

DISSERTATION

CLARIFYING THE CONSTRUCT OF COMPASSION:  
ABILITY TO DOWNREGULATE EMOTION AS A POTENTIAL MEDIATOR  
BETWEEN EMPATHIC AROUSAL AND COMPASSION

Submitted by

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## ABSTRACT

### CLARIFYING THE CONSTRUCT OF COMPASSION: ABILITY TO DOWNREGULATE EMOTION AS A POTENTIAL MEDIATOR BETWEEN EMPATHIC AROUSAL AND COMPASSION

The association between empathy and compassion was examined in a sample of Americans aged 35 to 86, using national survey and phone interview data, biological data, and neuropsychological data. Given the postulation that empathy is a necessary, but not sufficient, condition for compassion to emerge, compassion is conceptualized here as an emergent process that is contingent upon empathic arousal. The degree to which an experience of empathic arousal translates into compassion is hypothesized to depend upon an individual's ability to downregulate the emotional response associated with empathic arousal, which is conceptualized as physiological upregulation in response to witnessing another's suffering. If this hypothesis is supported, then the ability to downregulate physiological processes associated with empathic arousal should mediate a positive association between the activation of empathic feelings and engagement with compassionate behavior. While empathic arousal was found to predict compassion, we were unable to infer that downregulation processes mediated the relationship. The results of this study present preliminary findings that may inform future work aiming to clarify the construct of compassion. The results may also provide useful groundwork for future work about "compassion fatigue" and about how the emergence of compassionate action in therapeutic interactions can be cultivated.

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## Chapter 1: Introduction

Compassion, and the ability to engage with it regularly, is critical for counseling psychologists. Yet, prosocial concepts such as empathy and compassion lack definitional clarity within psychological literature, and the relationship between them is not well understood. Compassion is not typically addressed in a formal or experiential way by academic counseling psychology programs, perhaps because it is trusted to be implicit within individuals. Training prioritizes the theoretical, structural, and analytical aspects of counseling, providing tools and channels to guide pre-existing prosocial impulses, without necessarily focusing on the explicit cultivation of compassion. Compassion seems to be tacitly defined as an exhaustible, but renewable personal resource, prone to diminish in trying circumstances. Indeed, attention to compassion in the contemporary psychological literature primarily addresses the circumstance wherein compassion seems threatened, or in short-supply. The term "compassion fatigue" was introduced to the literature in recent decades (Figley, 1995), warning of certain dangers of working in a helping profession and prescribing tips for avoiding or coping with this problem (Kraus, 2005; Figley, 1995; 1997; Hellman, Morrison, & Abramowitz, 1987). But due to murky understanding and lack of consensus amongst counseling psychologists about how compassion is defined in the first place, it is unclear what exactly is suggested to be fatiguing, and upon what epistemological basis advice about compassion fatigue can be trusted as valid.

An extensive epistemological history of compassion may illuminate how compassion has been conceptualized as a construct more broadly; it may also highlight the potential for refinements in how academia conceptualizes compassion as it relates to clinical work. Maintaining resilience while engaged in the challenging therapeutic work of bearing witness to

human suffering rightfully should be of concern to counseling psychology, but without a nuanced and functional understanding of what empathy and compassion are, how and when they arise, and how they relate to each other, cautionary prescriptions about compassion fatigue may lack utility. Without thorough understandings of the nature of prosocial concepts that are hallmarks of clinical work, it is unclear whether or not contemporary counseling psychology training programs do their just duty by not addressing compassion (or its behavioral antecedents) in a more direct manner, as a core competency in counseling.

To address these ambiguities and concerns, the proposed study aims to empirically examine a critical component of a theoretical model of compassion that was formally hypothesized by Joan Halifax, a pioneering scholar-philosopher in the area of socially-engaged Buddhism (Halifax, 2012). Halifax's model, informed by multiple disciplines including psychology, neuroscience, and Buddhist philosophy, suggests that compassion is an emergent process, rather than a discrete feature, arising from a series of contingent preconditions, including empathic arousal. A cornerstone of Halifax's model is that the emergence of compassionate behavior in a practitioner in a helping field (such as a doctor, nurse, or counselor) depends not just on the capacity to be empathically aroused, but on the ability of the practitioner to downregulate this physiological response; only then can higher order functions be sufficiently accessed, leading to a synthesis that supports the emergence of compassion. The proposed study aims to explore this hypothesized link between empathic arousal, physiological downregulation of emotional response, and compassion, using pre-existing data. Findings about the functional relationship between empathic arousal and compassion may contribute to a more informed understanding of how compassion emerges and how it is cultivated and maintained, providing important implications for the training and practice of counseling psychology.



## Chapter 2: Background and Review of Related Literature

### *Compassion, in Psychological Research*

A concept long neglected in Western psychology and overlooked in modern Western culture (see Gilbert 2005; Ladner, 2004, for reviews) compassion is generally defined as deep awareness of the suffering of another, coupled with the wish to relieve it. It has been postulated to be comprised of a three-part experience of noticing another's pain, feeling with another, and responding in some way (Kanov et al., 2004). In the last three decades, the construct of compassion has emerged as an important concept in studies of mental health and psychological therapy (see Kanov et al., 2004, for a review). Goetz, Keltner, & Simon-Thomas (2010) pointed out that controversy continues surrounding the construct of compassion, because despite pervasive theoretical claims and numerous studies of a state-like episode of compassion, the construct 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). Descriptions of compassion in research have been varied and divergent, including classifications as: an emotion (e.g., Batson, 1991; Haidt, 2003; Sober & Wilson, 1998), an attitude (Blum 1980; Sprecher & Fehr, 2005), a general benevolent response to others regardless of suffering or blame (Post, 2002; Wispé, 1986); 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 a subtype or variant of love (e.g., Post, 2002; Sprecher & Fehr, 2005; Underwood, 2002). Despite the lack of clear consensus about what compassion is as a construct, contemporary studies have examined associations of compassion with other demographic or personal traits, such as socioeconomic

status (Stellar, Cohen, Oveis, & Keltner, 2012), attachment (Mikulincer & Shaver, 2005), psychopathology (Macbeth & Gumley, 2012), and religiosity/spirituality (Saslow et al., 2013), to name a few. According to Goetz and colleagues (2010), there has yet to be an integrative review of the evidence relevant to the question "What is compassion?".

### *Distinguishing Compassion from Related Constructs: Sympathy, Pity, and Empathy*

Recent psychological research has attempted to provide greater construct clarity, and delineate differences between compassion, sympathy, pity, and empathy. Several studies in this area have focused on compassion as a basic human instinct, and classified it as a form of evolved prosocial or moral behavior (e.g., Goetz et al., 2010; Oveis, Horberg, & Keltner, 2010; Keltner & Lerner, 2010; Keltner, Haidt, & Shiota, 2006). Researchers in this corner have defined compassion a feeling that arises in witnessing another's suffering, which motivates a subsequent desire to help (Goetz et al., 2010; Lazarus, 1991; Nussbaum, 1996; 2001). This definition clearly differentiates compassion from *empathy*, which refers to the vicarious experience of another's emotions (Lazarus, 1991). Empathy has been defined 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), and a scale for "empathic concern" was developed that "assesses 'other-oriented' feelings of sympathy and concern for unfortunate others" (Davis, 1983, p. 114). Compassion is thought to encompass a slightly broader set of states than sympathy (Nussbaum, 1996). 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 et al., 2007; Feather, 2006; Post, 2002; Wispé, 1986). The term *pity* is sometimes used to describe a state close to what is thought of as compassion

(e.g., Aristotle's usage of the term, 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).

Compassion is thought to be distinct from empathy, as empathic feelings may include feelings of concern, along with arousal and/or distress. A distinction between empathy and personal distress was suggested in 1981 (Hoffman) and in 1991 (Batson), with the acknowledgment that people sometimes experience "empathic overarousal". Further research by Eisenberg & Fabes (1992) argued that empathic overarousal, if aversive, is experienced as personal distress. Personal distress is thought to involve empathic arousal, but is linked with higher levels of physiological arousal than is sympathy (Eisenberg, Fabes & Spinrad, 2006). The idea that empathy may entail distress of some sort has been supported by a substantial body of neuroimaging studies of empathy, which have shown that by observing another's emotional state, part of the neural circuitry underlying the same state becomes active in oneself, whether it is disgust, pain or social emotions (Singer et al., 2004; Ruby & Decety, 2004; de Vignemont & Singer, 2006; Sommerville & Decety, 2006). For these reasons, the current study refers to a state of empathic engagement as "empathic arousal", rather than just empathy, in order to differentiate empathy from compassion, and to highlight the full suite of empathic feelings (to include distress or arousal) that may coincide with concern when witnessing the suffering of another.

Contemporary studies in psychology have not delved more deeply than this into the fundamental relationship between empathic arousal, physiological arousal, distress, and compassion. Instead of exploring the fundamental construct of compassion and these likely antecedents, much recent research has turned towards applied studies of variants of the theme of

compassion, such as self-compassion (e.g., Neff, 2005; 2012; Barnard & Curry, 2011; Patsiopoulos & Buchanan, 2011), or compassion fatigue (e.g., Figley 1995, 2002; Adamis, Boscarino, & Figley, 2006; Kraus, 2005). Indeed, it currently appears that the most ubiquitous research on the theme of compassion as it relates to the training and practice of counseling psychology are studies about these construct variants (self-compassion or compassion fatigue), which perhaps represent the most prominent compassion-related discourse in counseling psychology at the moment.

### *Compassion Fatigue*

Losing one's ability or desire to continue helping clients is a fearsome concept amongst psychotherapists, nurses, hospice workers, doctors, and other professionals whose jobs entail interaction with human suffering. One incarnation of this concept, which has made its way into psychology parlance and now holds a small but substantial corner of the psychological literature, is compassion fatigue, generally understood as the phenomena of a clinician tiring out of empathetic action to alleviate another's suffering. The term "compassion fatigue" was coined in 1992 by Carla Joinson, RN, while researching burnout in emergency department nurses, when she noticed some nurses had lost their "ability to nurture" (Joinson, 1992). Figley (1995) further developed the concept and introduced it to psychological literature, with a focus on trauma work and how mental health professionals in this arena appeared to vicariously experience the effects of trauma. Figley used the concept of compassion fatigue to describe the consequence of working with traumatized individuals, if the professional was exposed to significant numbers of them and had a strong empathic orientation (Figley, 1995). Empathic engagement with traumatized clients often requires the professional to discuss details of the traumatic experience, including role playing and dramatic reenactment of the events, which are thought to be vital to

the therapeutic process but can have an adverse emotional impact on the caregiver (Figley 2002a, 2002b). Compassion fatigue has been conceptualized as a type of vicarious trauma, sometimes referred to as *secondary traumatic stress* (Boscarino, Figley, & Adams, 2004).

