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## Compassion: An Evolutionary Analysis and Empirical Review

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### Abstract

What is compassion? And how did it evolve? In this review, we integrate three evolutionary arguments that converge on the hypothesis that compassion evolved as a distinct affective experience whose primary function is to facilitate cooperation and protection of the weak and those who suffer. Our empirical review reveals compassion to have distinct appraisal processes attuned to undeserved suffering, distinct signaling behavior related to caregiving patterns of touch, posture, and vocalization, and a phenomenological experience and physiological response that orients the individual to social approach. This response profile of compassion differs from those of distress, sadness, and love, suggesting that compassion is indeed a distinct emotion. We conclude by considering how compassion shapes moral judgment and action, how it varies across different cultures, and how it may engage specific patterns of neural activation, as well as emerging directions of research.

### Keywords

Compassion; Empathy; Sympathy; Prosocial Behavior; Altruism

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Compassion is controversial. Within studies of morality, theoretical claims about compassion reach contrasting conclusions: some theorists consider compassion to be an unreliable guide to judgments about right and wrong, whereas others view compassion as a source of principled moral judgment (Haidt, 2003; Nussbaum, 1996, 2001). Within debates about the nature of altruism, researchers have sought to document that a brief state like compassion is a proximal determinant of prosocial behavior (Batson & Shaw, 1991; Eisenberg & Miller, 1987; Hoffman, 1981). Within evolutionist thought, controversies have swirled around whether compassion and sympathy are the products of evolutionary processes, as Darwin assumed, or tendencies too costly for the self to align with the tenets of evolutionary theory (Cronin, 1991).

These debates highlight the question that motivates the present review: What is compassion? Ironically, despite pervasive theoretical claims and numerous studies of a state-like episode of compassion, it is largely absent from traditional emotion taxonomies and research (e.g., Boucher & Brandt, 1981; Ekman, 1999; Izard, 1977; Roseman, Spindel, & Jose, 1990; Smith & Ellsworth, 1985; Tomkins, 1984; for an exception, see Lazarus, 1991). Instead, compassion has been described as a vicarious experience of another's distress (e.g., Ekman, 2003; Hoffman, 1981), a blend of sadness and love (e.g. Shaver, Schwartz, Kirson & O'Connor, 1987), or as a

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subtype or variant of love (e.g., Post, 2002; Sprecher & Fehr, 2005; Underwood, 2002). Although recent authors have treated compassion as an emotion (e.g., Batson, 1991; Haidt, 2003; Sober & Wilson, 1998), there has yet to be an integrative review of the evidence relevant to the question “What is compassion?”

The central goal of this paper, therefore, is to present a functional analysis of compassion, and to review the evidence related to what is known about the appraised antecedents, experience, display behavior, and physiology associated with compassion. Before delving into our own theoretical account, we clarify our definition of compassion and distinguish it from related states.

## Definitions of Compassion and Levels of Analysis of Affective Experience

We define compassion as the feeling that arises in witnessing another's suffering and that motivates a subsequent desire to help (for similar definitions, see Lazarus, 1991; Nussbaum, 1996, 2001; Table 1). This definition conceptualizes compassion as an affective state defined by a specific subjective feeling, and differs from treatments of compassion as an attitude (Blum, 1980; Sprecher & Fehr, 2005), or as a general benevolent response to others regardless of suffering or blame (Post, 2002; Wispé, 1986). This definition also clearly differentiates compassion from *empathy*, which refers to the vicarious experience of another's emotions (Lazarus, 1991).

Other researchers have referred to this kind of other oriented state with different terms (see Wispé, 1986 for a review). For example, Batson defines empathy as a family of responses to another “that are more other-focused than self-focused, including feelings of sympathy, compassion, tenderness, and the like” (Batson, 1991, p. 86). Similarly, Davis's empathic concern scale “assesses ‘other-oriented’ feelings of sympathy and concern for unfortunate others” (Davis, 1983, p. 114). Eisenberg and colleagues (1994, p. 776) define *sympathy* “as an emotional reaction that is based on the apprehension of another's emotional state or condition and that involves feelings of concern and sorrow for the other person” (see also Darwin, 1871; Eisenberg, Michalik, Spinrad, Hofer, Kupfer, et al., 2007; Feather, 2006; Post, 2002; Wispé, 1986). The term *pity* is sometimes used to describe a state close to what we conceptualize as compassion (Aristotle as discussed in Nussbaum, 1996; Weiner, Graham, & Chandler, 1982; Weiner, Perry & Magnusson, 1988). Pity, however, involves the additional appraisal of feeling concern for someone considered inferior to the self (Ben Ze'ev, 2000; Fiske, Cuddy, Glick & Xu, 2002).

We prefer the term compassion because it encompasses a slightly broader set of states than sympathy (Nussbaum, 1996). We would place the states labeled with terms like “sympathy,” “pity,” and “empathic concern” into a family of compassion-related states that center upon a concern for ameliorating the suffering of another individual (for discussion of the concept of emotion families, see Ekman, 1992). As part of an emotion family, these states likely share central features with compassion: similar antecedents, key appraisal components, core action tendencies, and similar physiological responses and signal behaviors. They likely differ from compassion in terms of peripheral appraisals (for example appraised dominance in the case of pity) and certain display behaviors (Keltner & Lerner, 2009).

Empirical studies support this emotion-family approach to compassion and closely related states. Lexical studies of emotion terms in English (Campos, Shiota, Gonzaga, Keltner, Goetz & Shin, 2009; Shaver et al., 1987), Indonesian (Shaver, Murdaya, & Fraley, 2001), Chinese, and Italian (Shaver, Wu, & Schwartz, 1992) find that *compassion*, *sympathy*, and *pity* (or their translations) are often grouped together. In our own laboratory, participants' sorting of 150 positive emotion terms grouped *compassion* and *sympathy* together, along with words like

*kindness, tenderness, warmth, and caring* (Campos et al., 2009; pity was not included in this study). A study of both positive and negative emotion terms, however, found that *sympathy* and *pity* were sometimes placed in a positive emotion category with compassion, but more often placed in a category of sadness-related terms (Shaver et al., 1987), an issue which we revisit later.

Several self-report studies lend further credence to the claim that compassion and sympathy are closely related, and plausible members of an emotion family. These studies consistently reveal that ratings of *compassionate* and *sympathetic* load on a common factor (Batson, Fultz, & Schoenrade, 1987), whereas ratings of *sad* and *heavyhearted* load on a separate factor (Fultz, Schaller, & Cialdini, 1988). Many studies aggregate self-reports of more than one term, but others use only single-item measures or terms that are more appropriate to children's vocabulary (see Table 2 for a summary). In light of these findings, in the present review we synthesize what is known about compassion, pity, and sympathy, with an eye towards possible distinctions within this family. A critical need is for further research on the distinctions between compassion, sympathy, and pity.

Empirical studies of compassion can also be organized according to a levels of analysis framework for studying affective experiences (Kahneman, 1999; Rosenberg, 1998). *Emotions* represent a first level of analysis, and are brief, context-specific responses focused on a clear cause (Ekman, 1992). Although compassion is listed in few emotion taxonomies, numerous studies have examined the characteristics of brief experiences of compassion, or related states such as sympathy or empathic concern, which we synthesize in this review. At a second level of analysis, *moods* or *sentiments* are assumed to be longer lasting than emotions, less focused on a particular cause, and less context-bound than specific emotions (Watson & Tellegen, 1985). In a later section we will consider how brief experiences of compassion might develop into enduring sentiments. Finally, emotional *traits* refer to general styles of emotional responses that persist across context and time (Larsen & Ketelaar, 1991; McCullough, Emmons, & Tsang, 2002; Shiota, Keltner, & John, 2006). Studies of people prone to feeling compassion, or related states like empathic concern, are relevant to an understanding of what compassion is, given the supposition that emotional traits share core appraisals and action tendencies with the associated emotional state. Numerous studies of compassion, which we consider here, have examined trait-like tendencies towards briefer experiences of the state. Later we will consider how brief experiences of compassion might interact with the trait-like tendency to experience compassion.

## Theoretical Accounts of Compassion

Three alternative theoretical approaches to compassion can be discerned in the literature (see Table 1), and yield contrasting predictions that we will assess in our empirical review. A first account holds that compassion is another name for empathic distress (e.g. Ekman, 2003; Hoffman, 1981). People often mirror the emotions of those around them and vicariously experience others' emotions (Hatfield, Cacioppo, & Rapson, 1993). From the empathic distress perspective, compassion is simply a label that people apply to their vicarious experience of distress in response to another person's suffering. The clear implication is that the state of compassion should be associated with the expressive behavior, physiological response, and underlying appraisals of the state it is mirroring, most likely distress, pain, sadness, or fear.

A second account holds that compassion is not its own emotion, but rather a variant or blend of sadness or love (e.g., Post, 2002; Shaver et al., 1987; Sprecher & Fehr, 2005; Underwood, 2002). In English, lay conceptions of compassion often intermingle with conceptions of sadness and love (Shaver et al., 1987). In Shaver and colleagues' influential prototype analysis of emotion terms, U.S. participants categorized 135 emotion words into groups based on their

similarity to one another. Participants categorized the word *compassion* most often with *love*, *tenderness*, and *caring*. In addition, the words *pity* and *sympathy* were sometimes categorized with compassion and love, but were more often grouped with sadness. In another study, participants listed *compassionate love*, *unconditional love*, *giving love*, and *altruistic love* when asked to generate examples of the category *love* (Fehr & Russell, 1991). These terms were not rated as central to the prototype of love, but behaviors like caring, helping, and sharing were associated with most types of love (see Sprecher & Fehr, 2005). These lexical data raise the possibility that compassion is simply a variant of sadness or love, sharing core appraisals, properties of experience, and physiological response and display behavior of these emotions.

A third account holds that compassion is a distinct affective state, with a response profile that differs from those of distress, sadness, and love. The clearest case for this hypothesis is found in evolutionary analyses of compassion (e.g., Bowlby, 1969, 1973; Darwin, 1871; Haidt, 2003; Keltner, Haidt & Shiota, 2006). An evolutionary approach presupposes that emotions are adaptations to particular survival-and reproduction-related situations (e.g., Ekman, 1992; Keltner & Buswell, 1997; Nesse & Ellsworth, 2009). The different components of emotion—antecedent appraisal process, nonverbal display, experience, and autonomic physiology—serve specific functions in enabling the individual to meet the survival- or reproduction-related problem or opportunity (Keltner & Gross, 1999). Cast within this analysis, several lines of reasoning converge on the assertion that compassion is a distinct state that differs from related states like love, and that this state motivates specific patterns of behavior toward others in need.

## An Evolutionary Approach to Compassion

Early in the development of evolutionary theory, compassion proved to be a source of contention (Cronin, 1991). The notion that natural and sexual selection processes could have led to the emergence of an affective state that leads individuals to enhance the welfare of others at the expense to the self struck many as implausible. In stark contrast, Darwin viewed “sympathy” as the strongest of humans’ evolved “instincts.” He made this assertion within the following analysis in *Descent of Man, and Selection in Relation to Sex*, “sympathy will have been increased through natural selection; for those communities, which included the greatest number of the most sympathetic members, would flourish best, and rear the greatest number of offspring” (Darwin, 1871, p. 130).

More recent evolutionary treatments of compassion offer three lines of reasoning that account for the emergence of an affective state that is oriented toward enhancing the welfare of those who suffer (Frank, 1988; Keltner, 2009; Sober & Wilson, 1998). Compassion emerged, this reasoning holds, as a distinct affective state and trait because it enhances the welfare of vulnerable offspring, because it is a desirable emotion or attribute in mate selection processes, and because it enables cooperative relations with non-kin.

Within the vulnerable offspring argument, compassion is thought to have emerged as the affective element of a caregiving system, designed to help raise vulnerable offspring to the age of viability (thus ensuring that genes are more likely to be replicated). Human offspring are born more prematurely and more dependent than any other mammal, requiring unprecedented care to reach the age of independence and reproductive engagement (Bowlby, 1969; Hrdy, 2000; Mikulincer & Shaver, 2003). This pressure to care for vulnerable offspring gave rise to several adaptations: powerful responses to neonatal cues and distress vocalizations (e.g., Berry & McArthur, 1986; Bowlby, 1969); specific tactile behaviors, such as skin-to-skin contact (Hertenstein, 2002); classes of attachment-related behaviors between caregiver and offspring (Bell, 2001; Bowlby, 1969); and an affective experience—compassion—attuned to reducing the harm and suffering of vulnerable offspring. As Darwin reasoned, this tendency to reliably experience state-like feelings of compassion (or sympathy in his phrasing) for

vulnerable young offspring in moments of need or suffering would have directly increased the chances of offspring surviving, and ultimately reaching the age of reproductive viability.

