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Emotivational Psychology:
How Distinct Emotions Facilitate Fundamental Motives

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Abstract

Fundamental motivational systems and distinct emotions have both been suggested to be critically involved in the orchestration of adaptive responses to recurrent challenges in humans' evolutionary history. Research on motivation has, however, proceeded largely independently from research on emotions. Here, we contend that distinct emotions *are* what motivate behavior, and that these emotions may have evolved in tandem with fundamental motivational systems because they play a critical role in the functioning of those systems. Specifically, once a threat or opportunity has been identified, a distinct emotion is elicited, automatically galvanizing and guiding physiological, cognitive, and behavioral responses towards an adaptive outcome; this entire process occurs via a motivational system. We map six characteristic distinct emotions to six fundamental motivational systems, and review evidence supporting each hypothesized link. In doing so, we propose a novel framework for understanding human motivation and the corresponding emergence of distinct emotions.

Emotivational Psychology:

How Distinct Emotions Facilitate Fundamental Motives

In 1943, Abraham Maslow proposed a novel framework for research in motivational psychology: a hierarchy of needs, which aimed to integrate prevailing theories of his time into a unified “general-dynamic” theory of motivation. Maslow’s hierarchy was comprised of a set of five basic needs to which he believed people should aspire to satisfy: physiological, safety, love, esteem, and self-actualization. Though its theoretical importance to contemporary psychological science has been questioned, this account has had an important influence on humanistic psychology, as well as motivation research and personality theory broadly speaking. Thus, in an effort to bring Maslow’s cognitively contagious theory back to the forefront of psychological research on motivation, several years ago Kenrick, Griskevicius, Neuberg, and Schaller (2010) proposed a revamped hierarchy, suggesting that by infusing Maslow’s foundational structure with advances in evolutionary psychology, this classic framework could be instilled with renewed scholarly significance.

In their renovated pyramid of needs, Kenrick and colleagues followed Maslow’s lead to identify a set of fundamental human motives. In their account, however, each of these needs is not perceived as a goal to be aspired, but a functional motive that humans evolved to experience. In other words, rather than draw on insights from clinical psychology to identify a set of common aspirations that might promote human flourishing, the contemporary authors used evolutionary psychology to derive six motivational systems which would have been central to the proliferation of our ancestors’ genetic material: Self-protection, affiliation, status/esteem, mate acquisition, mate retention, and parenting. Beneath these higher-order psychological motivational systems the authors also located a lower-order system—immediate physiological

needs (e.g., hunger, thirst)—driven by largely unconscious biological deficits. The higher-order motives, in contrast, are thought to promote sets of actions directed towards enhancing individuals' survival and reproductive success by virtue of fostering a coordinated suite of physiological and psychological responses, which facilitate the related adaptive behavioral responses.

Here, we contend that distinct emotions play a critical role in orchestrating these suites of responses, and as a result are integral to an evolutionary understanding of human motivation. More specifically, emotions *are* what motivate behavior, yet thus far psychological research on motivation has proceeded largely separately from emotion research. The goal of this article is therefore to highlight the utility of integrating these two fairly divorced streams of work. By mapping specific patterns of affect to each of the higher-order motivational systems identified by Kenrick and colleagues (2010), and reviewing empirical evidence supporting each hypothesized link, we propose a novel framework for understanding human motivation and the corresponding emergence of distinct emotions. We argue that distinct emotions may have evolved, in part, to facilitate the satisfaction of core fundamental motives, which are central to human survival and reproductive success.

How Do Distinct Emotions Facilitate Fundamental Motivational Goals?

Fundamental motivational systems and distinct emotions have both been suggested to be critically involved in the orchestration of coordinated suites of behaviors, cognitions, and physiological responses to recurrent adaptive challenges in humans' evolutionary history. However, no framework yet exists which synthesizes the complementary arguments made by past researchers separately studying these topics. According to Kenrick and colleagues (2010), “any motivational system includes (a) a template for recognizing a particular class of relevant

environmental threats or opportunities, (b) inner motivational/physiological states designed to mobilize relevant resources, (c) cognitive decision rules designed to analyze trade-offs inherent in various prepotent responses, and (d) a set of responses designed to respond to threats or opportunities represented by the environmental inputs (i.e., to achieve adaptive goals).” (p. 21-22). Interestingly, an entirely separate line of research in the literature on the evolution of distinct emotions has highlighted the importance of a broad range of distinct emotional experiences in coordinating complex suites of “information-processing programs” in orchestrating solutions to critical adaptive problems faced by our ancestors (e.g., Al-Shawaf, Conroy-Beam, Asao, & Buss, 2015; Cosmides & Tooby, 2000; Tooby & Cosmides, 2008; Tooby, Cosmides, Sell, Lieberman, & Sznycer, 2008). According to this account, “[Emotions] are hypothesized to have evolved as *superordinate mechanisms* responsible for coordinating suites of other information-processing programs, including those of attention, perception, memory, categorization, learning, and energy allocation, as well as the more typically considered elements of physiology and manifest behaviour” (Al-Shawaf et al., 2015, p. 1). Given the similarity, and even direct overlap, between these functional explanations, it seems clear that fundamental motivational systems and distinct emotions are interrelated. We suggest that distinct emotions may have evolved, in part, to act in concert with fundamental motivational systems; galvanizing and orchestrating the complex processes necessary to solve adaptive problems relevant to each fitness-enhancing motive.