### *Re-Imagining Compassion Fatigue: Epistemological Considerations*

At this point, it is worthwhile to pause and consider deeper epistemological issues surrounding the concept of compassion, for two important reasons. First, as summarized above, the controversial and divergent nature of conceptualizations of compassion in psychological research has not resulted in clear scientific consensus about how the construct of compassion should be approached in scientific research. Second, the formulation of the current study is informed not just by literature from the field of psychology, but from epistemologies outside of psychological science's purview that deserve explanation. Particularly of note is the fact that the concept of "compassion fatigue", as made notorious in literature related to the field of counseling, makes little conceptual sense, or may even seem an oxymoron, according to the theoretical and epistemological underpinnings of the model of compassion tested by the current study. Compassion's deep epistemological roots are relevant to the background of the current study, and will also help elucidate how this study and its related lines of research present a challenge to current conceptions of compassion in counseling psychology.

Before we can agree as a scientific community that compassion fatigue is a true entity, we must first address the concept of compassion itself, as compassion has been proposed as the entity that may reach a saturation point. Towards this aim, we stand to benefit from considering: how has the concept of compassion evolved, as it has been incorporated into the milieu of psychological science? As research scientists and scholar-practitioners, is our formulation of compassion correct and sufficient, and as scientifically and pragmatically fertile as it could be?

Along its epistemological journey, did the concept change, sustain refinements, or differentiate from its roots, when it entered literature related to the field of clinical work? Earnestly pursuing these questions could better ground future empirical inquiries into compassion and compassion fatigue, and foster refreshed understanding about the relevance of compassion to psychotherapy. Compellingly, re-imagining compassion may bring into question our adherence to current doctrine about how we've imagined compassion fatigue within psychotherapy. Challenging existing assumptions about what compassion is and how it has been conceptualized within psychology may even entail, importantly, greater consideration of the spiritual dimension of healing-- one that has perhaps been overlooked within the context of academic inquiry about compassion and compassion fatigue.

*The Far Past: Theological and Philosophical Roots of Compassion*

The word "compassion" derives from the Latin roots, *passio* (suffering) and *com* (with), meaning, to suffer with another (Kanov et al., 2004). The concept of compassion itself, however, arose independently in different cultures and religions, suggesting that the potential to feel and experience compassion is a universal human quality, unlimited by time or geographical space. Collectively and historically, compassion has been conceptualized as an innate component of human response to suffering, and has been proposed to lie at the core of what it means to be human (Himmelfarb, 2001; Wuthnow, 1991). It has been suggested as an important factor in the creation and sustenance of human community (Clark, 1997; Nussbaum, 1996; 2001), and described as a virtue that contributes to personal and social good (Blum, 1980; Nussbaum, 2001; Solomon, 1998; Wuthnow, 1991). Documented discussions about the meaning of compassion as a human experience date back over two thousand years, within the domains of religion, philosophy, and sociology (Kanov et al., 2004).

In translations of ancient texts spanning multiple religions, references to compassion reoccur emphatically in religious teachings, and have remained remarkably constant, despite fundamental differences in philosophy and tradition (Nussbaum, 1996). In Judaism, for example, God is the Compassionate and is invoked as the Father of Compassion (Lampert, 2006), and *Rahmana* (Compassionate) becomes the usual designation for His revealed word, with *rahman* frequently cited in the Quran (see Compassion, 2002-2012). The feeling of sorrow towards a person in distress, coupled with the desire to relieve it, is ascribed alike to man and God, which in biblical Hebrew is referred to as *riham*, from *rehem*, meaning the mother or womb. Compassion is described as having 13 attributes, and likened to the feeling of a parent for a child (see Compassion, 2002-2012). In the Muslim tradition for adherents of Islam, similarly, mercy and compassion (*rahman* and *rahim*, in Arabic) are considered foremost amongst God's attributes, and each of the 114 chapters of the Quran, with one exception, begins with the verse, "In the name of Allah the Compassionate, the Merciful". In Christianity, God is spoken of as the "Father of compassion" and the "God of all comfort", and the Parable of the Good Samaritan endorses the idea that compassion should extend to all, even to include loving one's enemies. The idea of extending compassionate love to all living beings is a central tenant of Hindu philosophy, expounded upon by Gandhi and other Hindu philosophers (Tripathi & Mullet, 2010) and the Tamil Veda (written between 200 BC and 400 AD, also called the Tirukkal) dedicates Chapter 25 of Book 1 to compassion; in this chapter, it is suggested that one must pursue one's life path with compassion, that all life deserves one's love, and that charity without compassion is empty and inconceivable (Pope, 1886). Likewise, compassion for all life, human and non-human, is central to the Jain tradition. Finally, compassion (Karuna) is a central tenet of Buddhism, and one of the four aspects of heart opening or universal love known as the

Four Brahmaviharas: lovingkindness (Metta), compassion (Karuna), sympathetic joy (Mudita) and equanimity (Upekkha). In Buddhist philosophy, the basic nature of human beings is considered to be compassionate; all human beings are thought to possess "Buddha nature" (Henkel, 2011).

Notably, the philosophical forebears of western science did not necessarily see compassion with such rosy-tinted glasses, or imbue it with the same virtuousness and purity as its religious history conveys. Early Greek and Roman philosophers (such as Aristotle, and later on, Thomas Aquinas) felt some degree of distrust towards compassion, placing reason above it as the proper guide to conduct (Szarz, 1994). They frequently regarded compassion as an affect, rather than a virtue, neither admirable nor contemptible. The idea that compassion is a type of passion (see Szarz, 1994, for a historical review) and that passion can be dangerous, planted seeds in the epistemology of compassion that perhaps had astronomical impact upon the evolution of the concept, possibly helping to explain the seemingly wide girth between the no-holds-barred religious embrace of the construct, and the somewhat more cautious, skeptical approach to investigating compassion that has developed within western science today. Modern scientific skepticism seemed to reverberate in Aristotle's cautionary words (from the year 350 B.C.), when he wrote:

Now, neither the virtues nor the vices are *passions*, because we are not called good or bad on the ground of our passions... For he who lives as passion directs will not hear argument that dissuades him, nor understand it if he does... passion seems to yield not to argument, but to force (Szarz, 1994, pg. 4) .

During the Roman period and the middle ages, the Roman goddess of justice is a blindfolded woman whose virtue is dispassion, not compassion (Szarz, 1994), aligned with changing



attitudes and the idea that science demands a dispassionate, rational, empirical approach to ensure that our passions do not sabotage the process and contaminate scientific method. Hannah Arendt, a German-American political theorist and philosopher of the 20th century, described the philosophy of ancient Greeks and Romans as

...wholly at odds with the great esteem for compassion of modern times...the ancients regarded the most compassionate person as no more entitled to be called the best than the most fearful. The Stoics saw compassion and envy in the same terms: 'For the man who is pained by another's misfortune is also pained by another's prosperity' (Szar, 1994, pg. 5).

Thus, in early Greek and Roman philosophy, the divide between science and spirituality-- which has come to characterize much of our modern Western scientific approach to fuzzy, feeling-centered, spiritual concepts like compassion-- was already being reinforced.

*The Recent Past: Compassion as it Developed in Western Philosophy and Science*

Entering into the Renaissance period, while some philosophers expanded upon ideas of skepticism and even cynicism about various aspects of human thought and behavior, sometimes delving into thoughtful accounts of the darker or less flattering sides of humanity (e.g., Michel de Montaigne; Niccolo Machiavelli), other philosophers venerated the concept of compassion. Jean-Jacques Rousseau, for instance, worked towards liberating the concept from the dialectical tension between the mind-centered and heart-centered bases for action that was clearly present by the 18th century. Rousseau regarded compassion, for the undeserving in particular and for mankind in general, to be the greatest of the virtues (Younkins, 2005), and sought to prevent compassion from degenerating into an egocentrism as destructive as the egocentrism it seeks to combat (Hanley, 2010). So central was the concept of compassion to Rousseau that the basic

idea of his iconic document, *The Social Contract* (the political treatise which earned him exile from his home city of Geneva, and which contributed fodder to inspire the French Revolution), was that political institutions should allow the rule of compassion to provide the basis for legislation (Dammann, 2012). As rationalism and naturalism gained traction in ensuing decades, laying the groundwork for the formal founding of psychology in the 19th century, dialectical tension between the mutually complementary (yet opposed) ideas of gaining understanding via intuition, feeling, or sentiment, versus gaining understanding via empirical exploration and observation, only became more trenchant to scientists and philosophers alike. Perhaps this division was significant in guiding contemporary society's seeming tendency to furlough much of the discourse about compassion to spiritual, non-scientific domains. When Wilhelm Wundt emphasized that scientists should pursue manageable, well-defined problems that lent themselves to the techniques and equipment available at the time (Viney, 1993), and Franz Brentano defined psychology as the science of mental phenomena (Viney, 1993), the idea of scientifically studying something as sentimental and elusively spiritual as compassion was simply not a priority. As psychology moved towards the direction of understanding the nuts and bolts of how mental processes work (ushering in the era of functionalism, and then, behaviorism), scientific interest in compassion did not strongly emerge in psychology until the 20th century. This is likely primarily because the first psychological clinic did not open until 1896 (Plante, 2005). Therefore, within clinical psychology, the 19th century was more concerned with issues of assessment than treatment, and clinical issues related to therapy and treatment did not emerge until the 20th century.

*The Present: Compassion, and Compassion Fatigue, in Contemporary Academia versus Eastern Spiritual Traditions*

Discourse surrounding compassion seems dispassionate, and even a bit disheartening, when one considers the bulk of social psychology literature on the topic, which has helped delineate what appear to be the limits of human compassion, or the conditions which seem to foster or dissuade its development. For instance, when scientists examined the motivated regulation of compassion in the context of large-scale crises, such as natural disasters and genocides, much research has established that people tend to feel more compassion for single identifiable victims than for large masses of victims; however, this collapse of compassion depends on having the motivation and ability to regulate emotions, as people only show less compassion for many victims than for single victims of disasters when they expect to incur a financial cost of helping, and only when they can skillfully regulate their emotions (see Cameron & Payne, 2011). Further research is exploring how concerns about becoming emotionally exhausted may motivate people to curb their compassion for--and dehumanize--members of stigmatized social groups, such as homeless individuals and drug addicts (Cameron, Harris, & Payne, in prep).

Given this pragmatic approach to compassion and the philosophical roots behind the drive to operationalize compassion as a capacity of an individual (along with capacities for other passions, like aggression or violence) that may be evoked under certain conditions or only exist in limited supply, it is not surprising that within literature related to caregiving vocations (e.g. psychology; nursing) we have employed phrases such as compassion fatigue, compassion saturation, and compassion stress, implying that compassion is a measurable, exhaustible resource. Meanwhile, studies of the conditions that may lead to the cultivation, support,

maintenance, or even creation of compassion, have been rare, or nonexistent. The contrast between science's glass-half-empty take on compassion is striking against the more optimistic religious or spiritual writings about compassion, perhaps an illustration of how humankind tends to ascribe religious, non-human deities the qualities we find admirable and noble to strive for, yet idealistic, if not super-human.

### *Compassion as a Discrete, Exhaustible Resource*

Psychological literature on compassion fatigue has identified the following warning signs of compassion being exhausted: trouble sleeping, amplified physical reflexes, irritability, anxiety, hyper vigilance, and diminished interest in regular activities (Figley, 1995).