Consistent with this vulnerable offspring framework, caregiving and compassionate behavior have been reliably observed in remote, pre-industrial cultures living in the social environments of human evolution (Eibl-Eibesfeldt, 1989; Konner, 2003). Across radically different cultures, caregiving observed in kin and non-kin alike involves similar behaviors, including soothing touch, skin-to-skin contact, and specific vocalizations, some of which resemble the displays of compassion we will detail in a later section. Nonhuman primates most closely related to humans—chimpanzees and bonobos—have been observed to show caregiving oriented toward vulnerable and wounded conspecifics, suggesting that caregiving is a primate adaptation (de Waal, 1996; Warneken & Tomasello, 2006). Within this vulnerable offspring perspective, compassion is the brief affective state associated with caregiving toward those who suffer or are in need (see also Batson, Lishner, Cook, & Sawyer, 2005; Sober & Wilson, 1998 for similar arguments).

A second evolutionary argument for the emergence of compassion is found within sexual selection theory, which details the processes by which certain traits are selected for through the mate preferences of females and males (Buss & Kenrick, 1998; Miller, 2007). Here the focus is on compassion as a trait like tendency to feel the emotion and to act altruistically. The benefits to reproducing with compassionate individuals are clear, as intimated in Darwin's early analysis. More inclined to feel compassion during times of others' need and suffering, compassionate reproductive partners should be more likely devote more resources to offspring, to provide physical care—protection, affection, and touch—and to create cooperative, caring communities so vital to the survival of offspring. It is reasonable to expect (although an untested assumption) that more compassionate romantic partners will be more likely to be faithful, and remain in long-term monogamous bonds (Neff & Karney, 2009). It is interesting to note that the highest ranked attribute in young participants' assessments of a desirable mate in different cultures was character, or kindness (Buss et al., 1990). In a recent speed-dating study, for both men and women personal qualities like warmth in interaction partners, which likely involve elevated levels of compassion, were positively related to subsequent relationship interest (Eastwick & Finkel, 2008). The trait-like tendency to experience compassion correlates highly with a secure attachment style (Shiota et al., 2006), which predicts parenting behaviors that lead to healthier adjustment in offspring. Clearly, sensitivity to others' needs, enabled by compassion, is a central criterion in the formation of intimate bonds (Reis, Clark & Holmes, 2004). This reasoning, and the indirect evidence that we have reviewed, justify the claim that in intersexual selection processes, females and males likely preferred mating with more compassionate individuals—a process that over time would increase compassionate tendencies within the gene pool.

A third evolutionary argument posits that the compassionate predilections of others are an important criterion in the formation of cooperative relations with non-kin (Axelrod, 1984; Frank, 1988; Nesse, 2007). In this vein, Trivers (1971) proposed that compassion (sympathy in his terminology) evolved within a complex system of emotional states—involving liking, gratitude, anger, and guilt—which enable non-kin to initiate, maintain, and regulate reciprocally altruistic relationships (see also Gintis, 2000; Nesse, 1990). Within this system of emotions, compassion emerged as a state to motivate altruism in mutually beneficial relationships and contexts. In addition, emerging theories of gene-culture coevolution suggest that compassion and other prosocial tendencies evolved to motivate altruism in the context of cultural norms, values, and practices that reward altruists and punish selfish individuals (e.g. Henrich, 2004; Richerson & Boyd, 2005). In the context of these models, an emotion like compassion serves as an internal motivation and reward for following cooperative norms (Gintis, 2003).

The implication of this third line of evolutionary argument is that individuals will favor enduring relationships with more agreeable, compassionate individuals because this emotional trait predicts increased cooperative, trustworthy behavior and mutually beneficial exchanges among individuals not bound by kin relations. Framed within this cooperative non-kin argument, it is interesting to note that children high in dispositional empathy and compassion enjoy richer friendship networks (Zhou et al., 2002); that adolescents high in self-reported agreeableness, which strongly predicts the experience of compassion (Shiota et al., 2006), have more friends and are more accepted by their peers than adolescents low in agreeableness (Jensen-Campbell et al., 2002); and that across cultures group members go to great lengths to punish individuals who are not cooperative (Henrich et al., 2006).

These three lines of theorizing make a clear case for the evolution of compassion. This emotion emerged as a brief state oriented toward reducing the suffering or needs of vulnerable offspring, as a desirable trait within mate selection and alliance formation processes, and as a brief state predictive of cooperative relations with non-kin. Broader evolutionary treatments of distinct emotions have additionally posited that compassion is distinct from distress, sadness, and love (e.g., Keltner & Haidt, 2001; Lazarus, 1991). Empathic distress co-occurs and competes with compassion in responses to another's suffering (Batson, 1991). In responding to another's suffering or need, compassion can be costly, and personal distress may serve as an indicator that one cannot afford to help and instead should focus on oneself (Hoffman, 1981). Sadness is a similarly self-oriented response. In its purest form, sadness is a response to personal loss or negative events (Lazarus, 1991). It motivates a slowing of action and withdrawal from social contact, while its expression signals a need for social support and help. Sadness is an antecedent to others' compassion and we expect its expression to elicit compassion in others.

Within evolutionary arguments, compassion is also functionally distinct from love. Love has many forms (Fehr & Russell, 1991), but the two closest to compassion—maternal love and romantic love—differ in their core functions to promote positive attachments to offspring and to romantic partners respectively. These kinds of love center on affection, the appreciation of positive attributes of the other, and the motivation to be physically and psychologically close. Compassion, by contrast, responds quickly and appropriately to signals of suffering and is not necessarily accompanied or preceded by love (although clearly it can be a catalyst of love by enabling the formation of new relationships or the repair of damaged ones). The task of our review will be to ascertain whether the empirical evidence lends credence to these theoretical claims about distinctions (and similarities) between compassion and love.

Evolutionary analysis, then, posits that compassion is a distinct emotion and emotional trait, serving different functions than those served by distress, sadness, and love. Evolutionary approaches to emotion also offer guidelines for synthesizing empirical data that bear upon claims about distinct emotions (Ekman, 1992; Keltner & Buswell, 1997). Specifically, compassion should involve distinct appraised antecedents that center upon the evolutionary problem it has been designed to meet—the reduction of suffering. Appraisals of suffering, furthermore, should be influenced by the possible costs and benefits of aiding the suffering individual (e.g., Sober & Wilson, 1998). Compassion should involve distinct signaling behavior, so vital to the reduction of suffering and the detection of more compassionate potential mates and reciprocators in altruistic interactions with non-kin (Frank, 1988). Finally, compassion should involve distinct experiential and physiological processes that motivate appropriate behavior—approach toward those who suffer and soothing-related behavior. Finally, these compassion-related responses should be universal. The literatures to which we now turn on altruism, attribution, emotion, and prosocial behavior and traits provide a surprisingly rich empirical foundation to evaluate these claims.

## Compassion-Related Appraisals: Sensitivity to Suffering Constrained by Costs and Benefits

Emotions arise as the result of specific appraisals that track the individual's interaction with the environment as it affects the self (Clore & Ortony, 2008; Lazarus, 1991; Scherer, 1997; Smith & Ellsworth, 1985). Emotions are defined by their constitutive appraisals of antecedent events. A critical first test of the thesis that compassion is a distinct affective state is that it should arise as the result of appraisal processes that differ from those that produce distress, sadness, and love. In Figure 1 we present a model of the appraisal processes that give rise to compassion and theoretically relevant states, drawing upon insights of appraisal research (e.g. Ellsworth & Scherer, 2003) and evolutionary claims about compassion.

Early conceptual analyses and recent empirical data reveal that compassion arises in response to suffering and harm. In his analysis in *Rhetoric*, Aristotle identified the primary antecedent of compassion (called *eleos* in Greek) as others' serious suffering, referring to specific events such as death, experience of bodily assault or ill treatment, old age, illness, lack of food, lack of friends, physical weakness, disfigurement, and immobility (see Nussbaum, 1996, 2001 for analysis). Recent studies of the momentary experience of compassion dovetail with Aristotle's early analysis (see Table 2). In one illustrative study, participants asked to describe a recent experience of pity most often mentioned encountering individuals suffering from physical disabilities, victimization by environmental circumstances such as poverty, and catastrophic events (Weiner et al., 1982). Likewise, stimuli used in laboratory studies to elicit compassion and sympathy often contain cues of others' suffering, for example when participants are asked to watch another person receive painful shocks (Batson, O'Quin, Fultz, Vanderplas, & Isen, 1983), listen to someone who needs help because she is hospitalized (Batson, Sager, Garst & Kang, 1997), or watch films about a handicapped child (Eisenberg, Fabes, Bustamante, Mathy, Miller, & Lindholm, 1988). The suffering of vulnerable individuals—crying babies, malnourished children, and homeless individuals—is a potent elicitor of compassion (Oveis, Horberg, & Kelnter, in press; Zahn-Waxler, Friedman, & Cummins, 1983).

These findings are in keeping with the evolutionary analysis we have offered thus far—that compassion is oriented toward reducing the suffering of others. Within evolutionary analyses, however, compassion is not unbounded or unconditional, but instead shaped by cost-benefit ratios (Henrich, 2004; Sober & Wilson, 1998). In more specific terms, compassion should be more likely when the sufferer is related—genetically or in terms of shared values and interests—to the individual, when the sufferer is a good candidate for subsequent cooperative behavior or reciprocal altruism, and when the benefits of acting upon feelings of compassion outweigh the potential costs. Within the concepts of appraisal research, this analysis suggests that compassion will be shaped by: 1) the relevance of the sufferer to the self; 2) the sufferer's blameworthiness for the negative outcome; and 3) the individual's ability to cope with the situation at hand. In the following sections, we detail the evolutionary argument and relevant evidence for each element of our appraisal model of compassion, and reveal how compassion-related appraisals differ from those that give rise to distress, sadness, and love.

### Sensitivity to Benefits: Appraisals of Self and Goal Relevance

Although it is an other-oriented emotion, compassion should be most intense in response to the suffering of individuals who are self and goal relevant. By self relevant, we mean individuals who are most important to one's well-being. This can include those who are related to the self, including offspring in particular and genetic relations in general (Bowlby, 1969; Hamilton, 1964), as well as reproductive partners (Frank, 1988), friends, reciprocal alliances (Trivers, 1971), and group members (Sober & Wilson, 1998; Henrich, 2004). In addition, another's suffering can readily be appraised as relevant to the individual's broader goals or

values, such as a general value that all people should have equal rights and opportunities (Lazarus, 1991). To the extent that another's suffering is in keeping with the individual's goals (for example, in torturing an enemy), emotions like *schadenfreude* will result (Ortony, Clore & Collins, 1988). To the extent that another's suffering is incongruent with the individual's goals, and with increasing relatedness between the self and other, compassion will be experienced with increasing intensity.

Similarity and emotional closeness are two more specific appraisals that serve as proxies for self-relevance, and shape the magnitude of the compassionate response. Social network studies in community samples and self-reports of closeness in undergraduate populations reveal that, on average, we feel closer to those to whom we are more closely related (Korchmaros & Kenny, 2001; Neyer & Lang, 2003) and that we are more likely to feel compassion for those to whom we are closely related (Cialdini, Brown, Lewis, Luce, & Neuberg, 1997). Similarly, individuals are more likely to help, and presumably feel compassion for, those with whom they are genetically related (Burnstein, Crandall, & Kitayama, 1994) and emotionally close (Korchmaros & Kenny, 2001). People are also more likely to help—presumably in part due to heightened feelings of compassion—those who are similar to them in terms of personal values, preferences, behavior, or physical characteristics (Eisenberg & Miller, 1987). In one study, Cialdini and colleagues (1997) asked participants to imagine a stranger, an acquaintance, a friend, or a close family member who had been evicted from their home. Different target individuals elicited varying degrees of closeness (as measured by Aron's Inclusion of Other in Self Scale; Aron, Aron, & Smollan, 1992), and the degree of closeness fully accounted for the positive relationship between felt compassion and willingness to help.