In this article, we focus on the six higher-order motivational systems identified by Kenrick and colleagues (2010) and propose one characteristic distinct emotion that may have evolved in concert with each (see Figure). We suggest that distinct emotions evolved with fundamental motivational systems because they play a critical role in the functioning of those systems: Once a (real or imagined) threat or opportunity has been identified, a distinct emotion is

elicited, automatically galvanizing and guiding physiological, cognitive, and behavioral responses towards an adaptive outcome. More specifically, we argue that a critical part of each motivational system laid out by Kenrick and colleagues (2010) is the activation of a distinct emotion, which: (a) Is elicited by a particular class of relevant environmental threats or opportunities, (b) mobilizes relevant physiological resources, (c) is experientially associated with distinct cognitive decision rules and, (d) promotes a set of behavioral responses. Together, all of these components help achieve the adaptive goal. (We maintain the perspective of these authors that “environmental threats or opportunities” may include positive and negative eliciting events; e.g., victories, losses).

The “Emotivational” framework suggests that emotions are what motivate people to fulfil adaptive goals and respond to adaptive challenges; without a host of specific distinct emotions, individuals would fail to overcome a host of specific challenges to their survival and reproductive success. If an individual did not experience fear in the face of danger, self-protective behaviors would not be enacted and the individual might die. If an individual did not experience tenderness in response to helpless offspring, parenting behaviors would not be enacted and the individual’s offspring might die. These behaviors are driven by motivations, but motivations do not exist in a vacuum; in our account, they are an essential part of each emotional experience. Here, we discuss six distinct emotions that are characteristic of each motivational system identified by Kenrick and colleagues (2010), but there are, unquestionably, a number of other emotions that also likely evolved with each system in the same way (discussed briefly in closing). We hope that this approach encourages future researchers to explore the emergence of other distinct emotions as integral parts of these same fundamental systems. In the following sections, we: (a) Identify the adaptive problems each fundamental motivational system evolved

to solve, (b) suggest a characteristic distinct emotion which works in concert with the motivational system to facilitate the associated adaptive solutions, and (c) provide empirical evidence for each of these hypothesized associations. By enlisting current thinking in the evolutionary psychology of human motivation, we believe that this account will provide an integrative and potentially generative framework for understanding the emergence of a broad range of distinct emotions and their functions within motivational psychology.

Fundamental Motives and Associated Characteristic Emotions

Self-Protection and Fear

Throughout evolutionary history our human ancestors faced a multitude of recurrent survival-related dangers (e.g., falling objects, floods) and therefore needed a wide repertoire of escape and avoidance strategies. A “self-protection” motivational system that functioned to help individuals identify dangers and reflexively respond to these threats would have critically aided the survival of our ancestors (Kenrick et al., 2010). We suggest that *fear* may be a characteristic distinct emotion that co-evolved with the self-protection motivational system. If this account is correct, threats to well-being—especially those that would have been recurrent throughout evolutionary history— should activate the self-protection motivational system and also elicit fear. Feelings of fear should, in turn, be associated with coordinated physiological, psychological, and behavioral responses that facilitate the avoidance of harm.

Supporting these predictions, the human self-protection system becomes activated in response to recurrent threats to safety which were common in our ancestral environment (e.g., unfamiliar surroundings, darkness; Kenrick et al., 2010), and these same threats tend to elicit fear, from an early age and with relatively little conditioning (Debiec & LeDoux, 2004; see Ohman & Mineka, 2001, for review). Furthermore, fear experiences tend to be accompanied by a “fight or flight” physiological response in which the sympathetic nervous system is activated and

adrenaline is released into the bloodstream (see Giusto, Cairncross, & King, 1971; Levenson, 1992); fear thus may play a key role in mobilizing metabolic resources necessary to flee impending danger. Subjective feelings of fear are also functional in situations of danger, by promoting cognitions and decision rules regarding avoidance and withdrawal, which may have helped our ancestors escape harmful situations (e.g., Cacioppo & Berntson, 1994; Lang, Bradley, & Cuthbert, 1997). To take just one example of a finding supporting this account, individuals experiencing fear report a lower attitudinal propensity towards risky decisions (Lerner & Keltner, 2001). Finally, fear is associated with an automatic startle response (including sudden or rapid eye blinking; see Grillon & Davis, 1997) and rapid muscle extension which could aid in the reflexive avoidance of a potential predator (see also Chen & Bargh, 1999; Marsh, Ambady, & Kleck, 2005).

Affiliation and Happiness

Ancestral humans lived in groups and relied heavily on conspecifics for protection from external threats (Lancaster, 1976). Those without strong social connections would have failed to secure the benefits of shared cultural knowledge and resources (e.g., food); as a result, social group membership and belongingness was crucial to the survival and reproductive success of our ancestors (e.g., Henrich & Boyd, 1998; Hill & Hurtado, 1989). For this reason, Kenrick and colleagues (2010) suggest that humans evolved a fundamental motivational system geared towards promoting affiliation with peers. *Happiness* may be a characteristic distinct emotion that co-evolved with this system to facilitate the achievement of affiliative goals and help individuals avoid the adaptive problems associated with a solitary existence. If so, interacting with others in one's social network should activate the affiliation motivational system and also elicit happiness.