Compassion fatigue is thought to develop as a consequence of being fully available and present for clients, because therapists may become so involved in the client's suffering that they develop compassion fatigue (Lum, 2000). Therapists who become "too emotionally involved with their clients" are thought to be at risk for burn out (Fish, 2000; Banmen, 1997). As a protective measure, therapists are encouraged to engage in self-care, foster a sense of achievement, practice emotional separation or distancing from clients in between sessions by "disengaging", and maintain clear boundaries (Kraus, 2005; Figley, 1995; 1997; Hellman et al., 1987). While these conceptualizations of compassion fatigue, and antidotes to it, have gained traction within current western psychological science, it is fascinating to consider the ways in which they run counter to current, equally pragmatic and (arguably) scientific Buddhist views of compassion.

### *Contemporary Buddhist Thought about Compassion*

Buddhism and science have developed a unique relationship, as Buddhism, though a religion, does not mandate belief in super-human deities, and has a history of reliance on observation, interest in empirical experience, and rejection of metaphysical speculation (Cho,

2012). The dialogue between Buddhism and science has been particularly fruitful in this modern age, blossoming into scientific investigations of the "technology" of Buddhist meditation and its theory of mind (Cho, 2012). By comparing current Buddhist views on compassion (and hence, compassion fatigue) to current views within the academy of psychological science, we encounter a clear disparity of philosophical and observational accounts of compassion that reflects the greater epistemology of the concept. As outlined here, these disparities date back to antiquity within both lineages, beckoning for greater conceptual resolution and integration.

Buddhists would likely advise the opposite of disengaging or distancing oneself from a client, and endorse the idea of doing precisely the opposite: increasing intimacy with both self and other, by more deeply experiencing the interconnectedness and oneness of human suffering and experience. This prescription is based on what is perhaps a fundamentally different conception of what compassion is, how it originates, how it is maintained in the first place, and whether or not it is something that- if practiced correctly- could ever conceivably "fatigue". Moreover, in Buddhist dialogue on the subject, compassion is not described as a discrete feature or human virtue, per se, but more akin to a process or general diffusive quality. Chögyam Trungpa (meditation master & founder of Naropa University, the first Buddhist university in North America) describes compassion as something that "develops, grows, and ferments" by itself, and does not require any effort (Trungpa, 1973). Compassion, in his view, is basic warmth, an organic, spacious, and generous quality filled with spontaneously existing joy (see Trungpa, 1973, for a review). He conveys that for Buddhists, compassion contains all sorts of "heroic, juicy, positive, visionary, expansive" qualities, implies larger-scale thinking, and implies a freer way of relating to yourself and the world. Interestingly, and completely at odds with the idea of "compassion fatigue" as it is outlined within Western psychological literature, Trungpa contends

that compassion automatically invites a person to relate with other people, because it is no longer possible to regard people as a drain on energy. Others are thought to recharge personal energy, because in the process of relating with them, a person acknowledges their own wealth and richness. Trungpa implies a nuance of compassion that may help scientists re-imagine compassion in ways that could lead to scientific innovation. For instance, he further explains that true compassion requires only acknowledgment rather than maintenance, and furthermore:

You do not have to *feel* compassion. That is the distinction between *emotional* compassion and *compassion* compassion: you do not necessarily feel it; you *are* it.

Usually, if you are open, compassion happens because you are not preoccupied with some kind of self-indulgence (Trungpa, 1973, pg. 82).

The idea that compassion can be true or false, or subverted by self-indulgence, is echoed by other Buddhist leaders who have discussed the problem of compassion corrupted by ego. Indeed, in Buddhist conceptions, ego and compassion appear to be somewhat antithetical. Compassion is thought to "contain fundamental fearlessness, without hesitation...marked by tremendous generosity", and "this 'generous fearlessness' transcends the animal instinct of ego" (Trungpa, 2004); while the ego is considered to be an illusion of self that necessitates acknowledgment, such that illusions of self can be accurately perceived. Generally in Buddhism, the idea of building up illusory ideas about yourself (or others) that distance you from others is considered to be problematic, which is why meditation is considered to be a valuable practice: it entails intimate exploration of, or deconstruction of, constructs of the self and the ego (see Bhikkhu, 1999; Rinpoche, 1998; Midal, 2005, for reviews).

*Halifax Model: A Theoretical Model of Compassion*

The nuances of compassion, and potential subverting forces-- particularly within highly emotionally charged clinical contexts-- have been further elucidated by Joan Halifax, Ph.D, a Buddhist priest and anthropologist by training, with special interest in the intersections of neuroscience, psychology, Buddhism, and applied clinical work. She is perhaps most well-known for having developed a training program for hospice workers about how to support the dying. Halifax (2011) explains that in Buddhism, two main streams of compassion are identified: referential compassion and nonreferential compassion. Referential, or biased compassion, is compassion that has an object. Referential compassion has several subcategories, including compassion that arises through biological, sexual, or attachment bonds, through identifying with someone who has encountered suffering that we can personally relate to, or through ethical reasoning or moral imperative. Nonreferential or unbiased compassion, however, is compassion that has no object. Nonreferential, or unbiased compassion, is a form of pervasive compassion that is thought to arise from an experience of interconnectedness, which gives rise naturally to the wish for freedom from suffering for all. Halifax goes on to explain the "near and far enemies of compassion", some of which are not easy to detect, such as fear, grief, pity, anxiety, and righteous anger-- all expressions of personal distress (Halifax, 2011). Halifax seems to be suggesting that it is not appropriate to think that by merely retreating from clinical work, we can restore resiliency and avoid burn-out or fatigue. She firmly advocates that we must "focus attention on our own spiritual resources to support our work", and develop "a spiritual practice such as compassion meditation to have the strength and perspective to acknowledge the pain and suffering in others and ourselves and develop and appropriate ant transformative relationship to suffering through insight and the regulation of our emotions" (Halifax, 2011).

The seeming impasse between Buddhist and Western conceptualizations of compassion suggests the compelling idea that Western conceptions about compassion fatigue may place an inordinate amount of causality upon factors external to a practitioner (e.g., case load, clinical severity), while possibly neglecting to fully appreciate factors internal to a practitioner (e.g. the practice of referential/biased compassion instead of non-referential/unbiased, or interference by the "near enemies" of compassion, as outlined by Halifax, 2011).

Halifax's most recent work on the subject has culminated in the development of a theoretical model of compassion as an emergent process, rather than simply an innate capacity or discrete feature or virtue (Halifax, 2012). Importantly, compassion as conceptualized by Halifax's model does not view compassion as an exhaustible resource housed within an individual, but rather, as an emergent and contingent event that arises out of a dynamic interchange with another human being. The model suggests that compassion arises based upon a practitioners ability to a) attend to the experience of others, b) feel concern for others, and c) sense what will serve others. As a practitioner or therapist experiences or performs these tasks during therapy, they also experience certain events: empathy (emotional attunement), perspective taking (cognitive attunement), and the recollection or intrusion of memories (of personal experiences). These events lead to empathic arousal, which is physiological in nature. Critically, the model contends that the therapist must emotionally regulate this arousal in order to feel sympathy (i.e., concern for the client), which may then allow, finally, for compassion to emerge from the therapeutic interaction. If the therapist fails to emotionally regulate their empathic arousal, the therapist remains in a dysregulated state, mirroring the client's dysregulation (since clients who are suffering tend to present in physiologically dysregulated states). Theoretically, this associates with the therapist experiencing personal distress, rather



than sympathy. Behaviors thought to emerge from lack of regulation of empathic arousal leading to personal distress are anti-ethical to selfless prosocial behavior such as compassion, and purportedly include: selfish prosocial behavior, avoidance, freeze/fight/flight responses, abandonment of client, secondary trauma, or the experience of empathic or moral distress.

According to Halifax's model, compassion emerges from a dynamic, interactive, and enactive process which, though not trainable in and of itself, is primed by "non-compassion elements" that *are* trainable. The trainability of the "non-compassion elements" thought to allow compassion to emerge (e.g., attentional, affective, and cognitive processes) is a topic upon which Halifax has given impassioned public talks pleading for a re-conceptualization in how we think about, and train, compassion (Halifax, 2010). At the core of these trainable skills is one basic construct: the ability to downregulate physiological arousal associated with empathic reactions, when bearing witness to another's suffering. Emotion regulation is theorized as a critically important process, in order for the experience of selfless compassion to emerge. This is a divergent view than the seemingly prevalent view in counseling psychology (whether explicit, or tacit) that compassion already exists in us and merely need be enhanced or channeled. Perhaps we cannot train in compassion, but rather, set the field for the emergence of it, by training in the "non-compassion elements" that prime compassion (Halifax, 2012). A corollary of this theoretical view is that compassion fatigue does not exist as conceptualized by Western psychology, but rather, reflects some other deficit along the chain of contingent events and skills that must take place in order for selfless, effortless compassion to emerge.

Halifax's stress on the downregulation of empathic arousal is not just written into her theoretical model explicitly, but is also represented metaphorically and somatically, within the tradition and practice of socially-engaged Buddhism. The stress upon cultivating intimacy with

oneself and with others is related to the regulation of fearful emotional states. Halifax, in her teachings as the abbot of Upaya Zen Center of Santa Fe, New Mexico, frequently uses the metaphor of having a "strong back, soft front" to describe how zen practitioners work to manifest universal love through cultivation of the Four Brahmaviharas (lovingkindness, compassion, sympathetic joy, and equanimity) via the physical practice of meditation. "Strong back, soft front" has both a literal and a figurative meaning: Literally, when meditating, Buddhist practitioners practice keeping an erect spine, but without unnecessary muscle tension, so that one's front can be "soft, and open to experience". It is thought that the embodied physical practice of meditation (as much as the cognitive practice) assists in having a spiritual and psychological sense of groundedness, as well as an open quality of mind and heart, that can help facilitate the emergence of compassion. The posture of meditation is thought to embody personal strength in terms of equanimity and integrity (i.e., a "strong back"), while simultaneously helping to cultivate an open hearted, intimate approach towards self and other (i.e., a "soft front"), instead of embodying rigidity or fear. To extend the metaphor to a therapist, Halifax would contend that if a therapist unwittingly or accidentally embodies the opposite of this advice-- a "strong *front*, and soft *back*"-- that they are handicapped in the ability to act from a place of integrity and equanimity, or the ability to act in alignment with values of the profession. Instead, they are likely interacting with the world in general (and with patients) in a defended way, embodying the opposite of the intimacy needed to lay the scene for a compassionate therapeutic encounter. From this stance, Halifax argues, compassionate therapeutic encounters are unlikely to occur because the therapist is likely in a physiologically dys- or upregulated state, animated by fear or other negative emotions. In short, it could be said that much of the Buddhist practice of meditation, including the physical posture, is an effort to

emotionally regulate empathic arousal, since unregulated empathic arousal is thought to present barriers against the emergence of compassion.