Although self-relevance is clearly involved in compassion-related appraisals, self-other distinctions are crucial to the elicitation of compassion (Batson, 1991; Nussbaum, 1996). Compassion involves an awareness of one's separateness from the sufferer, as well as recognition that “the bad lot of the sufferer...is, right now, not one's own.” (Nussbaum, 1996, p. 35). To the extent that the negative outcomes for the other are considered consequences for the self, the more one will feel sadness, distress, or even fear (Ortony et al., 1988). Without self-other distinctions, one may not experience compassion upon witnessing another's suffering, but instead empathic sadness or distress. Consistent with this analysis, as children develop self-other distinctions, they begin to show clearer signs of other-oriented compassion, in the form of target-specific helping behaviors, rather than simple contagious distress (Volling, Kolak, & Kennedy, 2009). Thus, although self-relevance is an important appraisal, it must occur in the context of distinguishing the self from other.

### **Sensitivity to Benefits: Others' Deservingness in Appraisals of Compassion**

Evolutionary analyses posit that deservingness is central to the appraisal processes that give rise to compassion. Models of the evolution of altruism hinge on the assumption that altruists can choose to benefit other altruists (Frank, 1988; Hamilton, 1964; Trivers, 1971, Henrich, 2004). To enjoy the benefits of mutual cooperation and avoid the risks of exploitation by selfish individuals, prosocial individuals must interact selectively with other prosocial individuals. Kin selection bases this decision on degree of kinship (Hamilton, 1964); models of large scale cooperation in groups of non-kin focus on characterological factors such as trustworthiness, reputation, and prior cooperative behavior (Axelrod & Hamilton, 1981; Trivers, 1971). The implication is that compassion should be sensitive to appraisals of deservingness and to whether or not the person suffering is altruistic, cooperative, and of good character.

In his analysis, Aristotle similarly prioritized appraisals of deservingness, which are rooted in assumptions about the sufferer's character and intentions. More specifically, Aristotle argued that deserved suffering should lead to blame and reproach, whereas undeserved suffering should elicit compassion (Nussbaum, 1996, 2001). Contemporary theories of deservingness

(Feather, 2006) and attribution of blame (Weiner, 1985) echo Aristotle's analysis and suggest that appraisals of blame are important to whether or not compassion arises (see Figure 1).

One indicator of deservingness is the degree to which the individual is responsible for his or her suffering. Appraising the sufferer as responsible for his or her suffering is likely to be accompanied by certain beliefs that reflect poorly upon that individual's character: that the individual failed to exert effort to avoid the misfortune or violated norms and rules in bringing about the suffering. Assessments of controllability are intertwined with judgments of responsibility (Smith & Ellsworth, 1985) and figure prominently in appraisals that give rise to compassion. For example, in one study, stigmas such as paraplegia, blindness, cancer, Alzheimer's, and heart disease were rated low on controllability and also elicited pity (and, we assume, compassion). In contrast, stigmas such as obesity, child abuse, and drug abuse were rated high on controllability and elicited anger rather than pity (Weiner et al., 1988). A recent meta-analysis of 39 helping studies and 25 aggression studies further reveals how appraisals of the target's responsibility for their suffering influences the degree of compassion experienced by the perceiver (Rudolph, Roesch, Greitemeyer & Weiner, 2004). This meta-analysis found that targets who had greater control over the source of their suffering elicited less sympathy ( $r = -.45$ ) and more anger ( $r = .52$ ). In turn, sympathy towards less controllable suffering was positively correlated with helping behavior ( $r = .42$ ) and negatively correlated with aggression ( $r = -.44$ ). Anger showed the opposite pattern: it was negatively correlated with helping ( $r = -.24$ ) and positively correlated with aggression ( $r = .56$ ). These studies indicate that appraisals of low controllability and responsibility on the part of the target (or what we refer to as lack of personal blame in Figure 1) are critical to the elicitation of compassion and not anger.

A related target characteristic that signals good character and elicits compassion is the target's warmth and trustworthiness (Fiske, Cuddy & Glick, 2006). In a study of stereotype content, individuals and groups who were stereotyped as warm, but not competent—such as the disabled, elderly or retarded—elicited pity from others (Fiske et al., 2002). In contrast, those who were stereotyped as cold and not competent—such as the homeless and welfare recipients—elicited contempt. Those perceived as being warm but not competent were also perceived as less competitive and more benevolent. Thus, feeling pity (and we suggest compassion) for warm individuals is consistent with the argument that compassion should be felt for other altruists and cooperators, but not for selfish competitors.

### **Sensitivity to Costs: Coping Potential in Compassion Appraisals**

In addition to possible benefits, compassion should be sensitive to the possible costs involved in helping another (see Schroeder, Penner, Dovidio & Piliavin, 1995). Without consideration of the costs of devoting resources to others, one could easily be exploited or expose oneself to too many risks to emerge as an evolutionarily stable strategy (Sober & Wilson, 1998).

Within studies of appraisal, coping ability in part refers to the individual's assessment of the possible costs of acting on behalf of others (Lazarus & Folkman 1984). High coping ability reflects an appraisal that one's resources and abilities outweigh the costs or threats associated with a course of action. By implication, feelings of compassion should increase when the individual feels capable of coping with the target's suffering. Appraisals of low coping ability, by contrast, should activate distress in the face of another's suffering, which countervails compassion-related tendencies when resources are low (Hoffman, 1981). It is important to note that sadness and fear are associated with appraisals of feeling weak, powerless (Roseman et al., 1990), and unable to cope (Ellsworth & Smith, 1988a; Scherer, 1997).

No studies to date have explored this relationship between coping appraisals and felt compassion. Studies of individual differences in emotion regulation and empathic self-efficacy and compassion are informative, however. Emotion regulation reflects the individual's sense

of having the psychological resources to respond adaptively to the situation at hand (Eisenberg, Fabes, Murphy, Karbon, Maszk, et al., 1994; Gross, 1998). Children and adults who report the trait like tendency to regulate their emotions reliably report compassion rather than distress in responding to others' suffering, a finding that is in keeping with our claim that coping ability is a critical appraisal involved in the experience of compassion. For example, one study found aspects of emotion regulation such as inhibitory control (e.g. "When talking with someone, I can keep from interrupting them.") and attention shifting (e.g. "It is easy for me to alternate between two different tasks.") to be positively related to dispositional compassion (as measured by Davis' Empathic Concern scale) for adults who also reported high emotionality (Eisenberg et al., 1994). In this research, individual differences in distress correlated negatively with measures of emotion regulation. In a recent study, children who were rated by their parents as able to control their attention and regulate emotion-related impulses were subsequently rated by their teachers as high in dispositional sympathy up to six years later (Eisenberg et al., 2007).

In a similar vein, a sense of self-efficacy in aiding those who suffer increases the likelihood of experiencing compassion, presumably because the individual feels that their personal resources match the demands of the situation (Hoffman, 1981). In one study, adolescents' reports of empathic self-efficacy (e.g. "I can experience how a person in trouble feels") were positively related to their reports of sharing, helping, and taking care of others (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003). Similarly, secure attachment, which is related to feelings of self-efficacy when coping with distress (Mikulincer & Shaver, 2003), predicted the increased experience of experimentally induced compassion (Mikulincer, Gillath, Halevy, Avihou, Avidan, & Eshkoli, 2001; Mikulincer, Shaver, Gillath, & Nitzberg, 2005). In one study, participants who were subliminally primed with the name of a secure attachment figure reported feeling more compassion and were more willing to help a stranger in need (Mikulincer et al., 2005). Taken together, these studies suggest that an individual's ability to cope with the situation at hand is positively related to the experience of compassion and negatively related to the experience of distress (see Figure 1).

### **A summary of the appraisal processes that give rise to compassion and related states**

No research to date has established the entire appraisal pattern associated with compassion in one study. Our review of the literature, however, makes a case for a distinct, compassion-related appraisal pattern involving appraisals of self relevance, goal congruence, blame, and coping ability. Many of these specific appraisals map onto evolutionary claims about cost-benefit analyses that constrain the experience of compassion, and are supported by selected studies we have reviewed.

Critically, the compassion-related pattern of appraisal we portray in Figure 1 differs from those associated with the related states of distress, sadness, and love. Compassion is distinguished from love at the level of antecedent events: compassion responds to suffering and negative events, whereas love antecedents are primarily positive. In their study of emotion scripts, Shaver and colleagues (1987) found that love antecedents involved realizations that the loved one provides love and security, such as sharing time or good experiences with the other person, finding the other attractive, or experiencing especially good communication with the other person.

Sadness antecedents are negative, but differ from compassion in that they involve clear consequences for the self (Ortony et al., 1988). When participants were asked to describe a recent experience of sadness and the events that led to its occurrence, the descriptions revealed that participants most often described sadness as a response to unexpected negative personal outcomes (60%) such as loss of a loved one (50%) or loss or separation in a relationship (50%) (Shaver et al., 1987). Thus, an individual's own loss causes sadness but another's loss causes

compassion. This distinction between self and other is one that humans develop early and that is critical to distinction between sadness and compassion.

Finally, our model incorporates appraisals of one's own resources. Feeling able to cope effectively with the situation at hand is central to the elicitation of compassion. If one does not feel able to cope—psychologically or physically—then one is more likely to feel distress and anxiety. This hypothesized distinction between compassion- and distress-related appraisals has received indirect empirical support, which we have reviewed, but it deserves more systematic examination. Situational manipulations that diminish emotion regulation capacities, such as cognitive load or physical or emotional fatigue, should diminish compassion and increase experiences of empathic distress in response to the suffering of others. In a similar spirit, variables that enhance a sense of coping should make one more likely to feel compassion rather than distress.

Interestingly, our model of compassion-related appraisal reveals a close relationship between compassion with seemingly unrelated states like *schadenfreude* and anger. These connections are consistent with evolutionary arguments about strong reciprocity and the role of punishment-related emotions like anger in enforcing cooperation (e.g. Gintis, 2000). In this line of thought, people feel compassion for someone who genuinely needs help, but anger towards those who fail to uphold cooperation norms or seek costly help when it is undeserved. For example, students who fail an exam after not studying elicit less compassion than those who fail an exam after working very hard (Reyna & Weiner, 2001). This suggests that compassion appraisals include some judgment of fairness or justice.

Critically, more systematic comparisons of the appraisals associated with compassion, love, distress, and sadness are needed. So too are studies of the universality of the model of compassion-related appraisal we have presented here, in light of how central evidence of universality is to claims about the evolution of emotion (e.g., Ekman, 1992). This kind of cross-cultural work is also certain to yield interesting cultural variations in compassion, which we discuss later.

## Compassion-Related Display Behavior: A Signal of Commitment and Cooperation

Nonverbal expressions of emotion serve several functions (Ekman, 1992; Matsumoto, Keltner, Shiota, O'Sullivan, & Frank, 2008). Emotional displays in the face, voice, and body signal specific intentions (for example to cooperate or compete), motivations, and probable behaviors to others. Emotional displays also systematically evoke responses in others—for example embarrassment triggers feelings of forgiveness in others—that coordinate social interactions in adaptive ways (for reviews see Bachorowski & Owren, 2001; Keltner & Kring, 1998).

Early theoretical claims about the nonverbal display of compassion dovetail with these functional arguments. For example, Bowlby observed that infants rely on various display behaviors, such as distress vocalizations and the arm reach display, to trigger compassion in the caregiver as a central means by which to establish and maintain secure attachments (Bowlby, 1969). In his analysis of the evolution of cooperation amongst non-kin, Robert Frank (1988) argued that nonverbal displays of compassion (in particular oblique eyebrows) signal an individual's prosocial disposition, and are actively sought out as signs of an individual's worthiness as a reproductive partner or participant in reciprocally altruistic exchanges. These different lines of theorizing posit a distinct display of compassion that signals commitment and cooperation.

Early studies of emotional expression did not consider compassion. What might a nonverbal display of compassion look, sound, or feel like? One answer is found in evolutionary arguments about the origins of nonverbal display, which posit that emotions are signaled in highly stereotyped, ritualized actions that originally were part of more complex behavioral responses (Darwin, 1872; Ekman, 1992; Fridlund, 1994). Anger, for example, is signaled in ritualized facial and postural movements—the furrowed brow, clenched fist, and teeth display—which are elements of a more complex fight or attack response. To the extent that compassion is part of a caregiving response, as we have argued here, it should be signaled in caregiving related behaviors. This includes soothing vocalizations and tactile contact, which are less frequently studied in the literature on emotional expression, but are part of caregiving responses observed in different cultures (Eibl-Eibesfeldt, 1989). Table 3 summarizes studies of compassion-related facial actions, posture, vocalizations, and tactile behavior.