Feelings of happiness should, in turn, be associated with coordinated physiological, psychological, and behavioral responses that facilitate positive social interactions with peers.

Supporting these predictions, happiness is typically elicited when individuals are affiliating with peers; people report increases in happiness when they are socializing, experiencing meaningful interactions with friends, and reminded of their social networks; in contrast, decreases in happiness occur in response to feelings of loneliness (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004; Knowles & Gardner, 2008; Lun, Kesebir, & Oishi, 2008). People also report greater happiness in response to experiential purchases that help to strengthen their social relationships (van Boven & Gilovich, 2003) and to spending money on others rather than themselves (Dunn, Aknin, & Norton, 2008; 2014). Furthermore, individuals higher in dispositional happiness tend to be extraverted, agreeable, and engage in more affiliative behavior; they spend less time alone, more time with friends, and have better social relationships than less happy people (Diener & Seligman, 2002; Wong & Csikszentmihalyi, 1991).

Feeling happiness also mobilizes physiological and neurochemical processes which may aid in affiliation goals during social interactions; for example, happiness is associated with increases in serotonin, dopamine, and opioid activity (Berridge & Kringelbach, 2013; see Young, 2007), which have each been linked to positive social interactions, popularity, and affiliative feelings towards others in an economic trust game (Aan het Rot, Moskowitz, Pinard, & Young, 2006; Burt, 2008; see Depue & Morrone-Strupinsky, 2005; Schweiger, Stemmler, Burgdorf, & Wacker, 2014). Finally, happiness may also be associated with cognitions, attitudes, and behavioral tendencies that facilitate positive social interactions: Theorists have argued that suites of positive affect related to happiness (e.g., joy, contentment) motivate approach behavior by

sending internal signals that prompt individuals to explore novel objects, people, or situations (Fredrickson, 2001). Supporting this account, experiencing joy leads to a desire for social play, which can facilitate adaptive goals of the affiliation motivational system by strengthening bonds with peers through shared amusement (Aron, Norman, Aron, McKenna, & Heyman, 2000; Lee, 1983).

Status/Esteem and Pride

High-ranking individuals tend to have disproportionate influence within a group, such that social rank can be defined as the degree of influence one possesses over resource allocation, conflicts, and group decisions (Berger, Rosenholtz, & Zelditch, 1980). In contrast, low-ranking individuals must give up these benefits, deferring to higher-ranking group members. As a result, higher social rank tends to promote greater survival and reproductive success than low rank, and a large body of evidence attests to a strong relation between social rank and fitness across species (e.g., Barkow, 1975; Betzig, 1986; Cowlshaw & Dunbar, 1991; Hill & Hurtado, 1989; Sapolsky, 2005; von Rueden, Gurven, & Kaplan, 2011). Thus, Kenrick and colleagues (2010) argued that humans evolved a fundamental status/esteem motivational system geared towards enhancing survival and reproductive success through achieving high-status and gaining esteem from peers. Importantly, several researchers have argued that high rank can be achieved through two separate pathways: (1) Dominance, or the use of intimidation or threat of force to gain power, and (2) prestige, or earned respect via the possession and demonstration of valued skills and information (Cheng, Tracy, & Henrich, 2010; Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013; Henrich & Gil-White, 2001).

Pride is a characteristic distinct emotion which may have co-evolved with the status/esteem motivational system to aid in fulfilling these adaptive goals (Tracy, 2016). Several

researchers have found evidence for distinct “authentic” (i.e., achieving and confident) and “hubristic” (i.e., arrogant and self-aggrandizing) components of pride (Tracy & Robins, 2007), which may have separately evolved to facilitate the attainment of prestige and dominance, respectively (Cheng et al., 2010; Tracy, Shariff, & Cheng, 2010). If this account is correct, then rank-relevant events such as accomplishments or agonistic victories should activate the status/esteem motivational system and also elicit authentic and/or hubristic pride. Feeling pride should, in turn, be associated with coordinated physiological, psychological, and behavioral responses that facilitate gaining or maintaining prestige and/or dominance over peers.

Supporting these predictions, the experience or recollection of a success – a status-boosting event-- has been associated with high levels of pride, across several studies (Heatherton & Polivy, 1991; McFarland & Ross, 1982; Weiner, Russell, & Lerman, 1979; Williams & DeSteno, 2008), and among children and adults across cultures (Tracy & Matsumoto, 2008; Lewis, Alessandri, & Sullivan, 1992; Stipek, Recchia, McClintic, & Lewis, 1992). Studies also show that threats to social standing result in decreases in pride (Lewis, et al., 1992; Stipek et al., 1992; Tracy & Matsumoto, 2008).

Evidence supporting the unique links between authentic pride and prestige, and hubristic pride and dominance, is more preliminary, but one study found that individuals high in trait levels of authentic pride tend to describe themselves, and be judged by peers who know them well, as prestigious, whereas those who are high in trait hubristic pride are more likely to describe themselves and be judged by their peers as dominant (Cheng et al., 2010). Together, this work suggests that the attainment of high rank activates the status/esteem motivational system and elicits feelings of authentic and/or hubristic pride.

