyped as "slow" (Sng et al., 2025; Williams et al., 2016; Williams, 2023). Conceptually replicating this pattern in Japan and the U.S., ecology information also overrides the inferences made

about people raised by single mothers—who are also typically stereotyped as faster in their behavioral inclinations (Sng et al., 2025).

Because ecology shapes affordance-relevant behavior, and because social perceivers need to identify and manage such affordances to more effectively achieve their goals, social perceivers employ ecology stereotypes to understand and predict the actions of others.

Remaining Questions / Future Directions

There are a number of unanswered questions regarding the linkages between fundamental human motives, cognition, and behavior, several of which suggest additional potentially illuminating lines of research. To what extent does it make sense to think of fundamental motives as "modular" systems? How are the different motives connected to physiological processes, including distinct hormones and patterns of neurological activity? How do the opportunities and threats afforded by environments change across the lifespan? To what extent are fundamental motives universal likely to be found in more traditional societies? To what extent might the framework be useful in applied disciplines such as medicine, law, business, political science, and the development and diffusion of sustainability technologies?

Are fundamental motivational systems modular? As we noted, psychological thinking about domain specificity was critical in generating the fundamental motives framework. Traditional psychologists had conceptualized motivation in terms of *domain general* processes that were largely content free (such as high versus low arousal, or approach and

avoidance). The approach described here includes an assumption that the links between motivation, cognition, and behavior can be better understood by taking account of *domain-specific* goals. The central idea is that the same social stimulus is noticed, perceived, and responded to differently depending on whether one is currently motivated toward mate acquisition or parental care, for example. Although we believe that motivational systems therefore are intimately connected to domain specific processing, we do not regard those systems as modules in the strictly technical sense (see Barrett and Kurzban, 2006; and Pietraszewski & Wertz, 2022). According to strict criteria, a module is defined by automaticity (like an eyeblink in response to a rapidly approaching object in the visual field), encapsulation (it does not take inputs from other mental systems, as when a visual illusion –e.g., the moon appearing larger when on the horizon than directly above us – persists despite explicit knowledge that it is an illusion), rapidity, specificity (e.g., a visually approaching object triggers an eyeblink and not the secretion of saliva, the reverse is true of a squirt of lemon juice into one's mouth), as well as fixed neural architecture (e.g., speech recognition in Wernicke's area versus speech production in Broca's area), and characteristic breakdown (as in the characteristic problems in recognizing or producing speech after damage to Wernicke's versus Broca's areas). Just as human language capacity is composed of a number of somewhat modular processing mechanisms that interact with one another and with experience, it is possible that fundamental motivational systems involve the operation of some simple mechanisms that might be considered strictly or loosely modular (such as simple cues linked to threat or the perception of mating opportunities) – but at this point, this is an open question.

How are the different motives connected to physiological processes and neurological structures? The question of domain specific systems is related to the unanswered question of how exactly the different motives are differentially linked to hormonal and neural levels of analysis. Although it seems unlikely that there is a specific and localized neural mechanism dedicated to "mate acquisition" and another dedicated to "self-protection," it is certainly likely that those two systems do involve different activation of hormones (such as relative ratios of testosterone and estrogen versus adrenaline and noradrenaline, for example), as well as involvement of different neural subsystems (in the hypothalamus and amygdala, for example). Beall and Tracy (2017) and Shiota and colleagues (2017) review findings relevant to this line of reasoning.

Focusing more deeply inward, we have also begun conceptualizing how our integrated affordance management/fundamental motives framework can instantiate within biologically plausible neural networks. We see great promise here, in two ways—in the sense that our framework is quite compatible with the dynamism inherent in such networks, and that our framework (or something like it) is likely necessary to enable such networks to actually survive and reproduce in the real world. That is, existing models tend to underappreciate the substance, the content, of social life—the specific, qualitatively distinct challenges humans face and the flexible strategies we employ to enhance our fitness. Our early conceptual explorations, including in the context of re-examining Jung's idea of archetypes, suggest that our framework can provide that substance (Becker & Neuberg, 2019a, 2019b, 2025).

How do the opportunities and threats afforded by environments change across the lifespan? Because some goals shift across developmental phases, the opportunities and threats afforded by any particular environment likely shift as well. Recent work integrates the idea of ecological affordances with life history theory to theorize how the same feature of a social environment (e.g., a community with a high proportion of genetic relatives) can afford quite different opportunities or threats depending on one's life phase or stage (e.g., providing fitness-enhancing opportunities for young children and their parents, but fitness constraints on young adults seeking mating opportunities; Ko & Neuberg, 2025). We are beginning to explore empirically these ideas.

Are fundamental motives universal truly universal? From focusing inward on the workings of the brain toward extending outward on the workings of societies and cultures, our research conducted across a number of societies has indicated some cross-cultural commonalities in fundamental motives across 42 countries on all 6 populated continents (Africa, Asia, Australia, Europe, North and South America) as well as New Zealand. As noted above, there appears to be more cross-cultural similarity than differences in the general patterning of these motives. Although much of that data comes from countries that do not meet Henrich, Heine, and Norenzayan's (2010) definition of WEIRD (Western, educated, industrialized, rich, and democratic), many of the participants from non-Western, less wealthy, and non-democratic countries have been college educated and therefore likely exposed to Western ideas. Is it possible that different patterns might be found in less educated populations, or in people living in more traditional societies? From a theoretical perspective, it is presumed that modern humans inherited whatever

predispositions we have from ancestors who had to solve recurrent problems associated with survival, self-protection, affiliation, status, mate acquisition, mate retention, and family care. However, it is certainly plausible that ecological factors during development, as well as thousands of years of selection acting on the descendants of groups that have lived in high-density societies, and even some degree of random variation, could lead to differential activation of, or patterning of, certain motives in some traditional societies as compared to others.

To what extent might the framework be usefully applied to solving real world problems? Above, we briefly considered some applications of this perspective to economic decision-making (see also Brase, 2014; Griskevicius, Ackerman, Van den Bergh, & Li, 2011). To the extent that these motives are in fact fundamental human concerns, they ought to have implications for applied areas such as health psychology and clinical psychology (e.g., Kenrick & Lundberg-Kenrick, 2022; Zeigler-Hill & Hobbs, 2017). Those motives ought to have application in fields including management, law, and medicine. For example, it would be of interest to determine how fundamental motives are linked to leadership and team cooperation in the workplace, to criminal decision-making, or to the development of physical illness. At the broadest level, each of the fundamental motives contributes to environmentally destructive behavior at the global level, but it might be possible to tap those same motives to encourage sustainable choices at the local and global level (Kenrick, 2026). Research addressing these possible applications could have important implications for public policy.

Conclusion

We have described a program of research – applying a life history perspective to fundamental human motives and related environmental threats and opportunities -- that generated a number of findings ranging from cognitive biases in attention, encoding and memory to social behaviors including prejudice, attraction, and aggression, as well as creativity, self-actualization, and economic decision making. The theoretical framework described here has yet untapped potential for questions with both theoretical and practical importance.

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