### Compassion-Related Facial and Postural Behavior

Several early laboratory studies by Eisenberg and colleagues examined nonverbal correlates of brief experiences of compassion and distress (e.g., Eisenberg, McCreath & Ahn, 1988; Eisenberg, Fabes et al., 1988; Eisenberg et al., 1989; 1994; Fabes, Eisenberg, & Eisenbud, 1993; Guthrie et al., 1997). In these studies, compassion was coded as concerned attention, including “the eyebrow pulled down flat and forward over the bridge of the nose, furrowing in the center of the brow . . . , eyelids not pulled in tight or raised, head and body oriented forward, bottom eyelids sometimes raised slightly, and lower face relaxed” (Eisenberg et al., 1989, p. 58). In contrast, personal distress was coded as mild apprehension, including eyebrows that are raised and drawn together, tensing of the lower eyelid, and nervous mouth movements (Eisenberg, McCreath & Ahn, 1988; Eisenberg, Fabes, et al., 1988; Eisenberg et al., 1994; Guthrie et al., 1997).

These two patterns of nonverbal behavior predicted distinct self-reports, physiology, and helping behavior—solid evidence for a distinct display of compassion. The first pattern of nonverbal actions predicted increased feelings of sympathy and compassion and increased helping behavior, suggesting that these nonverbal actions signal compassion but not distress (e.g. Eisenberg, Schaller et al, 1988; Eisenberg et al., 1989; 1994; Fabes et al., 1993). It is also important to note that these compassion-related facial and postural actions differ from those that signal love, which include Duchenne smiles (i.e., those involving the action of the *orbicularis oculi*), open handed gestures, and forward leans but not furrowed eyebrows or lip presses (Gonzaga, Keltner, Londahl & Smith, 2001; Gonzaga, Turner, Keltner, Campos & Artemus, 2006). These initial studies of a compassion-related display are ambiguous, though, with respect to which specific nonverbal behaviors are part of compassion or distress expressions since they relied upon a global coding system that required coders to interpret the expressions they were seeing.

Guided by these initial studies, two studies ascertained whether naïve observers can reliably decode compassion from static photographs of facial and postural behaviors (Haidt & Keltner, 1999; Keltner & Buswell, 1996). Both studies presented different posers portraying compassion with oblique eyebrows, a fixed gaze, and head movement forward. The first study used a forced choice format and listed “sympathy” along with thirteen other emotion labels plus an option for “no emotion” (Keltner & Buswell, 1996). “Sympathy” was chosen often for this expression (between 33-43%), but problematically, the compassion display was also labeled as “sadness” (36%) and “no emotion” (32%), depending on the poser. The second study showed the same photographs to participants in the United States and India, but included “compassion” instead of “sympathy” as a label in the United States along with a “none of the above” option in a forced-choice format (Haidt & Keltner, 1999). Although American participants often labeled the compassion photograph as “compassion” (30%), they more often

labeled it as “sadness” (37%). In addition, recognition rates were much lower for the compassion photograph (30%) than for pictures of fear (55%), sadness (88%), and happiness (73%). Rates were even lower when Indian participants judged the compassion photograph (17%), although recognition of fear (55%), sadness (43%), and happiness (45%) remained relatively high. In these studies, the facial expression for compassion was not as recognizable as well-studied expressions, such as fear or happiness (a Duchenne smile).

The failure of naïve observers to reliably identify compassion from static photos of facial expressions likely has several origins. Compassion and sadness were often confused because they share facial muscle movements, most notably those that produce the oblique eyebrows (e.g. Ekman, Friesen, & Hager, 2002a; 2002b). If these judgment studies had presented information about the social context, for example that a person is in the presence of someone suffering, accuracy rates would have likely increased. In addition, still photographs did not convey the temporal dynamics of compassion-related display, including orientation to the target, forward leans, and eye contact. Although compassion includes gazing and leaning towards others (Eisenberg, Fabes, et al., 1988; Eisenberg, McCreath, & Ahn, 1988; Guthrie et al., 1997), sadness involves physical withdrawal (Shaver et al., 1987), averted gaze (Adams & Kleck, 2005) and slumped posture (Coulson, 2004). Recently, experiences of love during conversations between romantic heterosexual partners were associated with head nods, leaning towards partner, and affiliative hand gestures (Gonzaga et al., 2001, 2006). Future studies of compassion-related displays should go beyond facial and postural movements, and study dynamic displays and emotion recognition within social interactions.

### Touch and Voice in Communicating Compassion

Recent theory and evidence indicate that touch is a primary platform for the development of secure attachments and cooperative relationships—two contexts in which compassion is theorized to have evolved. With respect to the vulnerable offspring account, it is interesting to note that touch is the most developed sensory modality at birth (Hertenstein, 2002). Touch is also intimately involved in patterns of caregiving observed in different cultures. Recent empirical studies of humans and nonhumans find that soothing touch can stimulate activation in reward regions of the brain (Rolls, 2000), reduce levels of the stress hormone cortisol (Francis & Meaney, 1999), and reduce activation in stress-related regions of the brain when pain is anticipated (Coan, Schaefer, & Davidson, 2006). Touch is a powerful means by which individuals reduce the suffering of others.

Touch also promotes cooperation and reciprocal altruism. Nonhuman primates spend up to 20% of their day grooming, and systematically share food with other non-kin who have groomed them earlier in the day (de Waal, 1996). In humans, friendly patterns of touch have been found to increase compliance to requests (Willis & Hamm, 1980) and cooperation toward strangers in economic games (Kurzban, 2001).

Taken together, these studies indicate that touch is involved in two social processes related to the evolution of compassion: soothing and the formation of cooperative bonds. Tactile contact should be a modality in which compassion is communicated, and recent evidence supports this supposition (Hertenstein, Keltner, App, Buleit, & Jaskolka, 2006). In studies conducted in the United States and Spain, participants were asked to communicate twelve distinct emotions to another participant via touch on the forearm, including sympathy, fear, sadness, and love. Using a forced-choice format with a “none of the above” option, recipients of the touch could discern that sympathy was being communicated 48% and 57% of the time in Spain and the United States, respectively (chance guessing would yield accuracy rates less than 8%). Communication of sympathy involved patting and stroking behavior of moderate intensity and longer duration (Mean = 7.6 seconds). Impressively, in this same study decoders reliably identified love and gratitude at levels of accuracy similar to those for compassion, suggesting

that in the tactile modality, compassion is distinct from displays of these two prosocial emotions. In another study, videotapes of these brief, hand-to-forearm touches were shown to a new U.S. sample of observers. Over 53% of observers discerned that sympathy was being communicated through touch simply by watching the videotape of the hand making contact with the other's forearm (Hertenstein et al., 2006). This stood in contrast with basic emotions like sadness and happiness, which had relatively low recognition rates in touch versus facial expression channels (see Figure 2).

New evidence also suggests that compassion is communicated through the voice (Simon-Thomas, Keltner, Sauter, Sinicropi-Yao, & Abramson, in press). In this study participants were asked to communicate different emotion states with brief (e.g., half second) non-word utterances known as vocal bursts. Vocal bursts of compassion were then presented along with those of twelve positive states, including love and gratitude. Judges were asked to listen to these vocal bursts, and identify the emotion being expressed in a forced choice format that included a “none of the above” response. Judges reliably identified prosocial vocal bursts, including compassion, love and gratitude bursts rated as compassion, love or gratitude, 47% of the time. Compassion alone was identified 24% of the time, which is significantly greater than chance levels (8%).

In summary, the evidence for a distinct display of compassion is mixed. Observational studies using global coding schemes find positive relationships between a facial expression including lowered, furrowed brows with self-report and subsequent helping behavior. However, recognition studies using a related expression—one with raised, oblique eyebrows—find that this display is just as often labeled as sadness. Compassion appears to be more readily communicated through touch and perhaps the voice. This finding is in keeping with the literatures on the role of touch in suffering reduction and the formation of cooperative bonds, and the primacy of touch early in the infant's development (Hertenstein, 2002).

Our empirical review of compassion-related display behavior highlights several areas for future empirical inquiry. Studies need to examine how the different modalities—facial action, posture, touch, and voice—covary, which most strongly predict observer judgments of compassion, and how reliably compassion is signaled when all modalities are engaged (for related work on embarrassment, see Keltner, 1995, and on pride, see Tracy & Robins, 2007). Given the lower accuracy rates of recognizing compassion relative to other emotions, in particular in facial display, the interpretation of the expression of compassion may prove to be more context-dependent than other emotions. We also expect dynamic movements that indicate approach and engagement—such as head and eye movements forward—to have potent signal value in communicating compassion, and these have not been studied. Finally, and importantly, it remains to be seen if compassion is expressed similarly across gender, relationship type, and culture. This kind of evidence is critical to evolutionary arguments about compassion, which presuppose universal displays.

## **Compassion-related Experience and Physiology: A Motivator of Approach and Commitment**

Within evolutionary analyses of emotion, the experience of emotion is thought to serve as an internal signaling device, providing information about events in the environment and guiding the individual's patterns of thought and action in appropriate fashion (e.g., Keltner & Kring, 1998; Oatley & Johnson-Laird, 1987; Schwarz, 1990). In a similar vein, emotion-related autonomic responses are thought to enable emotion-related behavior (e.g., Levenson, 2003). For example, anger-related shifts in cardiovascular response, including elevated heart rate and changes in the distribution of blood through the body, support fight-or-flight behavior (Levenson, Ekman, & Friesen, 1990).

These arguments set the stage for hypotheses concerning compassion-related experience and physiology. Compassion-related appraisals make the individual aware of situations in which helping and altruism are needed, and possibly beneficial. The experiential and physiological facets of compassion, we further reason, motivate the individual to respond quickly and appropriately to the suffering of others. In more specific terms, we would expect the experience of compassion to be associated with increased care and concern for the other, reduced focus on one's own needs, and a desire to help the other for their own sake. The structure of the experience of compassion, furthermore, should be distinct from that of distress, sadness, and love. We would also expect the physiological correlates of compassion, particularly those in the autonomic nervous system, to enable outward attention, approach, and social engagement.

### The Phenomenology of Compassion

Studies of the subjective experience of compassion reveal that the momentary experience of compassion does indeed motivate altruistic and caring behavior, and that it is a distinguishable experience from sadness and distress (e.g., Batson, 1991; Batson & Shaw, 1991; Eisenberg, et al., 1989). Initial evidence for these claims comes from self-reports of emotion in response to witnessing another's suffering. Factor analyses consistently reveal that emotion ratings in these situations load on distinct compassion and distress factors. In a review of six studies, Batson and colleagues (Batson et al., 1987) found that self-reports of feeling *compassionate*, *sympathetic*, *moved*, *tender*, *warm*, and *softhearted* consistently load on a common factor. In contrast, self-reports of *alarmed*, *upset*, *disturbed*, *distressed*, *worried*, and *perturbed* loaded on a separate factor. The distinction between these factors occurred even though correlations between responses to distress and compassion items were positive ( $r$ 's ranged from .44 to .75, as reported in Batson et al., 1987). These initial studies of compassion-related experience did not include sadness-related words, but another study found that words like *sad*, *dejected*, *low-spirited*, *heavyhearted*, and *feeling low* loaded on a separate component from both compassion and distress (Fultz et al., 1988). In subjective reports, then, compassion appears as a distinct emotional response to appeals for help.

Experimental evidence reveals that compassion also has distinct motivational underpinnings from distress, and perhaps sadness. Whereas distress motivates focus on the self and a desire to reduce one's own suffering, compassion motivates concern for others and a desire to reduce others' suffering (Batson et al., 1987; Batson, 1991). This has been shown in multiple studies using a paradigm in which participants receive an appeal for help, but are offered an easy escape route. In this work, greater self-reported compassion led to more helping when escape was easy. In contrast, greater self-reported distress led to less helping when escape was easy (e.g., Batson et al., 1983).