Indirect evidence also suggests that feelings of pride may be associated with the mobilization of physiological resources which could aid in maintaining or further achieving high status: Testosterone, which is linked to status gains in both men and women (see Cashdan, 1995; Mazur, 1983; Mazur & Lamb, 1980; Newman, Sellers, & Josephs, 2005; Rose, Gordon, & Bernstein, 1972), has been shown to increase in response to posing the expansive postural component of the pride display (Carney, Cuddy, & Yap, 2010; but see Ranehill et al., 2015), and might aid individuals in status-driven agonistic encounters by facilitating aggressive and power-seeking behaviors. Future studies are needed to test for direct associations between feelings of pride and testosterone.

If pride co-evolved with the status/esteem motivational system, then feeling pride should also be associated with cognitions and behaviors that facilitate the maintenance and/or acquisition of dominance- and/or prestige-based status. In support of this prediction, Williams and DeSteno (2008) found that individuals experimentally manipulated to experience pride in response to task success were more likely to persevere at subsequent similar tasks, suggesting that the experience of pride directly promotes a desire and willingness to succeed (for related findings, see Herrald & Tomaka, 2002; Verbeke et al., 2004). Similarly, a study of undergraduate students found that those who experienced high levels of pride in an academic course early in the semester performed better on class exams later in the term (Pekrun, Elliot, & Maier, 2009).

Pride may also be involved in the facilitation of adaptive goals through a separate process: Potential future opportunities to move upwards in the social hierarchy may activate the status/esteem motivational system and elicit feelings of *anticipated* pride. The anticipation of pride should, in turn, shape individuals' physiological, cognitive, and behavioral responses facilitating an increase in effort and perseverance towards status-relevant goals. Supporting this

expectation, one set of studies found that the desire to increase one's pride following a failure leads to improvements in performance. Specifically, several samples of students responded to poor performance on an exam by changing their studying behaviors for subsequent exams—but only if they felt low levels of authentic pride in response to their prior failure. These individuals were motivated to seek out feelings of pride, and, as result, they performed better on subsequent exams (Weidman, Tracy, & Elliot, 2016).

Mate Acquisition and Lust

Sexual intercourse was, in humans' evolutionary history, a necessary first step toward successfully producing offspring; as a result, even short-term sexual encounters could have provided ancestral humans with a direct means of enhancing their reproductive fitness. Furthermore, by mating with others who were especially high in genetic quality, ancestral humans could have garnered additional indirect reproductive benefits by increasing their likelihood of conceiving healthy, pathogen-resistant offspring. For this reason, Kenrick and colleagues (2010) contend that humans evolved a fundamental mate acquisition motivational system geared towards enhancing reproductive success through the pursuit of sexual encounters with others at least relatively high in mate value. Though some have argued that the subjective experience of sexual arousal does not involve a specific emotional component and instead reflects a combination of emotions associated with general arousal and genital response (see Janssen, Prause, & Geer, 2007), others have argued that *lust* (also referred to as sexual arousal or sexual desire; Fisher, 1998) does fit the definition of a distinct emotion as described by many emotions theorists (Everaerd, 1988; Stevenson, et al., 2011). We agree, and suggest that lust may facilitate the pursuit of adaptive goals associated with the mate acquisition motivational system. If so, real or imagined potential sexual partners—especially those of high genetic quality—

should activate the mate acquisition motivational system and also elicit lust. Once elicited, feeling lust should, in turn, be associated with coordinated physiological, psychological, and behavioral responses that facilitate sexual intercourse with suitable partners.

A wealth of past research suggests that phenotypic markers of good health and pathogen resistance guide perceptions of attractiveness (see Rhodes, 2006), suggesting that perceived attractiveness is a cue to mate value. Supporting the expectation that lust may have evolved with the mate acquisition motivational system, the emotion is strongly elicited by the presence of highly attractive members of the opposite sex (e.g., Buunk, Dijkstra, Fetchenhauer, & Kenrick, 2002; Fletcher, Tither, O'Loughlin, Friesen, & Overall, 2004; Regan, 1998; Regan & Berscheid, 1997; Regan & Joshi, 2003; Sprecher & Regan, 2002). In other words, lust is activated when opportunities arise to mate with individuals most likely to produce genetically fit offspring.

In addition, lust mobilizes physiological resources necessary for successful copulation, such as increased vasocongestion of the sexual organs and genital tissues of both women and men (see Rellini, McCall, Randal, & Meston, 2005). Lust also may promote a cognitive orientation conducive to engaging in short-term sexual encounters (e.g., one-night stands, week-long flings), an often beneficial strategy for enhancing reproductive success; those who report higher levels of lust in response to sexual stimuli report less restricted sexual attitudes and more strongly advocate short-term mating strategies (Rupp & Wallen, 2008), and experiences of lust are associated with an enhanced willingness to engage in a wide range of sexual activities and risky sexual practices (Ariely & Loewenstein, 2006).