*Regulation of Emotional Responses as Related to Sympathy and Prosocial Behavior*

Halifax's idea that downregulating empathic arousal is a crucially important step in the process of compassion unfolding has been supported by recent scientific inquiries, though more research is needed. Various forms of cognitive or emotional regulation have been found to play supportive roles in an individual's ability to experience sympathy or avoid empathic overarousal, including executive attention (Posner & Rothbart, 2007) and the ability to shift one's attention or re-focus (Derryberry & Reed, 2002; Eisenberg et al., 1996). In several studies using self- or other- report measures, sampling populations ranging from children to the elderly, individuals who were higher in effortful control or self-regulation have been found to generally exhibit higher levels of sympathy and lower levels of personal distress (e.g., Eisenberg et al., 1994; Eisenberg et al., 1996; Eisenberg, et al., 2007; Okun, Shepard, & Eisenberg, 2000). Findings generally suggest that when an individual is able to exercise self-regulation of strong emotions, they are more likely to be high in sympathy, and that levels of sympathy increase as level of emotional arousal increases, but only for individuals with at least moderate levels of self-regulation or effortful control; individuals who lacked this ability were likely overwhelmed by their vicarious emotion. Nancy Eisenberg, a prolific researcher in this area (see Eisenberg, 2009, for a review), explains that these findings are consistent with data suggesting that in childhood or adolescence, sympathy has been related with the personality trait conscientiousness, which is partly a matter of regulation (Del Barrio, Aluja, & Garcia, 2004), as well as constructive modes of coping (McWhirter, Besett-Alesch, Horibata, & Gat, 2002), self-reported efficacy in self-regulation (e.g., resisting peer pressure to engage in high risk behaviors, use of alcohol and

drugs, theft and other transgressive activities) and in managing negative emotions (Bandura et al., 2003). Research on the link between sympathy and prosocial behavior is more limited, but there is evidence to suggest that regulated children are higher in prosocial behavior than are less regulated children (e.g., Eisenberg et al., 1996; Eisenberg et al., 2002). Eisenberg contends that, most likely, part of the relations between sympathy and measures of moral behavior (and perhaps moral reasoning) are due to the role of self-regulation in moral emotion and behavior. She has suggested that future research should focus on carefully delineating the role of self-regulatory processes in connections among moral emotions, judgments, and behaviors (Eisenberg, 2009). Though links between empathic arousal, self-regulatory processes, and compassion are not clearly understood, a recent study about compassion training suggested that compassion training alters altruism and neural responses to suffering, and that compassion can be cultivated through increased engagement of neural systems implicated in executive and emotional control, as well as in understanding the suffering of other people and reward processing (Weng et al., 2013). The current study may help to establish links between the constructs of empathic arousal and compassion, as well as help to elucidate the nature of what is now termed "compassion fatigue", which a research team recently suggested might more accurately be referred to as "pathological altruism", or "empathic distress fatigue" (Klimecki & Singer, 2012).

#### *The Current Study: Towards New Understandings of Compassion in Counseling Psychology*

The current study proposes to test an important keystone in Halifax's model of compassion, which would extend lines of research regarding the role of emotion regulation as it relates to empathic feelings and prosocial behavior in multiple ways. First, this study proposes to examine the role of downregulating the emotional experience of witnessing another's suffering (i.e., empathic arousal) as a critical link between the experience of empathy and the emergence

of compassion. Second, the study proposes to examine these links not just using report measures of cognitive methods of regulation (as most prior research has done), but will also examine neuropsychological and biological indices related to the regulation of empathic arousal. Using Halifax's theoretical model as a guide, it is hypothesized that empathic arousal (as measured by both self-report measures of empathic feelings, and by neuropsychological measures of emotional reactivity) will positively associate with compassion (as measured by a self-report measure). It is further hypothesized that the link between empathic arousal and compassion will be mediated by the ability to downregulate the physiological arousal associated with empathic arousal. The construct of the ability to downregulate empathic arousal will be operationalized through a combination of three sources of data: 1) neuropsychological measures of emotional recovery, 2) biological measures related to states of chronic dysregulation of physiological systems associated with stress and emotional arousal, and 3) self-report measures of emotional regulation through cognitive coping skills.

## Chapter 3: Methodology

### General Procedure

Hypothesized associations will be examined using a pre-existing, public-use dataset from a study conducted between 2004 and 2009.

### Data Source

This study uses data from the study of Midlife in the U.S. (MIDUS), a longitudinal study of health and aging in the United States (*see Figure 2, pg. 59, for a sampling overview*). The purpose of the larger study was to investigate the role of behavioral, psychological, and social factors in understanding age-related differences in physical and mental health. The initial wave of the study (Project 1, MIDUS 1) was conducted in 1994–1995, when a national sample of 3,487 individuals were surveyed via telephone using random digit dialing. All participants were noninstitutionalized, English-speaking adults aged 25–74 living in the U.S. The original cohort was resurveyed approximately 9 years later (range = 7.8–10.4 years), for a second wave of data collection referred to as MIDUS 2 (with associated Projects 2, 3, 4, and 5). The longitudinal response rate at MIDUS 2, adjusted for mortality, was 75% (Radler & Ryff, 2010). Additional details about the sampling procedure are available elsewhere (Radler & Ryff, 2010).

The current analyses focus on the subset of individuals in MIDUS 2 who also participated in a neuroscience substudy (Project 5 of MIDUS 2),  $N = 331$ . Respondents in Project 5 include two distinct subsamples, all of whom completed both the Project 1, and the Project 4 biomarker assessment at University of Wisconsin-Madison: (1) longitudinal ( $n = 223$ ) and (2) Milwaukee ( $n = 108$ ). The Milwaukee group contained individuals who participated in the baseline MIDUS Milwaukee study, initiated in 2005. Overall, data being analyzed from Project 4 and Project 5 of

MIDUS-2 was collected between 2002 and 2009 (*see Figure 3, pg. 59, for an overview of Project 4 & 5 Data*).

The purpose of the biomarker study (Project 4 of MIDUS-2) was to add comprehensive biological assessments on a subsample of MIDUS respondents, thus facilitating analyses that integrate behavioral and psychosocial factors with biology. The broad aim was to identify biopsychosocial pathways that contribute to diverse health outcomes. A further theme was to investigate protective roles that behavioral and psychosocial factors have in delaying morbidity and mortality, or in fostering resilience and recovery from health challenges once they occur.

The purpose of the Neuroscience Project (Project 5 of MIDUS-2) was to examine the central circuitry associated with individual differences in affective style that represent a continuum from vulnerability to resilience, and characterize some of the peripheral consequences of these central profiles for biological systems that may be relevant to health. A primary aim of Project 5 was to characterize individual differences in both emotional reactivity and emotional recovery using psychophysiological measures such as corrugator electromyography and eyeblink startle magnitude. Respondents in the Neuroscience Project are a representative subsample of the MIDUS (Midlife in the United States) survey.

The variables measured in the MIDUS-2 dataset which will be analyzed in the current study are discussed below.

#### *Measures of Empathic Arousal*

Empathetic arousal is represented in the dataset by two different types of data: 1) neuropsychological testing that indicates "emotional reactivity", through two separate types of measurements (EMG- and EBR-during viewing a negative emotional picture) and 2) survey responses that indicate "affective response to witnessing another's suffering" (ARWS). Although

both of these data sources theoretically relate to the same umbrella construct of "empathic arousal", they will be considered as separate predictors in the current analysis (rather than combined into a composite variable), due to their different natures of measurement. Examining the variables as separate predictors of "empathic arousal" also allows for greater theoretical precision in detecting effects. However, if upon statistical analysis, the neuropsychological variables representing "emotional reactivity" turn out to be highly enough correlated with the survey data of "affective response to another's suffering" to justify combining the two variables into one composite predictor variable, methods of doing so could be considered.

***Emotional reactivity (EMG-during and EBR-during)*** was measured in MIDUS 2 by using psychophysiological measures: corrugator electromyography (EMG) and eyeblink startle magnitude (EBR). EMG and EBR were examined during the presentation of emotional (positive and negative) and neutral pictures. Both EBR and corrugator EMG have been shown to be modulated by the valence of foreground stimuli in a linear pattern. The magnitude is attenuated when the stimulus is positive and enhanced when it is negative relative to a neutral stimulus (Lang et al., 1990, Cacioppo, Petty, Losch, & Kim 1986). "Reactivity" refers to a participant's response when measurements are taken while an emotional picture is displayed. (*See Figure 5, pg. 65, for an overview of how this data was collected; see appendix A, pg. 83, for more detailed information.*) For the purposes of the current study and the aim to isolate affective response to witnessing suffering, EMG and EBR measurements of emotional reactivity in regards to negative (not positive) emotional pictures will be examined. Thus there are two measurements that will be examined in analyses, which comprise the construct of "emotional reactivity" in the neuropsychological data: EMG while viewing a negative emotional picture (EMG-during), and EBR while viewing a negative emotional picture (EBR-during).



*Affective response to witnessing another's suffering (ARWS)* is represented in the MIDUS 2 survey data by the following 4 survey items, which participants answered using a 6-point likert scale, rating each from 1 ("strongly disagree") to 6 ("strongly agree"):

1. The sight of someone who is badly injured affects me strongly.
2. A picture of a starving child would really depress me.
3. A picture of a violent car accident makes me feel sick to my stomach.
4. A description of a badly wounded war victim would affect me strongly.

For each participant who answered all four items (N = 326), these four items were summed to create a continuous composite variable, by taking the mean of responses to these four items. The composite variable formed by these four items was used in the MIDUS 2 study to define a construct that researchers called "Visual Reactivity", but other researchers have termed it "Affective Stimuli" (Larsen, Norris, & Cacioppo, 2003) and here it is termed "Affective Response to Witnessing Another's Suffering. Psychometric analysis of this variable in the MIDUS 2 study revealed an alpha of 0.80, mean of 4.25, and standard deviation of .43, suggesting that the items are indeed measuring a similar construct with enough variability to be meaningful. For the purposes of the current study, the composite variable formed by these 4 items will be referred to as self-report of "Affective response to witnessing another's suffering".

### *Measure of Compassion*

The tendency of an individual to engage in compassionate behavior or action, though not directly measured in the MIDUS 2 dataset in terms of witnessable action, can be reasonably approximated by an assessment of "*Compassion*" (C). Compassion was assessed in the study using survey data comprised of 7 survey items, summed into one variable by taking the mean of

all 7 responses. Each item was rated by participants (N=306) on a 7-point likert scale from 1 ("strongly disagree") to 7 ("strongly agree"). The 7 items are as follows:

1. My ideal job involves helping other people.
2. It's important to take care of people who are vulnerable.
3. When I see someone hurt or in need, I feel a powerful urge to take care of them.
4. Taking care of others gives me a warm feeling inside.
5. I often notice people who need help.
6. I am a very compassionate person.
7. I enjoy spending time with children.

This composite variable has been used to measure compassion in previous research (Shiota et al, 2006); its psychometric analysis in the MIDUS 2 study indicated an alpha of 0.79, mean of 5.41, and standard deviation of 0.24, suggesting that all 7 items map onto a common construct and show sufficient variability to be meaningful.