The distinctions between the experiences of compassion and distress have been replicated with child participants using slightly different items. In one study, 3<sup>rd</sup> and 6<sup>th</sup> grade children were asked to recall an experience in which they felt particularly distressed and another experience in which they felt particularly sorry for someone else (Eisenberg, Schaller, et al., 1988). Consistent with Batson's research, children's self-reports of *sorry for* and *pity or concern for* loaded on the same factor, whereas *nervous*, *worried*, and *scared* loaded on another. These studies reveal that experiences of compassion are distinct from those of distress and sadness. Research with children is also consistent with the hypothesis that compassion motivates approach. In one study, 2<sup>nd</sup> and 5<sup>th</sup> graders watched a video about children who had lost their parents in a car accident. Children's self-reports of compassion during this video were positively related to helping in the form of donating their experiment money (Eisenberg, Fabes, Miller, Fultz, et al., 1989). Feelings of distress, by contrast, predicted less helping. In another study, children who verbally expressed distress when exposed to a crying infant were less likely

to intervene and try to soothe the infant than those who did not (Zahn-Waxler, Friedman & Cummins, 1983).

There is little evidence to evaluate whether compassion and love are distinct experiences. In one of the few relevant studies, romantic partners' reports of love were moderately positively correlated with reports of sympathy ( $r = .26$ ) after having discussed something good that recently happened (Gonzaga et al., 2001) and were uncorrelated after romantic partners discussed their first date (Gonzaga et al., 2006). In comparison, the experience of love was correlated strongly with desire ( $r = .54$ ). Romantic love, however, is a poor comparison for compassion. Instead, parental, friendship, or altruistic love would be better comparisons.

### Autonomic Nervous System Correlates

The autonomic nervous system involves approximately twenty bundles of neurons originating in the spinal cord that receive signals from regions of the cortex, the amygdala, and the hypothalamus, and that activate different target organs, glands, muscles, and blood vessels distributed throughout the body. In the most general sense, the autonomic nervous system is thought to create an "internal milieu" that enables emotion-related action tendencies, from fight or flight tendencies to withdrawal, or in the case of compassion, approach and caregiving (Janig, 2003).

Two lines of reasoning point to possible autonomic correlates of compassion. A first centers upon the fact that compassion, in particular compared to distress, involves orientation to the target individual and approach-related behavior (Hoffman, 1984). The parasympathetic nervous system effect of inhibition of heart rate has been associated with an orienting response and sustained outward attention that is in keeping with a core action tendency of compassion (Suess, Porges & Plude, 1994). In contrast, heart-rate acceleration and increased skin conductance are associated with fight or flight responses like those in fear (Cacioppo, Berntson, Larsen, Peohmann, & Ito, 2000). Given these distinctions, one might expect compassion to be associated with heart-rate deceleration and distress to be associated with increased heart rate and increased skin conductance.

Consistent with these claims, heart rate deceleration has been shown to occur in situations that evoke compassion, whereas heart rate acceleration has been shown to occur in situations that induce distress (Eisenberg, Fabes et al., 1988; Eisenberg, Schaller, et al., 1988; Eisenberg, Fabes, Schaller, Miller, et al., 1991). In one experimental study of preschoolers and second graders, children were exposed to three films. The distress induction film presented a young boy and girl who were frightened by a loud thunderstorm. There were two compassion induction films. One portrayed a young girl's sadness over her pet bird's death. In the other, a young girl discussed her physical handicap and then struggled to walk during a therapy session. Children showed heart rate deceleration during both of the compassion induction films and heart rate acceleration during the distress induction film (Eisenberg, Fabes et al., 1988). In a similar study with adults, heart rate decelerated during a compassion-inducing film, and self-reports of sympathy and compassion were positively related to heart rate deceleration (Eisenberg, Fabes, Schaller, Carlo & Miller, 1991). Other similarly motivated research has documented that heart rate deceleration is positively associated with prosocial behavior. Children who showed heart rate deceleration during evocative films were more willing to help bring homework or donate some of their experiment money to a child in need (Eisenberg et al., 1989).

Compassion and distress are differentiated in the accompanying levels of skin conductance, an index of sympathetic autonomic nervous system arousal. Distress-inducing films elicit higher levels of skin conductance than compassion-inducing films (Eisenberg, Fabes, Schaller, Carlo & Miller, 1991; Eisenberg, Fabes, Schaller, Miller, et al., 1991), and skin conductance

levels relate positively to distress self-reports (Eisenberg, Fabes, Schaller, Miller et al., 1991), to distress expressions (Eisenberg, Fabes, Schaller, Carlo & Miller, 1991), and to gaze aversion during a distressing film (Fabes et al., 1993).

A second line of reasoning posits that one branch of the parasympathetic nervous system regulated by the vagus nerve may have evolved uniquely in mammals to support attachment and caregiving behaviors so central to compassion (Beauchaine, 2001; Porges, 1995, 2001). The vagus nerve and its source nuclei interact in the regulation of a “social engagement system,” which includes facial and vocal displays, looking and listening activities, and motor behaviors such as tactile contact (Beauchaine, 2001; Porges, 2001). Activation of the vagus nerve is inferred from measures of the degree of respiration-linked variability in the heart rate, or respiratory sinus arrhythmia (RSA).

Tonic RSA, or an individual's baseline level of RSA at rest, is used as one dispositional indicator of vagal activity, whereas shifts in RSA relative to baseline during exposure to emotional stimuli are used as situational indicators of vagal activity (Beauchaine, 2001). With respect to compassion, studies confirm that tonic RSA is positively related to trait-like compassionate responding. Boys in kindergarten to 2<sup>nd</sup> grade with high tonic RSA were rated by teachers and parents as more helpful and more able to regulate their emotions than those with lower RSA (Eisenberg et al., 1996). In another study, children's tonic RSA was positively related to their own self-reports of sympathy, both dispositionally and in response to a compassion-inducing film (Fabes et al., 1993). Tonic RSA was also related to less self-reported distress, less facial display of distress and gaze aversion, and less arousal (lowered skin conductance) in response to the film.

A recent study of RSA during exposure to emotional stimuli suggests that vagal activity may also correlate with state-like episodes of compassion (Oveis, Horberg & Keltner, 2009). The researchers found that participants who were exposed to a series of 15 compassion-inducing photographs exhibited higher levels of RSA than those who were exposed to pride-inducing photographs. Higher RSA while watching the slides (after controlling for tonic RSA) was positively related to self-reports of experienced compassion, but negatively related to experience of pride.

Do the autonomic markers associated with compassion—heart rate deceleration, heart rate variability, reduced skin conductance—differ from those associated with sadness and love? No study to date has compared the autonomic profiles of these emotions. Many studies have examined sadness independently, and these point to informative physiological distinctions. Sadness, much like distress, is thought to be associated with elevated cardiovascular arousal (Levenson, 1992). A meta-analysis supported this claim, finding that the experience of sadness is associated with heart rate acceleration (Cacioppo et al., 2000), which differs from the pattern of heart rate deceleration associated with compassion that Eisenberg and colleagues have observed. For example, in the directed facial action task, in which participants are coached to produce prototypical emotional facial expressions, the sadness expression has been associated with heart rate acceleration (e.g., Ekman, Levenson, & Friesen, 1983; Levenson et al., 1990).

In summary, compassion-related decelerated heart rate suggests this emotion is associated with parasympathetic autonomic nervous system (as does suggestive evidence involving vagal tone measurement), whereas distress- and sadness-related heart-rate acceleration and increased skin conductance suggest that these two emotions are associated with sympathetic autonomic nervous system activation.

## Critical Summary of Alternatives

The theoretical literature on compassion yields three possible frames to account for the empirical data we have just presented: that 1) compassion is a vicarious emotion (and by implication resembles empathic distress), 2) compassion is a variant of sadness or love; or 3), compassion is a distinct emotion.

Our empirical review presents problems for a vicarious emotion account of compassion, which suggests that compassion will resemble empathic distress. The evidence reviewed here shows that compassion and distress differ in their phenomenologies, display behaviors, and autonomic profiles. Clearly empathy is involved in the elicitation and experience of compassion, but compassion does not reduce to an empathic state of mirrored distress, fear, or sadness. Although the compassion expression is similar to sadness expressions, aspects such as eye gaze, forward leans, and touch appear to communicate outward attention and approach. Several studies of empathy and altruism (reviewed elsewhere, see Batson, 1991; 1998; Eisenberg & Miller, 1987) find that experience of compassion leads to behaviors that reduce the other's suffering whereas distress leads to actions such as escape that reduce one's own suffering. And finally, the lowered heart rate and vagal activity associated with experience of compassion represents a clear distinction from the heightened sympathetic autonomic arousal associated with the emotions that elicit it, such as sadness and fear.

The second account—that compassion is a variant of sadness or love—likewise fails to map onto the empirical data that we have reviewed. This approach predicts that compassion will have similar appraisal themes to love, such as the positive feelings of security and proximity to a loved one. In contrast, compassion arises in response to appraisals of suffering. Several studies revealed that compassion and love are signaled in different facial, postural, and tactile actions. More focused comparisons are needed to ascertain whether or not compassion and love share a common autonomic response profile that motivates social approach (e.g., potentially in vagus nerve response or oxytocin release; see Carter, 1998; Taylor, Klein, Lewis, Gruenewald, Gurung, & Updegraff, 2000). Likewise, similar comparisons between compassion and love are needed in the realm of subjective experience and appraisal process, to more confidently claim that compassion is distinct from love.

One intriguing possibility is that compassion is moderated by love and valuing of the other person, probably through appraisals of self-relevance. Some research even suggests that love may moderate the influences of blame appraisals upon the experience of compassion, particularly in extreme cases of need. On this point, participants reported greater willingness to save a sibling who was to blame for their situation than an acquaintance who was not in a life and death scenario, but were more willing to help the acquaintance when the consequences were less dire (Greitemeyer, Rudolph, & Weiner, 2003).

The overlaps between sadness and compassion were most pronounced. These two affective states share certain facial actions. Of note, though, these emotions differ in their eliciting appraisals, their phenomenology, in patterns of touch and vocalization, and in their autonomic profile (although the two emotions have not been directly compared in ANS work). It is in turning to new modalities of emotion measurement that the distinctions between these emotions come into focus.

Given the difficulties these three approaches to compassion encounter, a third perspective—that compassion is a distinct emotion—is best suited to synthesize the existing empirical data. Compassion arises as the result of appraisals of suffering, and is associated with signaling behavior (e.g., soothing tactile contact), reduced heart rate, subjective feelings of concern, and social behaviors that alleviate suffering. This approach also incorporates many of the claims of the other hypotheses into a coherent framework. The empathic distress, sadness, and love

accounts of compassion are easily incorporated in appraisal aspects of the distinct state of compassion. For example, individual variation in values or emotional closeness determines the degree to which another's suffering is considered self and goal relevant, and, by implication, the likelihood of compassion.

The empirical study of compassion raises intriguing questions. Importantly, we have made the case that closely related states—sympathy, pity, and empathic concern—are part of the compassion family, and should manifest in a compassion-related profile that has emerged in our review. Empirical studies on this thesis are needed. This kind of research is also likely to yield findings concerning how these states differ in subtle ways. For example, one might expect vocal markers of dominance (e.g., deeper pitch) to be involved in pity-related vocalizations but not compassion-related vocalizations.

More generally, where does compassion fall within the dimensional space that characterizes so many affective states, a space defined by two dimensions—valence and arousal (Barrett & Russell, 1999; Russell, 2003)? Compassion clearly is rooted in certain negatively valenced appraisals and feelings of distress. At the same time, it engages approach and shares a core appraisal with positive emotions like gratitude and love (Shiota et al., 2006). Empirical studies of the underlying dimensions of appraisal of compassion may yield insights into the complex valence of this emotion, and new dimensions of emotion.

In this review, we have made the case that compassion is both a state and trait like tendency. Clearly, the experience, physiology, and display of compassion speak to its state like, episodic nature. At the same time it is quite clear that compassion is an enduring affective trait (Eisenberg et al., 2002; Grünh, Rebucal, Diehl, Lumley, & Labouvie-Vief, 2008; Shiota et al., 2006; Underwood, 2009). An important area of inquiry is to explore the relationships between the state like experience of compassion and the trait like tendency towards this emotion.