Mate Retention and Romantic Love

Humans' ancestral environment was unpredictable and characterized by long periods of resource scarcity. As a result, securing and retaining a long-term romantic partner likely resulted

in benefits to early humans' reproductive fitness through the potential for resource sharing and protection from predators and hostile conspecifics. Long-term companionate pairings are also beneficial for parenting; these relationships can precipitate and strengthen eventual co-parental relationships involving shared offspring. Maintaining a committed romantic partnership likely resulted in more supportive parental alliances as well as reductions in infidelity and consequent increased paternity certainty (for men). For these reasons, Kenrick and colleagues (2010) contend that humans evolved a fundamental mate retention motivational system. We argue that *romantic love* (also referred to as companionate love; Fisher, 1998), which is distinct from the related emotion of lust (see Diamond, 2003; 2004; Gonzaga, Turner, Keltner, Campos, & Altemus, 2006), is a characteristic distinct emotion that co-evolved with this system to facilitate relationship maintenance (e.g., Fisher, 2000). If this account is correct, one's real or imagined long-term companionate partner should activate the mate retention motivational system and also elicit romantic love. Feelings of romantic love should, in turn, be associated with coordinated physiological, psychological, and behavioral responses that facilitate trust, pair-bonding, and romantic relationship maintenance.

Supporting these predictions, across a multitude of diverse cultures, individuals report feelings of romantic love when asked to describe their long-term companionate partners (Jankowiak & Fischer, 1992). These feelings are, in turn, associated with the mobilization of physiological resources that facilitate trust and strengthen pair bonding: Among people in love, viewing pictures of their long-term companionate partners activates brain regions with high concentrations of oxytocin receptors (Bartels & Zeki, 2000). Oxytocin is a hormone that has been implicated in solidifying pair bonds and increasing trust, suggesting that feelings of romantic love may galvanize physiological responses geared towards enhancing relationship

maintenance (Kosfeld, Heinrichs, Zak, Fischbacher, & Fehr, 2005; Savulescu & Sandberg, 2008). Romantic love is also associated with an attitudinal desire to maintain romantic relationships by bolstering feelings of intimacy, commitment, self-other identity overlap, and anticipated probability of future marriage (Aron & Aron, 1997; 1998; Diamond, 2003; Dion & Dion, 1973; Ellis & Malamuth, 2000; Hatfield & Rapson, 1993; Hendrick & Hendrick, 1992; Rubin, 1970; Sternberg, 1986). Finally, feelings of romantic love strongly and positively predict couples' actual relationship maintenance (Le, Dove, Agnew, Korn, & Mutso, 2010), and negatively predict eventual relationship dissolution (Sprecher, 1999).

Parenting and Tenderness

Compared to other species, human babies are relatively slow to mature (Bjorklund & Shackleford, 1999; Clutton-Brock, 1990; 1991; Trivers, 1972). The resultant prolonged period of biological youth means that humans are incapable of feeding themselves or defending themselves against predation during the early stages of life (Hawkes & Paine, 2006). As a result, a high level of parental investment is necessary to ensure offspring survival. Kenrick and colleagues (2010) therefore contend that a fundamental parenting motivational system evolved in humans to help maximize the genetic interests of parents by ensuring that their offspring survive to reproductive age and are able to pass genetic material onto future generations. *Tenderness*, an emotion which is psychologically distinct from empathy, sympathy, and romantic love (see Buckels et al., 2015; Kalawski, 2010; Lishner, Batson, & Huss, 2011; Weidman & Tracy, 2016), may have evolved to facilitate these adaptive needs by promoting a desire to nurture and care for vulnerable offspring (McDougall, 1908). If so, one's real or imagined offspring should activate the parenting motivational system and also elicit tenderness. Once elicited, feeling tenderness

should, in turn, be associated with coordinated physiological, psychological, and behavioral responses that facilitate parental nurturance, protection, and parent-infant bonding.

Supporting these predictions, tenderness is felt in response to human infants, and also other baby-like (i.e., cute, vulnerable) stimuli, including adults whose faces have been experimentally manipulated to appear more infantile (Buckels et al., 2015; Lishner, Batson, & Huss, 2011; Lishner, Ocejka, Stocks, & Zaspel, 2008), suggesting that tenderness is elicited via activation of the parenting motivational system. Like romantic love, parenting behaviors have been associated with increases in oxytocin (see Feldman, 2012), suggesting that experiences of tenderness may be associated with the mobilization of physiological resources that aid in parent-infant bonding (Lee, Macbeth, Pagani, & Young, 2009); however, studies are needed to directly test for an association between feelings of tenderness and oxytocin. Feelings of tenderness may also be associated with cognitions, attitudes, and behavioral tendencies that facilitate parenting goals: In a recent investigation of the parenting motivational system, Buckels and colleagues (2015) found that dispositional tenderness is associated with a greater liking for infants and desire to protect them. Furthermore, among parents a chronic tendency to experience tenderness predicts caring child-rearing attitudes and self-child identity overlap, and, among non-parents, tenderness predicts a desire to have children (Buckels et al., 2015). This research also found that dispositional tenderness positively predicts the amount of time spent voluntarily looking at infant (but not adult) faces.

Further supporting evidence comes from separate studies showing that, following the visual perception of cute baby animals (with facial features mirroring those of tenderness-eliciting human infants), individuals show an increased tendency toward caution and carefulness—behaviors that could aid in the vigilant protection and nurturance of offspring

(Sherman, Haidt, & Coan, 2009). Together, these findings suggest that once the parenting motivational system is activated, tenderness galvanizes and coordinates associated physiological and psychological responses oriented towards enhancing parental care.