#### Measures of Ability to Downregulate Empathic Arousal

The ability to down-regulate emotions, both mentally and physiologically, is hypothesized and represented in the MIDUS 2 dataset by three distinct types of data: 1) neuropsychological testing that indicates *emotional recovery*; 2) biological testing that indicates *allostatic load*, which purportedly reflects the long-term, accumulative effects of poor physiological regulation of stress; and 3) survey responses that indicate *emotion regulation* in the form emotional reappraisal, a cognitive coping mechanism. *Note that, because the survey items measuring "emotion regulation" were added late to the MIDUS 2 Project 5 protocol, only the last third of participants completed these items (N=117). Associations can still be examined, but there will be reduced statistical power to detect meaningful associations.* Each of these three

distinct data types, and their associated variables in the data set (which may be used in the current analysis as potential mediating variables), are discussed in greater detail below.

*Emotional recovery (EMG-after and EBR-after)*, a key component of emotional regulation, was measured using psychophysiological measures such as corrugator electromyography (EMG) and eyeblink startle magnitude (EBR). Both EMG and corrugator EBR have been shown to be modulated by the valence of foreground stimuli in a linear pattern; i.e., the magnitude is attenuated when the stimulus is positive and enhanced when it is negative relative to a neutral stimulus (Lang et al., 1990, Cacioppo et al., 1986). Thus, EBR and corrugator EMG are useful indicators of reactivity to emotion-relevant stimuli but also of individual differences in the timeline of recovery (or return to baseline) after stimulus offset by measuring the EBR to an acoustic probe delivered after stimulus offset (Jackson et al., 2003) and aggregating corrugator EMG after stimulus offset (Jackson, 2004). To measure "recovery", EMG and EBR were measured after participants viewed an emotional picture (positive and negative), during a post-picture period. The logic of this strategy is that continued activation during the recovery period following a negative stimulus is indicative of poor automatic emotion regulation. (See Figure 5, pg. 65, for an overview of how this data was collected; see appendix A, pg. 83, for more detailed information). For the purposes of the current study and the aim to isolate the ability to downregulate after experiencing a negative or aversive emotion (not positive), EMG and EBR measurements of emotional reactivity during a post-picture period will be examined only in regards to negative (not positive) emotional pictures. Thus there are two measurements that will be examined in analyses, which make up the construct of "emotional recovery" in the neuropsychological data: EMG-after viewing a negative emotional picture, and EBR-after viewing a negative emotional picture.

*Emotion regulation (E-REG)* was assessed in the MIDUS 2 survey via items about two different forms of regulation, emotion reappraisal, and emotion suppression. *Note: Only emotion reappraisal items will be included in the current analysis as part of the emotion regulation variable, as the items making up the emotion suppression construct do not clearly map on to this studies conception of a cognitive coping skill. The items asked regarding emotion suppression could represent a self-regulatory mechanism, but could also represent mere emotional avoidance or emotional expressivity, neither of which seems especially pertinent to the current theoretical model being tested. The emotion suppression items discluded from this analysis were: 1. I keep my emotions to myself; 2. When I am feeling positive emotions, I am careful not to express them; 3. I control my emotions by not expressing them; 4. When I am feeling negative emotions, I make sure not to express them).*

Survey participants were first given the following instructions by researchers:

“We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways.”

Then, participants answered 6 items making up the "Emotion Reappraisal" composite (N=117). Participants answered using a 7-point likert scale from 1 ("strongly disagree") to 7 ("strongly agree"). A score for each composite was determined by taking an average of all unambiguously completed items (i.e., skipped items and questions for which more than one response was indicated were dropped). An average was taken instead of a sum to simplify problems of missing

items (a sum would be affected by missing items; an average is not). Participants for whom fewer than 50% of items were completed were excluded. Emotion reappraisal items consisted of the following:

1. When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.
2. When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.
3. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
4. When I want to feel more positive emotion, I change the way I'm thinking about the situation.
5. I control my emotions by changing the way I think about the situation I'm in.
6. When I want to feel less negative emotion, I change the way I'm thinking about the situation.

This variable was developed in a previous study (Gross & John, 2003), and in the MIDUS 2 study, psychometric analysis of the composite variable revealed the following data:  $\alpha = 0.77$ , mean = 4.98, and standard deviation = 0.11.

*Allostatic load (AL)* is a holistic measurement of wear and tear on the body which grows over time when an individual is exposed to stress. It represents the physiological consequences of chronic exposure to fluctuating or heightened neural or neuroendocrine response that results from repeated or chronic stress. The term was coined by McEwen and Stellar in 1993, and since then, this variable has been used in various studies to summarize dysregulation across multiple physiological systems (see Clark, Bond, & Hecker, 2007; Gallo et al., 2011; Goldman et al.,

2005; Gruenewald et al., 2012; McEwen, 2002; McEwen & Stellar, 1993; Schnorpfeil et al., 2003; Seeman, McEwen, Rowe, & Singer, 2001; Weinstein et al., 2003). The measurements associated with this variable purportedly relate to three distinct neurobiological processes in the brain: cerebral activation asymmetry, prefrontal function, and amygdala activation. To estimate functioning in these three brain areas, researchers have examined various biological indicators (i.e., biomarkers) that fall under three further distinct categories: neuroendocrine indicators, cardiovascular indicators, and inflammatory indicators. In determining which biomarkers would contribute to an allostatic load summary score, and which should be included as measurements in the design of Project 4 of MIDUS, biomarkers were selected based on two major criteria. First and foremost, biological parameters were selected on theoretical grounds (i.e., based on their known role as components of major regulatory systems). Second, selected parameters reflect those for which information could be collected within the logistical and financial constraints of the MIDUS project itself. Selection of subscale components was confirmed by results of factor analyses (Buckwalter et al., 2011). Specifically, Buckwalter et al. (2011) used principal component factor analysis on a set of biomarkers and compared the predictive power of seven obliquely rotated factors to that of a composite allostatic load marker. The set of factors predicted more of the variance in measures of mental and physical health, suggesting that allostatic load is best analyzed as a multisystem construct.

Biological parameters making up the allostatic load measurement are summarized as follows: Measures of (a) *cardiovascular* functioning included resting systolic blood pressure, pulse pressure, and resting pulse rate; indicators of (b) *sympathetic nervous system* activity included overnight urinary measures of epinephrine and norepinephrine; measures of (c) *parasympathetic nervous system* activity included the following heart rate variability parameters:

low frequency spectral power, high frequency spectral power, the standard deviation of R-R (heartbeat to heartbeat) intervals, and the root mean square of successive differences; indicators of (d) *hypothalamic pituitary adrenal axis activity* included an overnight urinary measure of the hormone cortisol and a serum measure of the hormone dehydroepiandrosterone sulfate; measures of (e) *inflammation* included plasma C-reactive protein, fibrinogen, and serum measures of interleukin-6 and the soluble adhesion molecules E-selectin and intracellular adhesion molecule-1; indicators of (f) *lipid/fat metabolism* included high density lipoprotein cholesterol, low density lipoprotein cholesterol, triglycerides, body mass index, and waist-hip ratio; and levels of glycosylated hemoglobin, fasting glucose, and the homeostasis model of insulin resistance served as measures of (g) *glucose metabolism*. (see Figure 4, pg. 60 for an overview of data comprising the allostatic load variable; see appendix B, pg. 84, for detailed information describing data collection of biomarkers.)

#### How Allostatic Load Scores were Calculated

The MIDUS Project 4 research project did not calculate an Allostatic Load summary score within their dataset for public use, because of differing methods amongst researchers for calculating this variable (employee of MIDUS study, personal communication, March 25, 2016). Scientific consensus has not been reached about the best method for combining measurements of multiple biomarkers to create one variable that best represents "allostatic load". Prior research has utilized anywhere from 10 to 24 biomarkers (see Seeman et al., 1997 for early research that examined allostatic load using 10 biomarkers), spanning multiple biological indices reflecting function of different biological systems, and utilized different methods of combining measurements. In the current dataset, the measurements of 23 biomarkers (theoretically postulated to represent the construct of allostatic load) were available for analysis. A recent study

(Wiley et al., 2016) that explored how these 23 biomarkers measured within the MIDUS dataset load onto a common construct found that, within this specific sample, 4 of the biomarkers (LDL cholesterol, urinary epinephrine, D-HEAS, and urinary cortisol) did load onto the common construct of allostatic load, and/or (in the case of urinary epinephrine and urinary cortisol) loaded onto the construct in ways opposite of the predicted direction. Low factor loadings were theorized to occur due to theoretical uncertainty about what precisely was indicated by high or low values of the biomarker (e.g., in the case of urinary cortisol), or due to logistical issues with specimen collection (e.g., in the case of D-HEAS). Therefore, in order to increase construct clarity and predictive power, when calculating an allostatic load variable for the current study, these 4 biomarkers were excluded, leaving 19 biomarkers in the MIDUS dataset that were included when creating the measurement of allostatic load. Of the 19 biomarkers, 4 biomarker measurements were log transformed, in order to reduce positive skew and kurtosis (RMSDD, SDRR, HF-HRV, and LF-HRV), and the biomarker of HDL cholesterol was reverse scored. Measurements were then standardized, summed, and averaged to create one variable representing allostatic load. Consistent with prior research, each of the biomarkers in the model was given equal weight in its contribution to the concept AL, a stand alone measurement thought to represent an individual's baseline functioning across multiple physiological systems. While some studies have arrived at an allostatic load score through other methods (e.g., by summing the number of parameters for which a subject fell into the top or bottom 10% of the distribution, i.e., the group of highest 'risk', other studies have arrived at a measure of allostatic load, as we have, by averaging z-scores for each parameter, yielding essentially the same results (see Hyman, 2001, for a review).



### Measures of Possible Confounds

Certain mood states, like anxiety or depression, may correlate with an individual's ability to empathize with others, or to feel or act compassionately. Both state and trait anxiety, and depressive symptomology, were assessed in the MIDUS 2 study, and can be controlled for in analyses if necessary. State anxiety (i.e., how anxious a person feels during the time of survey administration) and trait anxiety (i.e., how anxious a person tends to feel, in general) were both measured via survey items from the Spielberger State\_Trait Anxiety Inventory (Spielberger, 1989) using a likert scale. Depressive symptoms were measured via survey items from the Mood and Anxiety Symptom Questionnaire (MAS-Q; Clark & Watson, 1991) using a likert scale. Gender and age are additional potential confounding variables that could possibly affect an individual's level of empathic response or compassion, and can be controlled for in analyses.

## Chapter 4: Predictions

The fundamental prediction of this study is that empathic arousal will predict compassion; specifically, that a person must experience empathic arousal in order to experience compassion. It is predicted, then, that empathic arousal will have a positive association with compassion, such that higher levels of empathic arousal (as measured by three variables: emotion reactivity, represented by EMG-during (i.e., while viewing a negative emotional picture) and EBR-during, and, affective response to another's suffering or ARWS) will each relate to higher compassion (C) scores.