One variant of this question is whether the cultivation of state like episodes of compassion can develop into more enduring compassion-based sentiments or traits. Numerous meditation practices attempt to cultivate the compassionate disposition in loving kindness exercises, in which the individual contemplates feelings of compassion toward individuals close to the self (or the self), and gradually extends those feelings to less close individuals and eventually adversaries and all sentient beings (Wallace, 2005). These loving kindness meditations have been found to shift the resting lateralization patterns in the brain to the left frontal lobes, which is associated with greater approach tendencies (Davidson, Kabat-Zinn, Schumacher, Rosenkranz, Muller, et al., 2003), and to lead to boosts in overall well-being and social connection (Fredrickson, Cohn, Coffey, Pek & Finkel, 2008). These studies suggest that mindful experiences of compassionate states increase trait like tendencies to feel compassion. Other work speaks to the benefits of such shifts: more enduring compassion-related sentiments toward a romantic partner predict increased satisfaction in relationships over time (Neff & Karney, 2009) and trait like tendencies toward self-compassion predict increased psychological functioning and reduced symptoms of anxiety, depression, and rumination (Neff, Rude, & Kirkpatrick, 2007).

Based on our synthesis of the empirical studies of compassion, we now consider several questions warranting future research. We focus on three: Is compassion universal across cultures? How is it a moral emotion? And what do we know of its central nervous system correlates?

### **Cultural Universals and Variation in Compassion**

A central implication of evolutionary analysis is that, as an adaptation, compassion should be a universal feature of the human species (Brown, 1991). And it is in the study of compassion

across cultures that the evidence is most lacking. The evolutionary accounts of compassion that we have detailed here posit that compassion should be involved in the care of vulnerable offspring, should be central to mate preferences, and should play an important role in the formation of cooperative alliances across radically different cultures. With few exceptions, these assertions await empirical attention, and are critical to assessing an evolutionary analysis of compassion. To the extent that compassion proves not to be importantly involved in the raising of offspring across cultures or a central criterion in mate selection or alliance formations with non-kin, the evolutionary arguments we have offered here become less tenable.

The broader thesis that compassion is a distinct emotion likewise is in need of evidence from non-western cultures. It will be important to study the appraisals, experience, display, and physiology of compassion across cultures. Again, universality in these different response modalities represents strong evidence for the evolutionary argument we are offering here; significant cultural variation in these responses represents a significant challenge to our perspective, and suggests that while compassion may still serve caregiving functions, the state itself is more subject to cultural variation than suggested by evolutionary accounts. We hope that the present review enables this line of inquiry in its identification of compassion-related inductions and measures.

What evidence is there for compassion as a universally experienced emotion? Compassion and related terms appear in the early writings of Aristotle (Nussbaum, 1996), Confucius (Bockover, 1995), and are a central concept in both early and contemporary Buddhism (de Silva, 1995; Trungpa, 1973). In contemporary psychological research, compassion and related states have been studied in such diverse cultures as Brazil, India, China, Japan, Indonesia, Malaysia, Spain and Germany (e.g. Dalsky, Gohm, Noguchi & Shiomura, 2008; Eisenberg, Zhou & Koller, 2001; Haidt & Keltner, 1999; Hertenstein et al., 2006; Shaver et al., 1992; 2001; Trommsdorff, Friedlmeier, & Mayer, 2007). Studies of the emotion lexicon show that compassion and related terms are rated as highly prototypical emotions in Chinese (Shaver et al., 1992) and Indonesian (Shaver et al., 2001). Behaviors related to compassion, such as helping, forgiveness, and reciprocity are valued highly in all cultures (Gouldner, 1960; Miller & Bersoff, 1994; Schwartz & Bardi, 2001). In a study of value hierarchies in 54 nations, benevolence towards people with whom one is in frequent personal contact and protection for the welfare of all people were consistently among the most important values (Schwartz & Bardi, 2001).

These studies support the argument that suffering and need are universal elicitors of compassion. For example, young children from four different cultures (Malaysia, Indonesia, Israel, and Germany) expressed sympathy (coded as inner eyebrows lifted, corners of the mouth turned down, lack of tension in the face, and a soft voice) when a female experimenter expressed sadness when her balloon broke (Trommsdorff et al., 2007). Research participants in China reported feeling sympathy for AIDS patients (Zhou, Zhang, Fang & Li, 2005), for individuals who were fired from their job (Zhang, Xia, & Li, 2007), and for individuals who failed at a task that they tried hard to complete (Zhang, Reyna, Qian, & Yu, 2008). In addition, these studies suggest that appraisals centering upon responsibility and blame—critical in our model of compassion-related appraisals—play a universal role in the elicitation of compassion, as they do in other emotions (see Mesquita & Frijda, 1992; Scherer, 1997). For example, Chinese managers and employees judged another employee as not responsible for his failure when he tried very hard to succeed but was thwarted. In turn, these appraisals of the lack of responsibility were associated with increased sympathy (Zhang et al., 2008), and helping behavior (Zhang et al., 2007).

Several studies in non-western cultures have examined the correlates of individual differences in the trait-like tendency to experience compassion, and these studies are germane to the question of the universality of compassion. Consistent with research in the United States, the

self-reported tendency to experience compassion relates to the increased tendency to perspective-take in Brazilian adolescents (Eisenberg et al., 2001) and Chinese adults (Siu & Shek, 2005). Self-reported individual differences in compassion have also been positively associated with self-reported prosocial behavior in Japan (Kitayama & Markus, 2000) and Brazil (Eisenberg et al., 2001).

Cross-cultural studies of compassion-related display behavior suggest that compassion is recognizable in dynamic displays involving touch, but not in decontextualized facial expressions. When communicated through touch, Spanish participants recognized compassion at above chance levels, and differentiated this display from tactile contact of love and gratitude (Hertenstein et al., 2006). In contrast, a study in India tested one particular facial display of compassion and found it was more often labeled as sadness (*dukha*) than compassion (*karuna*), which was consistent with a concurrent study in an American sample (Haidt & Keltner, 1999). It is unclear, however, if the lack of recognition is the result of the specific expression tested or the result of compassion having no universal facial expression at all.

Just as important as the search for the universality of compassion are studies that document systematic cultural variation in this complex emotion. Compassion's functions—the reduction of suffering and the formation and maintenance of cooperative relationships—almost certainly vary across cultures. In this way, the evolved capacity to feel compassion may function like a language acquisition tendency (Henrich, 2004; Richerson & Boyd, 2005), and vary in ways that are analogous to how languages differ across cultures, varying according to culturally specific concepts, values, norms, and practices (Clark, 1997; Hoshchild, 1979).

For example, the tendency to experience compassion and sympathy has been positively related to interdependent self-construal and collectivism in both American and Japanese samples (Dalsky et al., 2008; Uchida & Kitayama, 2001). Indeed, theorists argue that in the context of interdependence, one's well-being is closely connected to giving and receiving sympathy from others (Kitayama & Markus, 2000). This direct link has yet to be tested, however. In addition, cultures vary in the extent to which cooperation and altruism are observed outside the family (Henrich et al., 2005). Individuals from collectivistic cultures (e.g., China and Japan) tend to help members of their own groups more than Americans, whereas Americans help people from groups other than their own more than Chinese and Japanese (Leung, 1988; Wong & Hong, 2005). These findings point to a hypothesis worthy of testing: that interdependence increases the tendency to feel compassion for ingroup members, whereas independence increases the tendency to feel compassion for outgroup members.

Contemporary studies of emotion and culture point to other ways in which compassion is likely to vary across cultures (Keltner & Lerner, 2009). Cultures vary in which emotions are focal in daily experience (Mesquita, 2003), and which emotions are valued, or idealized (Tsai, 2007). Cultural variations in the prioritization of hierarchy (Fischer & Smith, 2003), equality (Blum, 1980), and caring (Levine, Norenzayan, & Philbrick, 2001) are likely to predict the extent to which compassion is a focal or idealized emotion in the particular culture. For example, a comparison of the emotion lexicon in English, Italian, and Chinese found that all represented compassion and related terms, but in slightly different ways (Shaver et al., 1992). In the more interdependent cultures of China and Italy, these terms appear to be highly emphasized and differentiated: forming the basis of a “sad love” cluster in Chinese and a separate cluster from love and sadness in Italian. In English, however, the terms were clumped under love or sadness, indicating that the concepts are less well differentiated, and perhaps less focal.

Finally, cultures also vary in the outward display of emotion. Cultures that value particular emotions are likely to have a richer emotion-specific lexicon and vocabulary of nonverbal display for the emotion (e.g., Haidt & Keltner, 1999; Tsai, 2007). Sociological and

anthropological work reveals rich variations in the cultural scripts around the giving and receiving of help and compassion (Clark, 1997; Kipnis, 2002; Smart, 1999). Empirical studies of the vocabulary of compassion, both verbal and nonverbal, and the scripts, or feeling rules, that govern how compassion should be expressed, are likely to yield informative cultural differences in compassion. This work is likely to be particularly fruitful if compassion is studied in more naturalistic social interactions (e.g. Van Kleef et al., 2008).

Studies of compassion across different cultures are few in number but rich with promise. This work is essential to the claim that compassion is an evolved emotion (where one would expect important universalities in compassion across cultures). It is also likely to reveal striking differences in the place of compassion in the daily emotional lives of individuals in different cultures, which our next section reveals, would speak to cultural variations in the substance of moral judgment and action.

### Compassion and Moral Judgment and Action

Compassion is a controversial emotion within theorizing about the ethical and moral rules that should structure society. Compassion is a central focus of many spiritual and ethical traditions, from Buddhism and Confucianism to Christianity, and a state and disposition people seek to cultivate on the assumption it will make for more morally coherent lives and more cooperative communities (Armstrong, 2006; Davidson & Harrington, 2002; Nussbaum, 2001). In contrast, many influential social theorists, from Ayn Rand to Immanuel Kant, have treated compassion critically, deeming it to be a subjective and unreliable source of moral judgment and action, and antithetical to individual achievement (Keltner, 2009). This stance is typified in the following quote of Immanuel Kant: “*A feeling of sympathy is beautiful and amiable; for it shows a charitable interest in the lot of other men... But this good natured passion is nevertheless weak and always blind.*” (Kant, 1960, p. 58)

How might compassion shape moral judgment and action? In the broadest sense, morality refers to judgments and actions that people deem as right or wrong, obligatory with respect to maintaining a cooperative social order, and relevant to formal punishment and sanctions (Haidt, 2003; Turiel, 1983; de Waal, 1996). People in different cultures consider several domains of human action as moral (Haidt, 2007; Rozin, Lowery, Imada & Haidt, 1999; Shweder, Much, Mahapatra, & Park, 1997). These include: harm and suffering; freedom and rights; punitive and distributive justice; purity of mind and body; and fulfilling duties in the service of a group. Within an evolutionary framework, moral principles enable more cooperative groups, which reduce the likelihood of costly, adversarial conflict (Sober & Wilson, 1998) and increase the amount and quality of care given to vulnerable offspring (e.g., Hrdy, 2000).

The argument that emotions such as compassion figure prominently in moral judgment and action rests upon a few more specific claims (e.g., Haidt, 2003; McCullough, Kilpatrick, Emmons, & Larson, 2001). A first is that some emotions act as moral *intuitions*, or fast, automatic judgments of right and wrong within specific moral domains, which feed into moral judgments, for example about whether to punish or not or how to allocate resources (Damasio, 1994; Greene & Haidt, 2002; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Haidt, 2003, 2007; McCullough et al., 2001). A second is that emotions motivate relevant behavior within moral domains. For example, anger guides judgments about violations of individual freedoms and rights, and motivates specific actions within that domain, such as forms of punishment (Haidt, 2001; Lerner, Goldberg, & Tetlock, 1998).

Cast within this framework, one possibility is that compassion motivates moral judgment and action within the specific moral domain related to unjustified harm, a moral category recognized in almost all cultures that have been studied (Haidt, 2003; Vasquez, Keltner, Ebenbach, & Banaszynski, 2001). Several findings align with this hypothesis. As we have seen,

compassion is attuned to suffering and the needs of those who are vulnerable, and is sensitive to the responsibility or blameworthiness of the individual who suffers (e.g., Rudolph et al., 2004). In newly reported research, the trait like tendency to report elevated empathic concern predicted strong endorsements of government policies that reduce suffering and enhance the welfare of those in need, such as the elderly, the poor, or children (Smith, 2009). On the other end of the continuum, Blair and colleagues have found that extremely violent people showed little emotional reaction to those who suffer (e.g., Blair et al., 2004). In recent work, state and trait compassion amplified the sense of self-other similarity to those who are vulnerable, who suffer, and who are in need, suggesting that compassion elevates the sense of ingroupness those who suffer. State and trait compassion predicted increased sense of dissimilarity to those who are strong (Oveis et al., in press; but see Batson et al., 1997). In this sense the experience of compassion is a moral barometer (McCullough et al., 2001)—it closely tracks suffering, responsibility, vulnerability, and other harm-related concerns, and serves as an intuition that guides attitudes that seek to remedy unjustified suffering or need.