General Discussion

By integrating recent advances in evolutionary and motivational psychology (e.g., Kenrick et al., 2010) with contemporary emotions research (e.g., Al-Shawaf et al., 2015; Tooby & Cosmides, 2008), we have proposed a novel framework for studying the emergence of distinct emotions. Specifically, we have suggested that a host of distinct emotions may have emerged to coordinate complex suites of physiological, cognitive, and behavioral responses associated with the six higher-order fundamental motivational systems identified by Kenrick and colleagues (2010). We posit that fear, happiness, pride, lust, romantic love, and tenderness evolved, in part, to help individuals overcome specific adaptive problems associated with self-protection, affiliation, status/esteem, mate acquisition, mate retention, and parenting, respectively. In each case, we highlighted several lines of empirical evidence supporting our argument that each of these characteristic emotions (a) is activated when a particular class of relevant environmental threats or opportunities is identified, (b) mobilizes relevant physiological resources to help achieve the adaptive goal associated with the motivational system, (c) is experientially associated with cognitive decision rules designed to help achieve the adaptive goal of the motivational system, and (d) promotes a set of behavioral responses oriented toward achieving that adaptive goal.

The current framework draws from the set of six higher-order motivational systems identified by Kenrick and colleagues (2010); however, we do not wish to suggest that the six emotions discussed here are the *only* evolved emotions, or the only emotions relevant to these

fundamental systems. To take just one example, disgust is a distinct emotion that has received a great deal of research attention, including numerous studies suggesting that it may have evolved to facilitate goals of the self-protection motivational system by orienting experiencers away from parasitic infection (e.g., Curtis, Aunger, & Rabie, 2004; Curtis, de Barra, & Aunger, 2011; Rozin, Haidt, & McCauley, 1993; Schaller & Duncan, 2007). Many similar examples exist, of other emotions that facilitate fundamental motives, and we hope that future researchers addressing this topic will consider adopting the approach offered here, of mapping distinct emotions onto one (or more) of the fundamental evolved motivational systems, to provide a useful extension of our model.

The theoretical perspective that undergirds the current framework differs importantly from those of previously developed motivational theories. Many theories of motivation describe sets of motives or “needs” based upon phenomenological outcomes for the individual (such as happiness, health, meaning) with the tacit (and sometimes explicit) suggestion that these needs must be fulfilled in order for people to attain some subjectively defined state of well-being (e.g., need to belong; need for achievement, need for power; need for structure; e.g., Baumeister & Leary, 1995; McClelland, 1951; Murray, 1938; Neuberg & Newsom, 1993; Reiss, 2004; Winter, John, Stewart, Klohnen, & Duncan, 1998). These previous approaches are highly informative regarding the subjective phenomenology of human behavior, but our evolutionary-based and emotion-centered account has the benefit of being more explanatory than descriptive; instead of describing sets of “needs” from the subjective “person's eye view”, contemporary evolutionary perspectives on motivation (such as those which have informed the formulation of the current framework) take a “gene's-eye view”. These theories suggest that sets of motivational systems evolved (and exist) not because they serve individuals’ phenomenological outcomes, but rather

because they facilitated the reproduction of genes (e.g., Kenrick et al., 2010).

By emphasizing the functional role of emotions across an array of evolutionarily fundamental motives, the current perspective offers a critical advancement beyond prior work. Several prior theoretical frameworks have considered the role of emotions in human motivation by sorting distinct emotions into generalized, overarching, motivational categories post-hoc; approach-avoidance perspectives on human motivation, for instance, have described the role of certain emotions in facilitating either broad approach-oriented or broad avoidance-oriented motives (e.g., Elliot & Thrash, 2002; Marsh, Ambady, & Kleck, 2005). This overgeneralization tends to minimize crucial functional differences between distinct emotions. For example, lust facilitates approach-oriented behavioral responses toward potential short-term mating opportunities (Impett, Peplau, & Gable, 2005) but tenderness also facilitates approach-oriented behavioral responses, albeit toward cute, vulnerable, infants (Buckels, et al., 2015). Thus, both lust and tenderness may facilitate approach-oriented motives, but sorting them under this umbrella category fails to draw an important functional distinction between the different adaptive problems (mate acquisition and parenting, respectively) that these emotions likely evolved to solve.

The hierarchical organization of distinct emotions adopted by the current framework (see Figure) also differs from that of previous motivational perspectives in potentially useful ways. In their discussion of fundamental motivational systems, Kenrick and colleagues (2010) saw merit in preserving the foundational structure of Maslow's (1943) original pyramid of needs, suggesting that (although activation of any one motive is context-contingent) some motives may take cognitive priority over others. Our perspective suggests that this hierarchical approach may also inform testable predictions for future work regarding possible relationships between distinct

emotions; elicitation of some distinct emotions may take priority over others. Just as an evolutionary cost/benefit logic implies that motivational systems which are more pertinent to maximizing reproductive fitness may be more difficult to suppress, so too may be the emotions which facilitate them. For example, activation of the self-protection motivational system, located at the bottom of Kenrick and colleagues' (2010) revised pyramid, is imperative to survival (i.e., if individuals do not protect themselves from harm, they will die) so temporary suppression of this system may be difficult or even impossible, as it would have been particularly costly throughout evolutionary history. On the other hand, activation of the affiliation system, located nearer to the top of the pyramid, is less imperative to immediate survival and may have a lower cognitive priority than motives below, and is therefore likely to be more easily suppressed when competing motives arise. Analogously, fear may have a higher emotional priority than happiness. This implies that, when one is in danger and feeling fear, the simultaneous intensity of happiness in response to affiliating with peers may be quite easily attenuated; in contrast, if one is affiliating with peers, correspondent feelings of happiness may not as easily suppress the simultaneous intensity of fear felt in response to immediate danger. This basic, yet unexplored, hypothesis implies a host of testable predictions for a potential "hierarchy of emotions" and offers another exciting direction for future research which is lacking in other theories of human motivation and emotion.