The mediation model this study tests is that the level of compassion associated with empathic arousal will vary according to individuals' ability to downregulate their empathic arousal, i.e., their emotional response (*see Figure 2, pg. 59, for a graphic showing the mediation model*). The ability to downregulate empathic arousal will be examined using data from three different sources, so there are three separate predictions: Specifically, it is hypothesized that 1) individuals who have lower scores for emotion recovery (i.e., where a lower score indicates better recovery on measures of EMG-after and EBR-after), 2) lower scores for allostatic load (AL), and 3) higher scores for emotion regulation (E-REG), will also have higher scores for compassion (C). What follows is a more detailed description of these predictions, specific to each variable.

### *Predictions Regarding Neuropsychological data: Emotion Reactivity (EMG-during and EBR-during) and Emotion Recovery (EMG-after and EBR-after)*

Emotion reactivity and recovery (key components of regulation) may represent neuropsychological evidence related to an individual's ability to regulate their emotions and

bring themselves more quickly back to a baseline, emotionally neutral state. *Emotion reactivity* (EMG-during and EBR-during) refers to how neuropsychologically responsive an individual is to positive or negative emotional arousal. Therefore, emotion reactivity is considered to be part of the construct of "empathic arousal", and it is predicted that greater scores for emotion reactivity (EMG-during and EBR-during) will associate with greater compassion (C) scores. *Emotion recovery* refers to how quickly an individual exhibits neuropsychological recovery, *after* having been emotionally aroused by viewing positive or negative pictures. Therefore emotion recovery (EMG-after and EBR-after) is considered to be part of the construct of "ability to downregulate emotion", and it is predicted that, in a mediation model that examines emotion recovery as a possible mediating variable between empathic arousal and compassion, lower scores for emotion recovery (i.e., a lower score indicating better recovery) will associate with higher compassion (C) scores.

#### *Predictions Regarding Affective Response to Witnessing Another's Suffering (ARWS)*

In order for compassion to emerge, it is hypothesized that an individual must first experience empathic arousal. Affective response to witnessing another's suffering (ARWS), such as by feeling emotionally moved when viewing or hearing about the suffering of another, is thus hypothesized to be a prerequisite for compassion. Thus, ARWS is expected to positively associate with compassion (C); i.e., people who endorse having greater ARWS are hypothesized to also have higher compassion (C) scores.

#### *Predictions Regarding Allostatic Load (AL)*

Allostatic load (AL) may represent a distal measure of an individual's inability to downregulate emotional responses (including empathic arousal) over time. If an individual exhibits poor ability to regulate emotional responses, they would hypothetically be more likely to

exhibit high allostatic load, since allostatic load is fundamentally an indicator of poor ability to regulate physiological systems when under chronic stress. The physiological effects of empathic arousal that are distressing or stressful are likely to have a similar physiological profile to chronic stress. Thus, since allostatic load hypothetically could indicate a long-term propensity towards dysregulation of, or failure to downregulate, physiological upregulation due to the potentially distressing components of emotional (or empathic) arousal, allostatic load will be tested as a mediating variable between empathic arousal and compassion. If a significant association between allostatic load and compassion is discovered, then follow up analyses of separate physiological indices or each individual biomarker can be performed to determine which measurements drive the effect; however, there is no theoretical basis for forming a prediction that would expect certain biomarker measurements to be more strongly related to compassion than others.

#### *Predictions Regarding Emotion Regulation (E-REG)*

The ability to cognitively reappraise a situation may represent a valuable coping skill related to the experience of negative emotions, and the ability to cognitively shift in order to reduce the negative effects of this experience. The current study hypothesizes that coping with the effects of negative emotions plays an important role in coping with any negative feelings associated with empathic arousal, and that this is a necessary step in order for compassionate action to emerge. Therefore, the variable emotion regulation (E-REG, made up of survey items indicating a participant's tendency to use emotion reappraisal to deal with negative emotions), is hypothesized to associate positively with compassion: specifically, the greater emotion reappraisal tactics a participant endorses using (i.e., a higher E-REG score), the greater their compassion (C) scores are expected to be.

## Chapter 5: Results

### General Procedure

Preliminary Analyses were conducted using correlation matrices and regression analyses. Univariate general linear model analyses were used to examine primary hypothesized associations (primary analyses), and multiple regression analyses were used to explore possible mediating relationships (secondary analyses) while controlling for potential confounding variables. Statistical comparisons for significant differences were performed using two-tailed Student's *t*-tests, unless otherwise noted.

### Controlled Variables

It was hypothesized that the variables of anxiety (both state and trait), depression, age, and gender might significantly affect an individual's tendency to self-identify as compassionate. When these variables were separately entered as predictors of compassion in a regression model, only state anxiety and gender were found to have significant associations with compassion. state-anxiety (i.e., an individual's self-reported symptoms of anxiety during test administration; *see Appendix C, pg. 85, to view the items making up the measure*) predicted compassion,  $F(1, 312) = 9.44, p < .01$ , and gender predicted compassion,  $F(1, 324) = 4.06, p < .05$ . Thus, the two variables of state-anxiety and gender were entered as controls in all the analyses to follow.

### Preliminary Analyses: Relationships Amongst Variables

Preliminary analyses were performed to check for multicollinearity amongst variables, and, to consider whether the variables comprising the constructs of "empathic arousal" or "ability to downregulate emotion" should be aggregated into respective composites.

To determine if multicollinearity existed amongst variables, a correlation matrix was created that included all predictor or mediator variables to be used in analyses. For multicollinearity to exist, more than two variables must be highly inter-correlated with each other. Correlation coefficients were all small (ranging from  $-.29$  to  $.26$ ), contra-indicative of multicollinearity problems in this study. Furthermore, in regression analyses, tolerance was always above  $.9$ , while variance inflation factors were always below  $2$ , indicating that multicollinearity did not need to be accounted for.

To determine whether even the most basic criterion was met for creating an aggregate variable, correlations were examined between the three sub-variables making up the construct of empathic arousal (EMG-during, EBR-during, and ARWS), and between the four sub-variables making up the construct of ability to down regulate (EMG-after, EBR-after, AL, and E-REG). Again, correlation coefficients were small, both between EA subcomponent variables (ranging from  $-.08$  to  $.04$ ), as well as for ability to down regulate subcomponents (ranging from  $-.16$  to  $.09$ ). Thus, there was no reasonable statistical justification to create aggregate variables combining disparate forms of data.

Given the results of this preliminary analysis, as well as the purposes of the current study, its exploratory nature, and disparate types and measurements of data, it was determined to be most sensible to keep predictor sub-component variables separate, and mediator sub-component variables separate. In the regression analyses to follow, the variables associated with each data source were considered separately as potential predictive or mediating variables.

#### *Primary Analyses: Compassion and Empathetic Arousal*

To test the primary prediction, that compassion is positively associated with empathic arousal, univariate general linear model analyses were conducted.

First, the association of the composite compassion survey scores (C) with the affective response to witnessing another's suffering survey scores (ARWS) was examined. The hypothesis tested was that self-assessment of compassion via survey items would be positively associated with measures of empathic arousal: specifically, that higher compassion would correlate with greater empathic arousal. The sample size of participants for whom full survey information was obtained for these measures was 314. In this regression analysis, ARWS was entered as a predictor of compassion, controlling for state-anxiety and gender, and compassion (C) was entered as the dependent variable. Within this sample, we detected a positive association between compassion and ARWS,  $F(1, 310) = 23.99, p < .01$  (see Figure 1, below), in which ARWS accounted for 10% of the variability in C scores ( $R^2 = .10$ ).

Next, the associations of compassion (C) with each of the two hypothesized neuropsychological variables thought to represent emotional reactivity (EMG-during and EBR-during) were examined. In each regression analysis, EMG-during or EBR-during was entered as a predictor of compassion, controlling for state-anxiety and gender. The sample size of participants for whom full survey information was obtained for these measures was 280 for EMG-during and 254 for EBR during. Within these samples, the hypothesis tested was that self-assessment of compassion via survey items would be positively associated with measures of empathic arousal via neuropsychological data: specifically, that higher compassion would correlate with greater emotion reactivity as evidenced by higher EMG-during and EBR-during measurements. Virtually no association was found between EMG-during and C,  $F(1, 277) = .01, p = .937$ , or between EBR-during and C,  $F(1, 251) = .04, p = .842$ , revealing that the neuropsychological variables did not predict compassion. These analyses revealed that, in order to go forth with tests of potential mediation models involving empathic arousal and compassion

in this sample, survey data alone (i.e., ARWS) provides the best operationalization of the construct of "empathic arousal". The plot below (*Figure 1*) shows how AWRS associated with compassion (using residuals for each variable). Each dot (with several overlapping) represents one of the 314 individuals in the sample for whom complete survey data on AWRS and C were available.

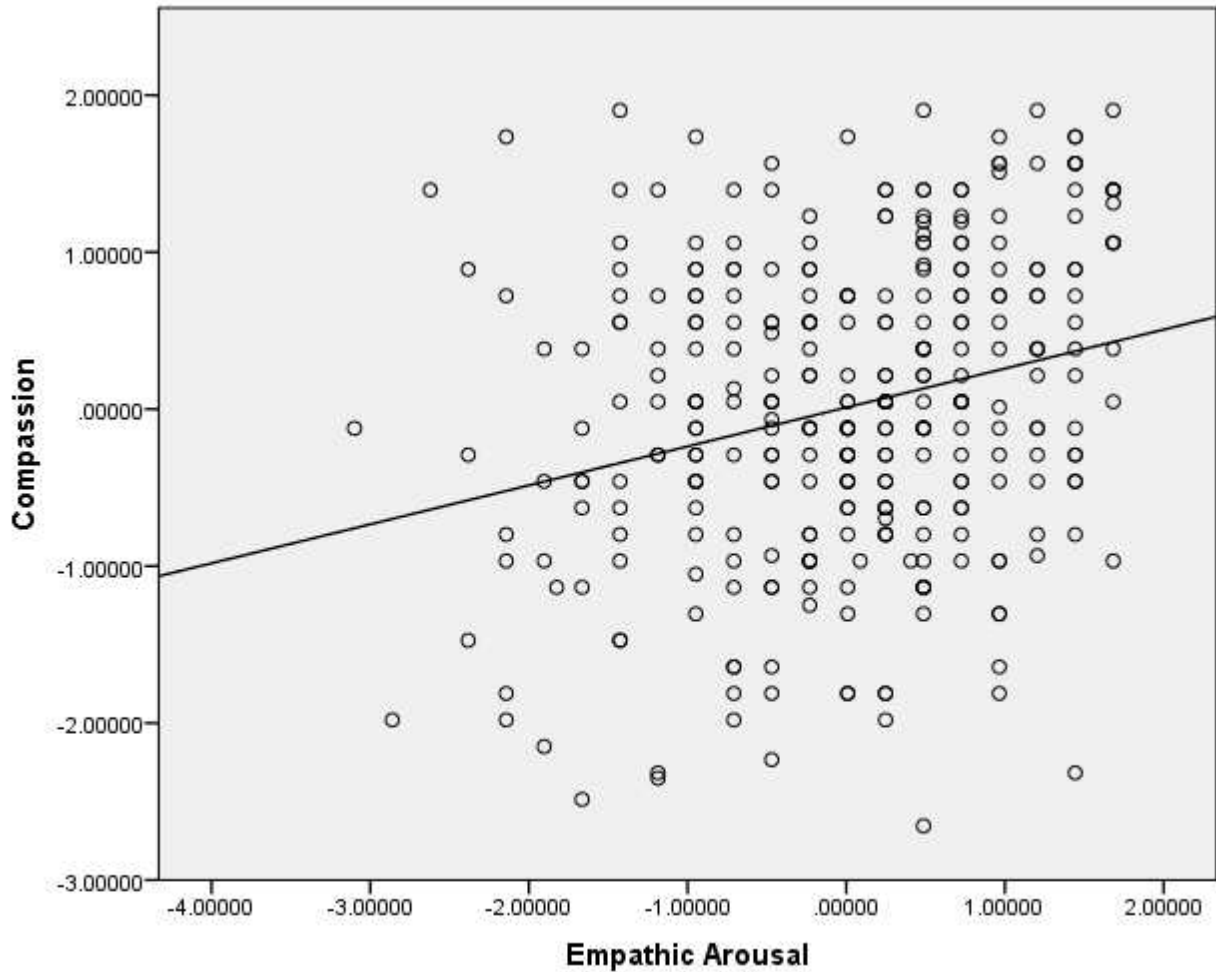


Figure 1. *Empathic Arousal (AWRS) plotted against Compassion(C);  $R^2 = .10$*

*Secondary Analyses: Ability to Downregulate Emotion as Mediator*

To test the secondary prediction, that compassion is lower in people who do not regulate their empathic arousal as efficiently as people who do, four variables (E-REG, EMG-after, EBR-