In keeping with this domain specific hypothesis, compassion should motivate harm-reducing actions (McCullough et al., 2001). The data relevant to this thesis are unequivocal. Batson and colleagues' definitive work has shown that felt empathic concern motivates altruistic actions toward those who suffer, even at a cost to the self (reviewed in Batson & Shaw, 1991). Work by Omoto and colleagues has found that felt empathic concern, a close relative of compassion, is a powerful motive of volunteerism, non-remunerated behavior that benefits non-kin (e.g., caring for the dying, the sick, or troubled children) with no expectation of reward (Omoto, Malsch, & Barraza, 2009). Compassion diminishes punitive tendencies toward wrongdoers (Rudolph et al., 2004). Compassion is a powerful proximal determinant of the reduction of suffering and sacrifice on behalf of others' welfare. The findings we have just reviewed align with the thesis that compassion is metaphorically a “guardian” of the moral domain of harm and undeserved suffering (Haidt, 2003).

A second possibility is that compassion guides moral judgment and action across different moral domains. This perspective predicts that compassion will guide judgments and actions not solely in the realm of harm and suffering, but in other moral domains as well, including in the domains of individual freedom and rights and bodily and spiritual purity. According to this hypothesis, for example, one would expect state or trait compassion to predict judgments of the increased seriousness of undeserved suffering (a domain specific prediction) and of violations of freedoms and rights and bodily and spiritual purity. In continuing with this line of reasoning, one would expect compassion not only to predispose the individual to take action to reduce undeserved suffering but also actions to increase others' freedoms or rights or purity. Empirical studies are revealing specific emotions to guide morally relevant judgment and action within specific domains: anger is associated with judgment and actions related to individual freedoms and rights (Rozin, Haidt, & McCauley, 1993); disgust is associated with judgments and actions relevant to purity but not other domains. Data conforming to this second hypothesis would suggest that compassion is a different kind of moral emotion, one that motivates morally relevant judgment and action across domains.

### **Neural Correlates of Compassion**

The search for distinct central neural correlates of compassion has emerged as an active area of inquiry (Immordino-Yang, McColl, Damasio, & Damasio, 2009; Kim et al., 2009). This research promises answers to intriguing questions. For example, does the neural representation of another person's undeserved pain differ from the neural representation of morally justified or retributive pain (Decety, Michalska, & Akitsuki, 2008; Singer et al., 2006)? Studies of central nervous system activity also offer the promise of testing some of the predictions that derive from our appraisal model of compassion without relying upon retrospective, self-report

measures, which are problematic with respect to verifying claims about appraisal (e.g., Parkinson & Manstead, 1992).

The conceptual analysis we have developed here points to two research strategies that could fruitfully guide the study of the neural correlates of compassion. A first is to compare compassion to the related states of distress, sadness, and love. No such study has made these direct comparisons, but separate lines of inquiry have documented neural correlates of these states, which we represent in Table 4. Although this literature is just emerging, it is interesting to note distinctions in central nervous system activity across these four states. For example, love has been associated with reduced activation in the amygdala and engagement of the orbital frontal cortex, which fits its more positively valenced core, and clearly differs from compassion. Also of note is the lack of activation in temporal parietal areas implicated in comprehending other's emotions and thoughts during induced states of sadness or personal distress (Adolphs, 2008; Pelphrey, Morris, Michelich, Allison, & McCarthy, 2005; Saxe & Wexler, 2005). The findings represented in Table 4 offer further evidence of distinctions between compassion and theoretically relevant states.

A second empirical strategy is to rely on our appraisal model of compassion to identify the specific neural processes associated with compassion-related appraisals. For example, a rich literature on the amygdala (Adolphs & Spezio, 2006; LeDoux, 2007; Phelps & LeDoux, 2005) suggests that detection of suffering during compassion would engage this region of the brain, and that appraisals of the degree of suffering would strongly correlate with activation in the amygdala (see Table 4). In a similar spirit, studies implicating dorsal medial and lateral prefrontal cortex in reappraisal-based emotion regulation, i.e. coping, justify investigating the role that these areas play in compassion in contrast to personal distress (Ochsner et al., 2004). Finally, extant research on the midbrain periaqueductal gray (PAG) is relevant. This phylogenetically old area supports maternal-infant attachment behaviors (Noriuchi, Kikuchi, & Senoo, 2008), suggesting that this region may be involved in a caregiving orientation towards those who are vulnerable or suffer, motivating compassionate responding.

In another line of speculation, appraisals of the relevance of the other to the self are also critical in the elicitation of compassion, and may specifically engage mid and ventral areas of the medial prefrontal cortex (mPFC) (Gusnard, Akbudak, Shulman, & Raichle, 2001; Harris, McClure, van den Bos, Cohen, & Fiske, 2007; Mitchell, Banaji, & Macrae, 2005). Two recent studies of compassion lend credence to this line of thinking. Compassion was induced by having participants see the self-relevance of another's suffering. Participants looked at sad facial expressions 'compassionately with a willingness to feel, share and understand the suffering of a person' during fMRI acquisition (Kim et al., 2009). In a second study, participants recalled 'compelling, realistic, and naturalistic' narratives that described other individuals' physically and socially painful experiences which they had previously reviewed with an experimenter (Immordino-Yang et al., 2009). Both studies reported increased blood oxygenation level dependent (BOLD) activation in the mPFC.

Finally, neuroscientific studies offer the promise of illuminating how approach tendencies and rewarding experiences are involved in compassion. This is important theoretically for it would point to a central nervous system process involved in the cost-benefit analyses we have suggested are critical to compassion, wherein the benefits of helping are appraised as outweighing the costs. On this, it is intriguing to note that in the 'looking at sad facial expressions' study described in the previous paragraph, self-reports of compassion towards the sad faces predicted greater activation in dopaminergic reward signaling areas (substantia nigra – SN, and ventral tegmental area - VTA). This finding provides preliminary evidence that there is an intrinsic reward to compassion, one that could help outweigh any costs or risks perceived in helping behavior. In seeking further to document the rewarding properties of compassion,

it could prove fruitful to ascertain whether compassion preferentially engages the left hemisphere, which has been associated with approach motivation (Davidson, Shackman, & Maxwell, 2004; Harmon-Jones, Lueck, Fearn, & Harmon-Jones, 2006).

Neuroscientific studies of compassion offer the promise testing whether compassion differs from related states at the neural level, and capturing the appraisal processes engaged by this emotion. The merging of our conceptual analysis of compassion and studies of relevant regions of the brain suggest that compassion involves detecting another person's suffering expressions (TPJ), mirroring their emotional experience (IFC, insula, temporal pole), assessing the relevance/deservedness of the sufferer (mid-ventral mPFC), coping with empathic distress (dorsal mPFC/IFC), feeling warmth/tenderness towards others (PAG, SN & VTA) and an overarching motivation to approach (heightened left hemisphere).

## Conclusion

Compassion has long had a problematic standing in the study of emotion (Lazarus, 1991). It has been most typically ignored in emotion taxonomies, and when considered, treated as empathic distress, or as subtype or blend of sadness and love. Our review reveals compassion to arise out of distinct appraisal processes, to have distinct display behaviors, distinct experiences, and an approach-related physiological response. The state like experience of compassion, and the trait like tendency to feel compassion, fall under the purview of three evolutionary arguments: that compassion evolved as part of a caregiving response to vulnerable offspring, that compassionate individuals were preferred in mate selection processes, and that compassion emerged as a desirable trait in cooperative relations between non-kin. We have highlighted areas in need of more research (culture, display, neural correlates). Empirical answers to questions about altruism (is a selfless form of altruism encoded in the genes?), morality (to what extent are basic moral judgments of harm and punishment driven by compassion?), and evolution (is compassion our strongest instinct?) lie on the horizon in the study of this important emotion.

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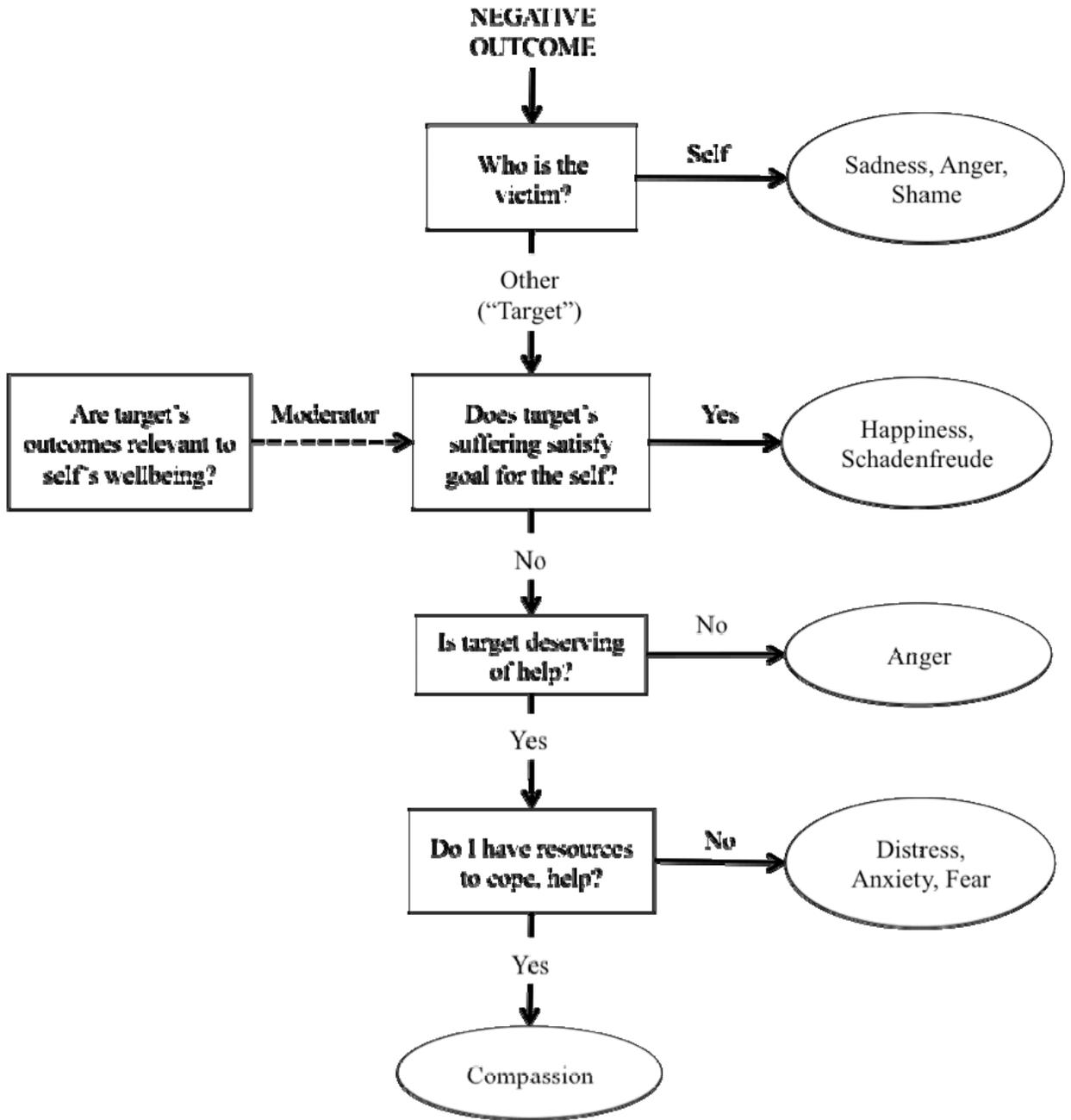
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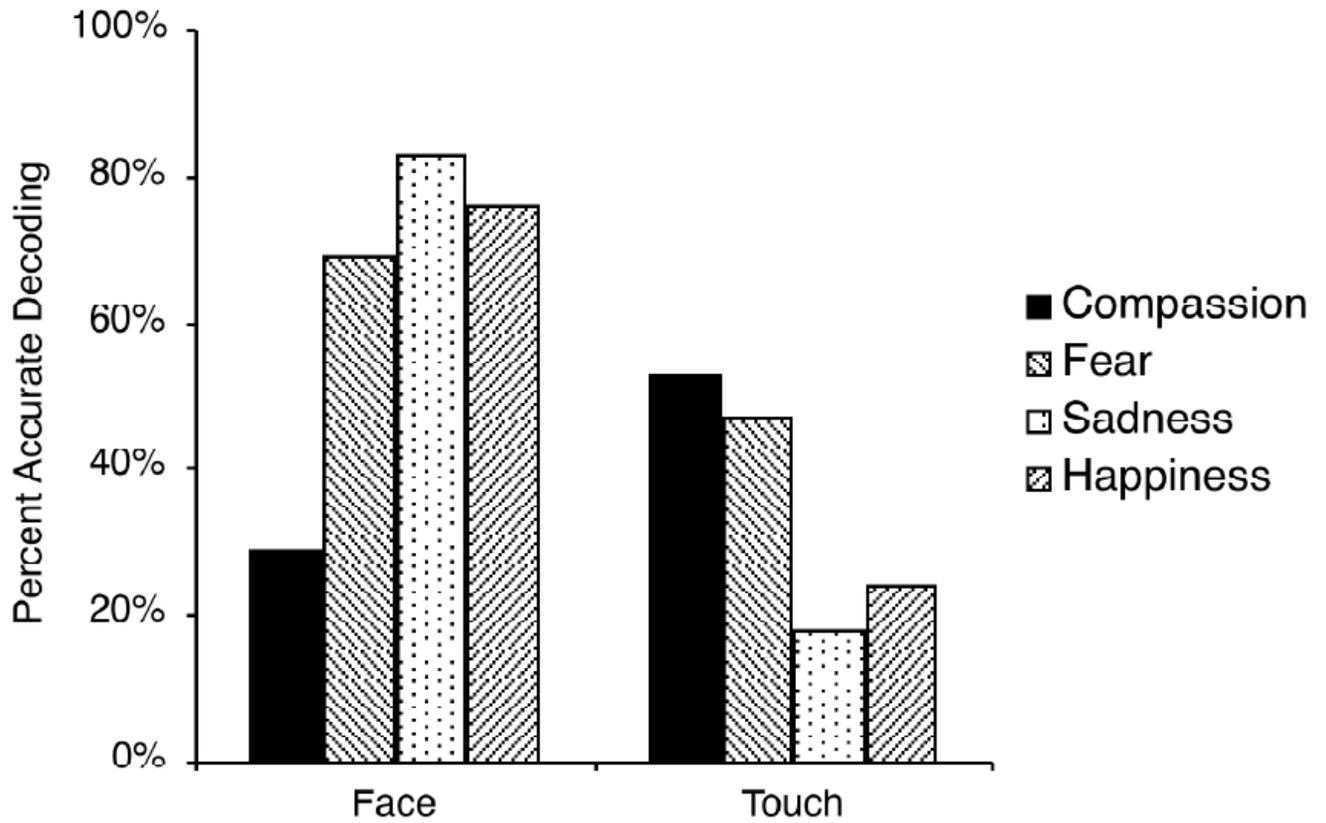
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**Figure 1.** Appraisal model of compassion displaying how witnessing negative outcomes leads to felt compassion with moderation of relevance to self.