Another intriguing avenue for future work—inspired by previous perspectives on motivation (e.g., Higgins 1998)—is the potential mapping of both prevention- and promotion-oriented distinct emotions to each fundamental motivational system. For example, pride is felt in response to the attainment of high status and may have evolved to promote success in status-relevant domains (see Tracy, 2016) but a different distinct emotion, shame, is felt in response to

losses in status and may have evolved to prevent future failure in status-relevant domains (see Fessler, 2007). If this account is correct, then negative rank-relevant events such as failures or agonistic losses should activate the status/esteem motivational system and elicit shame. Feeling shame should, in turn, be associated with coordinated physiological, psychological, and behavioral responses that facilitate the prevention of further losses in dominance or prestige over peers. In support of this expectation, studies suggest that feeling shame is associated with increases in cortisol (Dickerson, Mycek, & Zaldivar, 2008) and proinflammatory cytokine activity (Dickerson, Kemeny, Aziz, Kim, & Fahey, 2004) which may facilitate adaptive behaviors such as submission and withdrawal during situations of status decline (Dickerson, Gruenewald, & Kemeny, 2009); these behaviors may effectively minimize further drops in social rank. Another potential example is sexual jealousy, which may be a prevention-focused characteristic distinct emotion that co-evolved with the mate retention motivational system; considerable evidence suggests that this emotion functions as a mate retention tactic by motivating individuals to defend against possible challenges to the maintenance of long-term romantic pair bonds (e.g., Buss, Larsen, Westen, & Semmelroth, 1992). Devoting empirical attention to other prevention-oriented emotions under the current framework may be useful for investigating the adaptive function of a host of other heavily studied distinct emotions (e.g., anger, sadness) and, again, we by no means wish to imply that our list of six characteristic emotions is exhaustive.

We also do not wish to suggest a one-to-one mapping of any particular emotion to any particular motivational system; just as motivational tendencies may overlap, so too may the experience of distinct emotions. Neel, Kenrick, White, and Neuberg (2016) assessed individual differences in the chronic activation of the six evolutionarily fundamental motivational systems

described in this article and examined correlations among them. Some were positively correlated, others were negatively correlated, and others were not correlated at all; the same may be true of the experience of distinct emotions. Two fundamental motivational systems which were found to be positively correlated ($r = .32$) were systems corresponding closely to affiliation and status/esteem. Under our model then, we would expect overlap between the experience of emotions characteristic of these systems: happiness and pride. In fact, studies support this expectation (Weidman & Tracy, 2016). However, our model further suggests that: (a) feelings of pride should be stronger than other emotions (including happiness) in response to status-related achievements, and (b) feelings of pride should motivate status-related goal pursuit more than other emotions do. Indirect support of the latter hypothesis comes from past work showing that experimentally induced feelings of pride are more effective than induced feelings of happiness at eliciting behavioral responses associated with long-term goal pursuit (Katzir, Eval, Meiran, & Kessler, 2010). As these hypotheses suggest, exploring the potentially overlapping adaptive functions of superficially similar emotions provides an interesting avenue for future research and may be informative for refining and/or expanding the catalogue of emotions which are currently considered evolved.

The mapping of characteristic distinct emotions to the six higher-order motivational systems identified by Kenrick and colleagues (2010) provides a useful jumping off point for future work; however, there may be additional, more nuanced fundamental motivational systems (or “sub-systems”) with additional evolved characteristic distinct emotions. Recently, Neel and colleagues (2016) developed a self-report measure to assess the relative strength of each of the six higher-order fundamental motivational systems; analyses from this work supported the decomposition of several of these motives into arrays of “submotives”. For example, these

authors found that the affiliation motivational system is best conceptualized as three separate motivational subsystems specific to group membership, exclusion concern, and independence—each of which can be considered a separate recurrent adaptive problem, but all of which are broadly relevant to and comprised within the affiliation system. In our discussion of the affiliation motivational system, we suggest that happiness may have been a characteristic distinct emotion that co-evolved with this system; however, we acknowledge, as others have, that happiness may be too broad a construct to be considered one single distinct emotion (see Tugade, Shiota, & Kirby, 2014). Interestingly, past work has implicated several distinct positively valenced emotions (including joy, contentment, and gratitude) in the facilitation of separate, potentially unique affiliative submotives (Aron, Norman, Aron, McKenna, & Heyman, 2000; Fredrickson, 2001; 2004). For example, gratitude may be a distinct emotion that evolved to facilitate reciprocal altruism (McCullough, Kimeldorf, & Cohen, 2008), and, within our model, may be characteristic of an affiliative submotive specific to group membership.