after, and AL) from three sources of data (survey data, neuropsychological, and biological) were assessed as possible mediators of the association between compassion and empathic arousal. These variables were hypothesized to indicate "ability to downregulate emotion", and were each examined separately to determine if they might play a role in mediating the relationship between empathic arousal and compassion.

To determine if a significant mediating relationship was present, a three step process was utilized. First, I examined whether the potential mediating variable was correlated with empathic arousal (ARWS), since a significant association with the independent variable is a prerequisite for a variable to be a potential candidate as a mediator (Baron & Kenny, 1986). Second, if a significant association was found, I proceeded to examine whether the mediator was a significant predictor of the outcome variable in an equation including both the mediator and the independent variable. Using a univariate general linear model, in multiple regression analyses, I examined partial correlations of potential mediating variables with ARWS and C. Along with ARWS, the potential mediating variable was entered as a predictor, and compassion was entered as the dependent variable, controlling for confounding variables. Finally, if the partial correlations indicated evidence of a mediating effect, I further tested the mediating effect for significance, using the Sobel test (Sobel, 1982).

First, the survey data was examined (E-REG) as a potential mediator. Although both E-REG and ARWS associated with compassion (E-REG associated with C,  $r(117) = .22, p < .01$ , while ARWS associated with C,  $r(323) = .26, p < .001$ ), E-REG and ARWS did not correlate with each other,  $r(108) = .14, p = .143$ . This indicates that a composite of survey items measuring emotion reappraisal as an emotion regulation strategy (i.e., E-REG) did not mediate the relationship between C and ARWS.

Second, the neuropsychological variables were examined (EMG-after and EBR-after) as potential mediators. EMG-after did not covary with ARWS  $r(288) = .08, p = .178$ ; it also did not covary with compassion,  $r(288) = -.03, p = .573$ . EBR-after did not covary with ARWS, either  $r(269) = .03, p = .640$ . In this sample, there was no evidence that the neuropsychological variables measuring "emotion recovery" (i.e., EMG-after or EBR-after) mediated the relationship between empathic arousal and compassion. Notably, EBR-after was weakly, but significantly correlated with compassion,  $r(266) = -.14, p < .05$ , indicating that participants who self-reported greater compassion also exhibited lower EBR-after scores, indicating better emotional recovery.

Finally, the biological variable of allostatic load (AL) was examined as a potential mediator (and, if necessary, its separate indices and biomarker counterparts could be examined in order to determine which biomarkers were driving any detected effects). Allostatic load had virtually no linear association with either ARWS,  $r(306) = .02, p = .711$ , or with compassion,  $r(304) = -.05, p = .373$ . Amongst the individual biomarkers, only one showed a significant correlation with compassion, which was waist-to-hip ratio,  $r(325) = -.15, p = .006$ , but there is no theoretical reason for expecting this association. We cannot infer that the relationship between ARWS and C is mediated by allostatic load, or by any of the individual biomarkers making up the allostatic load measurement.

In summary, these analyses do not provide support for a mediating effect between any of the variables hypothesized to represent "ability to downregulate emotion" and compassion and empathic arousal. Overall, while results are inconclusive, within this sample it does not appear that these four variables (E-REG, EMG-after, EBR-after, or AL) tap an intermediary process that significantly impacts the association between empathic arousal and compassion.

## Chapter 6: Discussion

### *Summary*

In a sample of 314 Americans aged 35 to 86, who participated in MIDUS from 2002 to 2009, empathic arousal predicted compassion. Individuals who self-reported higher empathic arousal, also self-reported higher identification as a compassionate person. Ability to regulate emotion, as measured by survey items, was also associated with compassion. But we were unable to infer that the ability to downregulate emotion (as measured by survey, neuropsychological measures of emotion recovery, and biological measures reflecting chronic physiological upregulation) mediated the relationship between empathic arousal and compassion.

### *Discussion of the Results*

This research is correlational in nature. Therefore, we are unable to infer that empathic arousal causally contributes to compassion, or that the ability to downregulate emotion contributes to compassion, even though these variables were positively associated with each other in the predicted directions. Discussed here are three plausible scenarios that could account for these associations. The first two scenarios were not explored in the current study, while the third possibility entailed the hypotheses that were empirically explored using the MIDUS dataset for this study.

First, a factor predisposing compassion could also predispose empathic arousal. For instance, participants whose life experiences cause them to bear witness to the suffering of others more regularly or with more intensity may be more likely to self-report greater empathic arousal. These individuals may also be more likely to cultivate compassion, simply because they have experienced more life situations in which a compassionate response is triggered. Second,

compassion could affect empathic arousal: people who have deliberately cultivated the ability to respond compassionately may have thereby increased their capacity for greater empathic arousal, possibly regardless of how frequently their life experiences bring them into contact with the suffering of others. These first two possibilities were not explored in the current dataset, because they were not relevant to the hypotheses for this study, and because the frequency and intensity of life experiences entailing the occasion to bear witness to other's suffering was not assessed in the MIDUS study.

A third possibility, as discussed in the introduction and hypothesized for this study, is that a critical step linking empathic arousal to greater compassionate action could be the ability to downregulate empathic arousal. Downregulation of emotion was hypothesized to be a key intermediary step between the emotional, empathetic reaction to suffering, and the ability to intervene in a compassionate way. This effect was hypothesized to be an important pathway between empathy and compassion, regardless of a person's life experiences, and regardless of effortful cultivation of compassion. It was hypothesized that greater empathic arousal should result in a greater compassionate response, if the individual is able to downregulate emotion (i.e., the physiological response to witnessing suffering). While it was difficult to achieve a perfect operationalization of these three constructs within the MIDUS dataset (empathic arousal, compassion, and ability to downregulate emotion), an exploratory data analysis was conducted to examine this hypothesis in a preliminary way.

As noted previously, four variables from three different sources of data (survey, neuropsychological, and biological) were identified in the MIDUS dataset that could reflect the ability to downregulate emotion: AL (allostatic load, reflecting chronic up-regulation of the body's stress-response systems), EMG-after and EBR-after (eyeblink startle reflex measurements

and corrugator electromyography measurements taken after viewing a negative emotional picture, reflecting emotion recovery), and E-REG (emotion regulation as measured by survey items). Each of these data sources operationalizes the construct of ability to downregulate emotion in a different way, spanning from a measure postulated to capture processes occurring and accruing over time (i.e., allostatic load), to measures capturing immediate responses in a precise moment (i.e., neuropsychological variables), to measures that ask participants to reflect and self-report about their general tendencies (i.e., survey items). If these variables represented a mediating factor responsible for the association found between empathic arousal and compassion, they should relate to both empathic arousal and compassion, and the relationship between empathic arousal and compassion should be strengthened when an individual shows greater ability to downregulate emotion (i.e., the statistical relationship between empathic arousal and compassion should be attenuated when ability to downregulate emotion is entered into a regression model, since ability to downregulate emotion would now be accounting for some degree of the association between empathic arousal and compassion). Assessment of the variables involved in this hypothesized mediating relationship yielded inconclusive results, but overall, did not provide any evidence for a mediating effect.

Allostatic load represents a very broad measurement of physiological functioning. It is thought to provide a snapshot of an individual's functioning that reflects the individual's resiliency more generally. Speculatively, this measurement could tap into an individual's chronic inability to downregulate emotions well. Clearly, though, this variable does not necessarily tap specifically into an individual's ability to downregulate emotion, or into an individual's response to bearing witness to the suffering of others. Myriad forms of stress could heighten an individual's allostatic load score, and while this stress (unto itself) and the chronic upregulation

of the body's stress response systems was indeed hypothesized to impair an individual's ability to downregulate emotion, we nonetheless could not detect a relationship between allostatic load and empathy, or between allostatic load and compassion-- which is perhaps an encouraging finding, given that it may suggest that the ability to experience empathy and compassion is undeterred by chronic stress. This finding is interesting, however, in light of the fact that state anxiety - a more immediate, time-sensitive measure of stress, which probably relates to more immediate upregulation of physiological systems implicated with anxiety - did in fact associate positively with empathic arousal, and negatively with compassion, as assessed via survey items administered at the same time as the survey responses. It remains plausible that stress, and the ability to regulate it, plays a role between empathic arousal and compassion, but that present analyses were unable to properly operationalize the constructs and isolate the effect within the present dataset. Possibly, the physiological regulation of emotion that matters most to the relationship between empathy and compassion is of a more immediate, time-sensitive context than the allostatic load measurement was able to pick up.

If the allostatic load variable captured a broad and sweeping measurement of an individual's chronic upregulation due to stress, the neuropsychological variables captured the extreme opposite: an individual's immediate ability to recover from negative emotions. If immediate stress is more likely to impact the relationship between empathic arousal and compassion, one might expect these variables to mediate the relationship. However, neither neuropsychological variable associated with emotional recovery significantly covaried with survey reports of empathic arousal. Further, the correlations between EMG and EBR measures that were theoretically supposed to represent similar concepts of emotion reactivity and emotion recovery were low, the reason being unclear. Additional sample times over time may improve

this reliability. If the allostatic load variable was too broad to capture the construct of "ability to downregulate emotion", then perhaps the neuropsychological variables were too narrow, capturing a response to negative emotion that occurs within seconds (or milliseconds). Possibly, the ability to downregulate emotion in a way that is meaningful to the present hypotheses may entail a more involved process that goes on sometime after this first, nearly instantaneous reaction to experiencing a negative emotion. Overall, while small sample size or sampling variability may also have inhibited results, the pattern of results does not provide substantial evidence that individual differences in either emotional recovery (as indicated by the neuropsychological data) or in upregulation of physiological systems (as indicated by the biological data) account in any way for the association between compassion and empathic arousal.