**Figure 2.** Recognition accuracy of compassion, fear, sadness, and happiness by expression modality. Accuracy rates corrected for number of choices. Facial expression findings averaged from Haidt & Keltner (1999) and Keltner & Buswell (1996); touch findings from Hertenstein et al. (2006).

Table 1

## Theoretical Positions on Compassion as Emotion

Theorist	Quotation	Theoretical Position		
		Distinct Emotion	Vicarious Emotion	Variant of Love or Sadness
Batson (1991)	"[Empathy refers] to one particular set of congruent vicarious emotions, those that are more other-focused than self-focused, including feelings of sympathy, compassion, tenderness, and the like." (p. 86)	X	X	
Darwin (1871/2004)	"The all-important emotion of sympathy is distinct from that of love. A mother may passionately love her sleeping and passive infant, but she can hardly at such times be said to feel sympathy for it." (p. 129)	X		
Hoffman (1981)	Empathy "may be defined as a vicarious affective response to others: that is, an affective response appropriate to someone else's situation rather than one's own." (p. 128)		X	
Lazarus (1991)	"Compassion...is not a sharing of another person's emotional state, which will vary depending on what the other person's emotional experience seems to be, but an emotion of its own. In <i>compassion</i> , the emotion is felt and shaped in the person feeling, it not by whatever the other person is believed to be feeling, but by feeling personal distress at the suffering of another and wanting to ameliorate it. The <i>core relational theme</i> for compassion, therefore, is <i>being moved by another's suffering and wanting to help</i> ." (p. 289)	X		
Post (2002)	"Compassion... is love in response to the other in suffering; sympathy...is love in response to the other who suffers unfairly" (p. 51)			X
Shaver et al., 1986	"[S]ympathy ... seem[s] to refer to [a] mixture of sadness and love... [it is] a feeling of sadness for a person we care about... [it] share[s] antecedents—and perhaps responses as well—with both love and sadness." (p. 1082)			X
Sprecher & Fehr (2005)	" <i>Compassionate love</i> is an attitude toward other(s), either close others or strangers or all of humanity; containing feelings, cognitions, and behaviors that are focused on caring, concern, tenderness, and an orientation toward supporting, helping, and understanding the other(s), particularly when the other(s) is (are) perceived to be suffering or in need." (p. 630)			X
Trivers (1971)	"[T]he emotion of sympathy has been selected to motivate altruistic behavior as a function of the plight of the recipient of such behavior; crudely put, the greater the potential benefit to the recipient, the greater the sympathy and the more likely the altruistic gesture, even to strange or disliked individuals." (p. 49)	X		

**Table 2**  
**Antecedents, Appraisals, and Subjective Experience of the Compassionate Response**

Antecedents	Appraisals	Subjective Experience
Babies & children in need <sup>6,7,8,9,10,11,15</sup>	Self and goal relevance <sup>4,5,12</sup> Goal incongruence <sup>14</sup>	Adults (Multiple-item Measures): <sup>1,2,3,4,5,7,8,10,12,13,16,17</sup>
Distress vocalizations <sup>3,15,22</sup>	Target not responsible <sup>19,20,21</sup>	Compassionate
Pain <sup>1,3,11,16</sup>	Self able to cope/help <sup>14,16</sup>	Sympathetic,
Sadness <sup>1,6,7</sup>		Moved,
Illness, physical or mental disability <sup>6,9,10</sup>		Tender
Homelessness <sup>1,5</sup>		Warm,
Poverty <sup>8</sup>		Softhearted
Victims of catastrophe or loss <sup>1,4,7,16</sup>		Touched
		Adults (Single-Item Measures):
		Sympathy <sup>18</sup>
		Pity <sup>20,21</sup>
		Children: <sup>6,7,9,11,12,13</sup>
		Sorry for other
		Concern for other

Note

<sup>1</sup> Batson et al., 1989;

<sup>2</sup> Batson et al., 1987;

<sup>3</sup> Batson et al., 1983;

<sup>4</sup> Batson et al., 1997;

<sup>5</sup> Cialdini et al., 1997;

<sup>6</sup> Eisenberg, Fabes, et al., 1988;

<sup>7</sup> Eisenberg, Fabes, et al., 1989;

<sup>8</sup> Eisenberg, Fabes, et al., 1994;

<sup>9</sup> Eisenberg, Fabes, Schaller, Carlo & Miller, 1991;

<sup>10</sup> Eisenberg, Fabes, Schaller, Miller, et al., 1991;

<sup>11</sup> Eisenberg, McCreath, & Ahn, 1988;

<sup>12</sup> Eisenberg & Miller, 1987;

<sup>13</sup> Eisenberg, Schaller, et al., 1988;

<sup>14</sup> Ellsworth & Smith, 1988b;

<sup>15</sup> Fabes et al., 1994;

<sup>16</sup> Mikulincer et al., 2001, 2005;

<sup>17</sup>Oveis et al., in press;

<sup>18</sup>Reyna & Weiner, 2001;

<sup>19</sup>Rudolph, Roesch, Greitemeyer, & Weiner, 2004;

<sup>20</sup>Weiner, Graham & Chandler, 1982;

<sup>21</sup>Weiner, Perry, Magnusson, 1988;

<sup>22</sup>Zahn-Waxler, Friedman, & Cummins, 1983.

**Table 3**  
**Studies of Nonverbal Compassion Cues by Method**

Expression Component	Observational Studies	Recognition Studies
Orientation		
Eye gaze towards partner	Guthrie et al. (1997)	Haidt & Keltner (1999) Keltner & Buswell (1996)
Head & body orientation to partner	Eisenberg, Fabes, et al. (1989) Eisenberg, Schaller, et al. (1988) Eisenberg et al. (1991) Guthrie et al. (1997)	
Forward lean	Eisenberg, Schaller, et al. (1988)	Haidt & Keltner (1999) Keltner & Buswell (1996)
Touch	Hertenstein et al. (2006) Zahn-Waxler et al. (1992)	Hertenstein et al. (2006)
Facial Expression		
Oblique eyebrows	Eisenberg, McCreath & Ahn (1988)	Haidt & Keltner (1999) Keltner & Buswell (1996)
Furrowed eyebrows	Eisenberg, Fabes, et al. (1989) Eisenberg, Schaller, et al. (1988) Eisenberg et al. (1991) Guthrie et al. (1997)	
Lower eyelid raised	Eisenberg, Fabes, et al. (1989) Eisenberg, Schaller, et al. (1988) Eisenberg et al. (1991) Guthrie et al. (1997)	
Slight mouth press	Eisenberg, Fabes, et al. (1989) Eisenberg et al. (1991) Guthrie et al. (1997)	Haidt & Keltner (1999) Keltner & Buswell (1996)

**Table 4**  
**CNS Regions Implicated in Compassion versus Related States of Personal Distress, Sadness and Love\***

	Amygdala	ACC	mPFC	OFC	IFC/aInsula	Temp. Pole	VTA/SN/VS	TPC	PCun/PCC
Compassion	↑ <sup>1,2</sup>	↑ <sup>1,2</sup>	↑ <sup>1,2</sup>	--	↑ <sup>1,2</sup>	↑ <sup>2</sup>	↑ <sup>2</sup>	↑ <sup>1</sup>	↑ <sup>1</sup>
Personal Distress	↑ <sup>5</sup>	↑ <sup>3,4</sup>	↑ <sup>3,4</sup>	--	↑ <sup>4</sup>	--	--	--	↑ <sup>3</sup>
Sadness	↑ <sup>6</sup>	↑ <sup>7,8</sup>	↑ <sup>6,8</sup>	--	↑ <sup>6,7,8</sup>	↑ <sup>8</sup>	--	--	↑ <sup>6,8,17</sup>
Love*	↓ <sup>9</sup>	↑ <sup>9,13</sup>	--	↑ <sup>10,11</sup>	↑ <sup>9,11,13</sup>	↑ <sup>9,10</sup>	↑ <sup>9,12,13</sup>	↑ <sup>13</sup>	↓ <sup>9</sup>

Note. ↑=increased BOLD activity, ↓=decreased BOLD activity, --= inconsistent/unreported activation. ACC = anterior cingulate cortex, mPFC = medial prefrontal cortex, OFC=orbital frontal cortex, IFC/Insula = Inferior frontal cortex and anterior insula, Temp.pole = temporal Pole, VTA/SN/VS = ventral tegmental area, substantia nigra and ventral striatum, TPC = temporal parietal cortex, PCun/PCC = precuneus and posterior cingulate cortex.

\* Neuroimaging studies of love include 'early intense infatuation', 'romantic/committed', 'maternal' and 'unconditional' subtypes.

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<sup>1</sup> Immordino-Yang, McColl, Damasio, & Damasio, 2009,

<sup>2</sup> Kim et al., 2009,

<sup>3</sup> Sinha, Lacadie, Skudlarski, & Wexler, 2004,

<sup>4</sup> Liberzon et al., 2007,

<sup>5</sup> Costafreda, Brammer, David, & Fu, 2008,

<sup>6</sup> Goldin et al., 2005,

<sup>7</sup> Damasio et al., 2000,

<sup>8</sup> O'Connor, Gundel, McRae, & Lane, 2007,

<sup>9</sup> Bartels & Zeki, 2004,

<sup>10</sup> Nitschke et al., 2004,

<sup>11</sup> Noriuchi, Kikuchi, & Senoo, 2008,

<sup>12</sup> Fisher, Aron, & Brown, 2006,

<sup>13</sup> Beauguegard, Courtemanche, Paquette, & St-Pierre, 2009.