Neel and colleagues (2016) also found that the parenting motivational system may be best characterized as one of two subsystems of a broader motivational system facilitating kin care. The other kin care motivational subsystem these authors identified is oriented toward caregiving for one's close relatives who are not necessarily offspring; this dual conceptualization is consistent with past work suggesting that compassion is a distinct emotion that has evolutionary origins related to parental care but overgeneralizes to related others as well (Goetz, Keltner, & Simon-Thomas, 2010). We believe there is merit in retaining a certain degree of aggregation which reflects functional commonalities shared by different social goals; however, exploring the more nuanced motivational subsystems that may be associated with separate but superficially similar distinct emotions presents an exciting direction for future research.

Acknowledging the role of emotions in human motivation under the current framework also allows for intriguing, testable predictions regarding differences in the intensity of experiencing certain distinct emotions. Individuals differ in the extent to which specific motivational systems are chronically active (Neel et al., 2016) and this heightened (or attenuated) dispositional activation may have measurable implications for the intensity of characteristic emotions experienced. The chronic activation of a motivational system depends heavily on the evolutionary costs/benefits of that specific motivational strategy and may be moderated, predictably, by a number of genetic and environmental factors (see Ellis et al., 2012). For example, historically men who had greater access to receptive reproductive partners (e.g., those who were better able to attract a mate) typically enjoyed greater reproductive benefits by devoting more effort to mate acquisition and less to parenting (see Gangestad & Simpson, 2000); as such, the parenting motivational system of men who are more sexually attractive may be less chronically active. In line with the current perspective, recent evidence suggests that men who believe that they possess more sexually attractive traits (e.g., sex appeal) exhibit a weaker tenderness emotional response to human infants (Beall & Schaller, 2014). The intensity of other distinct emotional experiences may also be calibrated to the chronic activation of their characteristic motivational strategies; examining the evolutionary costs/benefits of specific motivational strategies—as well as the variables moderating those costs/benefits (e.g., environment, individual differences)—in future research may help to explain important individual differences observed in emotional experiences. Similarly, given that certain species are differentially adapted to a variety of motivational strategies, the current framework may also be useful for informing predictions for cross-species comparisons of emotional experience. For example, some species invest heavily into parental care while others do not (see Figuerdo et al.,

2005); if tenderness is experienced by non-human animals (an important question for future comparative studies), do these latter species experience a weaker tenderness response to offspring?

Finally, our suggestion that fundamental motivational systems could not function without specific distinct emotions to galvanize particular suites of physiological, cognitive, and behavioral responses essential to each system has important implications for models of “basic” emotions and, in particular, which emotions should be included in this category, beyond those originally included by Ekman and colleagues (e.g., 1992). We have, however, avoided the term “basic” here, because it has come to be strongly associated with emotions that have universally recognizable facial expressions, and, in our view, though such expressions can be a strong indicator of an emotion’s evolutionary origins, they should not be considered a necessary criterion. For example, certain emotions, such as sexual jealousy (e.g., Buss, 2013) show strong evidence of evolution but do not have distinct facial expressions (see Al-Shawaf, Conroy-Beam, Asao, & Buss, 2015). To avoid confusion on this point, we have used the phrase “distinct emotions” to refer to emotions that evolved to serve specific functions which are distinct from that of other emotions. Many contemporary emotions theorists agree with the suggestion that a host of emotions beyond the original 5 or 6 “basic” emotions likely evolved to serve distinct adaptive purposes (e.g., Al-Shawaf, Conroy-Beam, Asao, & Buss, 2015; Cosmides & Tooby, 2000; Shiota, Campos, Oveis, Hertenstein, Simon-Thomas, & Keltner, 2016; Shiota, Neufeld, Danvers, Osborne, Sng, & Yee, 2014; Tooby & Cosmides, 2008; Tooby, Cosmides, Sell, Lieberman, & Sznycer, 2008). Our framework follows the lead of these scholars and suggests that a potentially useful approach toward building a comprehensive taxonomy of evolved emotions is to draw upon evolutionary perspectives on human motivation; to first identify a

fundamental motivational system geared towards solving a recurrent adaptive problem which persisted throughout hominid evolution and then identify a characteristic emotion which may have galvanized physiological, cognitive and behavioral responses to facilitate the solving of that specific adaptive problem. Adopting our framework may therefore even further expand the catalogue of evolved emotions and, conversely, may also be useful in elucidating which emotions share nontrivial overlap and should therefore not be considered distinct: If two emotions are labelled differently but are: (a) elicited by the same threats or opportunities, and (b) associated with identical physiological, cognitive, and behavioral responses, then our framework suggests that they may not both be distinct evolved emotions.

In sum, the emotivational perspective presents a novel framework for studying the role of emotions in human motivation and we hope that future researchers addressing these topics will consider adopting the approach offered here as a useful starting point for hypothesis generation and theoretical advancement. We believe that a complete understanding of emotions requires the acknowledgement of evolved motivational systems, just as a complete understanding of human motivation needs to take into account the role of emotions.

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Figure Caption

The six higher-order motivational systems identified by Kenrick and colleagues (2010) and a characteristic distinct emotion that may have evolved in concert with each. We posit that fear, happiness, pride, lust, romantic love, and tenderness evolved, in part, to overcome specific adaptive problems associated with self-protection, affiliation, status/esteem, mate acquisition, mate retention, and parenting, respectively.

Figure