In the case of survey items associated with reappraisal of emotions, interpreted here as a form of emotion regulation (E-REG), we did not find support for the notion that emotion regulation via reappraisal mediates the relationship between empathic arousal and compassion. It is possible that the operationalization of this construct was slightly muddled, given that the survey items may be tapping into two emotion regulation strategies at the same time-- one which is hypothesized to contribute to compassion, while the other would be predicted to curtail it: Emotion reappraisal that entails mindful acceptance of negative emotions would likely contribute to compassion, but emotion reappraisal that entails avoidant or suppressive attempts to control emotional experience would likely have the exact opposite effect on compassion. We are unable to determine whether the survey items for E-REG were able to parse these two finer conceptual distinctions.

A related possibility is that E-REG mediates the relationship between compassion and empathic arousal, but in a non-linear fashion: for instance, individuals with very low E-REG scores might also report less empathic arousal because, if they have less empathetic to begin with, they may also be less needful of having emotion regulation strategies in the first place, while individuals with very high E-REG scores may report less empathetic arousal because they immediately employ emotional regulation strategies of avoidance or suppression, to avoid feeling distress. However, when empathic arousal and empathic arousal squared were regressed on E-REG, there did not appear to be any curvilinear, quadratic relationship between empathic arousal and E-REG in this sample,  $F(2, 116) = 1.58, p = .211$ .

While the variables postulated to represent "ability to downregulate emotion" (EMG-after and EBR-after, AL, and E-REG) were not found to be good candidates for mediating the relationship between ARWS and C, state anxiety was correlated with both ARWS  $r(309) = .141, p < .01$ , and with C  $r(309) = -.17, p < .01$ , and was thus controlled for in analyses. Possibly, state anxiety could better tap the construct of ability to regulate emotion within a time window more relevant to empathic arousal and compassion than the hypothesized variables, and state anxiety could mediate the relationship between empathic arousal and compassion (i.e., individuals with lower state anxiety may experience greater compassion). This possibility was tested in a post-hoc analysis. The partial correlation of compassion (C) and empathic arousal (ARWS), controlling for gender, was  $r(320) = .24, p < .001$ . When state anxiety was added as a control, this relationship changed to  $r(308) = .27, p < .001$ . The fact that the association between C and ARWS increases slightly when state anxiety is entered as a control suggests that anxiety is attenuating the relationship between C and ARWS somewhat and could indeed have a mediating effect; however, when this effect was tested for significance using the Sobel test, it was found to



be non-significant: the test statistic for the Sobel test was  $-.51$ , with an associated  $p$  value of  $.61$ , and did not provide evidence of mediation.

Given that the least insignificant findings between constructs were detected when using survey variables, and because of the potential for imprecision in these variables as discussed above, a post-hoc exploratory analysis was conducted to ascertain whether hypothesized associations could be strengthened (specifically, the relationship between ARWS and C, with E-REG as the mediating variable) by improving the conceptual precision of the survey variables of both E-REG and ARWS. A few additional survey items were discovered that would seem to map onto each of these constructs, potentially slightly improving any "muddling" present in prior analyses.

To construct each new variable, the additional items were added to the original items and averaged; then a reliability analysis was conducted on the new composite to check for consistency amongst items.

For ARWS, four new items were added to the original four items, creating a new variable termed "ARWS-Improved". The four items added to the original four ARWS items were:

5. I am not affected by the moods of others (reverse scored)
6. If a person hurts someone close to me, I feel personally hurt as well.
- 7 I think nothing is more important than to be sympathetic to others.
8. I am moved when I hear of another person's hardship.

*(To see the complete 8-item scale for ARWS-Improved, see Appendix D, pg. 86).*

Two of the new items (items 5 and 6) were taken from a survey measure called the Relational-Interdependent Self Construal Scale (Cross et al., 2000). The other two items (items 7 and 8) were taken from a survey measure called the Sympathy Scale (Uchida & Kitayama, 2001). The

four added items were answered on a 7-point likert scale, rating each from 1 ("strongly disagree") to 7 ("strongly agree"). For ARWS-Improved, psychometric analysis of this variable revealed an alpha of 0.65, mean of 36.68, and standard deviation of 5.66.

For E-REG, four new items were added to the original 6 items, creating a new variable termed "E-REG-Improved". The four items added to the original six E-REG items were:

7. One can be a better person only through changing one's thoughts and feelings.
8. I control my emotions by changing the way I think about the situation I'm in.
9. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
10. I do my best to maintain a calm mind.

*(To see the complete 10-item scale for E-REG-Improved, see Appendix E, pg. 87).*

The four items added to create E-REG-Improved were taken from a survey measure called the Self-Control Scale (Markus & Kitayama, 1991; Gross & John, 2003). These items were answered using a 7-point likert scale, rating each from 1 ("strongly disagree") to 7 ("strongly agree"). For E-REG-Improved, psychometric analysis of this variable revealed an alpha of 0.77, mean of 50.53, and standard deviation of 7.66.

Regression analyses were re-run using ARWS-Improved, E-REG-Improved, and C (compassion). Using the "new and improved" predictor variable, ARWS-improved, and showed a higher association with compassion (C),  $r(316) = .39, p < .001$ , but it did not have a significantly stronger relationship with E-REG-improved,  $r(109) = .15, p = .125$ . E-REG-improved and compassion (C) also did not demonstrate a stronger relationship;  $r(112) = .19, p < .05$ . We still cannot infer that emotion regulation mediates the relationship between empathic arousal and compassion. However, this pattern of results (such as the fact that ARWS-improved

showed a somewhat higher correlation with C (compassion), once it was strengthened by a few additional survey items) may suggest that the fine distinctions this study attempts to make between the concepts of empathic arousal (i.e., affective response to witnessing suffering), and ability to downregulate emotion (i.e., emotion regulation), simply do not map perfectly onto the MIDUS dataset survey items. Possibly, a study designed to test the specific prediction at hand, with originally constructed survey items designed to more precisely capture hypothesized constructs, could be more successful in assessing whether a mediation effect is truly present, or not.

Because gender significantly co-varied with both empathic arousal (ARWS) and compassion (C) in this sample, another set of post-hoc analyses were performed to explore this effect, using ARWS-improved and E-REG-improved as predictors. ARWS-improved remained associated with C in samples of both women and men, significantly so;  $r(48) = .56, p < .001$  in men, and  $r(52) = .39, p < .001$  in women. But when associations between E-REG-improved and C were examined separately between men and women, it was discovered that associations between emotion regulation and compassion were only significant within men,  $r(48) = .24, p < .05$ . It would be inappropriate to draw conclusions from these findings, however, given the small sample size for each gender and broad margin for error.

### *Limitations of the Study*

There are four significant limitations to the current research.

First, as outlined above, the research is correlational in nature. Therefore, we are unable to infer that empathic arousal, or the ability to downregulate it, causally contributes to compassion (though, clearly, those scenarios are plausible ones).

Second, our estimates of all hypothesized constructs are rough ones. As described in detail in the discussion of results above, mapping of theoretical constructs in the current study onto pre-determined variables within the existing dataset represented best attempts to approximate hypothesized constructs, and likely imparted imperfect estimates.

Third, self-report measures (i.e., survey items) may or may not be valid indicators of actual behaviors related to compassion, empathy, and downregulation of emotion. For instance, compassion is assessed through survey items tapping whether an individual identifies as being a compassionate person in general, which may vary from whether or not an individual actually engages in compassionate action when empathically aroused.

Fourth, the hypothesized model would ideally be tested in a research design that allows for empathic arousal and compassionate action to be directly observed and measured in a more immediate time-context, in temporal relationship to each other (as opposed to via survey items that assessed general tendencies at indiscriminate time points). Here, these constructs were assessed in a way that could not precisely capture the temporal relationships amongst the hypothesized sequential events of experiencing empathic arousal, regulating it (or not), and engaging in compassionate action (or not).

Despite these limitations, this initial exploratory work may help lay the groundwork for more- in-depth analyses of the nature of empathic arousal, downregulation of physiological state, and compassion.

#### *Implications for Future Research*

Future work may further examine the association between empathic arousal and compassion, with the possibility of ability to downregulate emotion as a mediating variable, in the following ways:

First, the question of causality between empathic arousal and compassion may be addressed with longitudinal (observational) studies of individuals using a repeated measures design, in clinical contexts that entail providing participants the opportunity to have an affective response to witnessing suffering on a regular and repeated basis (i.e., recruiting participants such as nurses, hospice workers, doctors, social workers, or therapists). This study design could reveal whether or not changes in compassion mirror changes in empathic arousal between subjects, or within subjects, over time, suggesting a direct effect of empathic arousal on compassion. Such a study may also elucidate how sensitive compassion levels are, temporally, to experiences of empathic arousal. It could also measure related relevant concepts regarding compassion fatigue, moral distress, vicarious trauma, and burnout, in addition to measuring compassionate actions (not just feelings or self-identification via survey items), in order to more fully assess the variable of compassion.

Second, future work may incorporate measures of other possible mediators of the relationship between compassion and empathic arousal. For instance, in the hypothetical longitudinal study described above, participants could be monitored and assessed regarding a vast array of self-care strategies and emotion-regulation strategies that may be implicated in the relationship between empathic arousal and compassion. These may include: seeking social support; self-medicating via drugs or alcohol; amount and frequency of physical exercise; time spent pursuing personal hobbies non-related to work; disassociation from, suppression of, or avoidance of emotion; practicing emotion regulation via practices or hobbies that help practitioners to feel grounded, centered, or less stressed, etc. Variables such as hours of work, intensity and frequency of suffering witnessed, could either be assessed or controlled for in such

a study, in order to better isolate effects or see how target constructs covary with empathic arousal and compassion.

Third, the possibility that "ability to downregulate emotion" plays a mediating role between empathic arousal and compassion may also be assessed via an experimental, between groups design. For instance, using the same group of participants described above, empathic arousal and compassion could be measured after direct experience within clinical situations. One group of participants could be given tools and opportunities to practice downregulating emotion after being empathically aroused (e.g., diaphragmatic breathing or other somatic breathwork; relaxation exercises), while a comparison group would not receive this manipulation.

Fourth, future work (as described above) could address issues of imprecision in construct clarity by better assessing the construct of emotion regulation. Assessment measures could distinguish between strategies used to regulate emotion that are mindful, welcoming, and accepting of negative emotional experiences, versus strategies that are avoidant, dissociative, controlling, or suppressive. This would be an important distinction to make, given that the former strategy is hypothesized to foster compassion, while the latter is not.

Fifth, the differing associations we found in men and women between ability to downregulate emotion and compassion may be better assessed and explored using larger sample sizes. It is curious that certain associations that were significant in women were altogether not present in men in this sample, suggesting that women and men may demonstrate different pathways between empathic arousal and compassion, or use different strategies of downregulating emotion. Gender differences are worth exploring in greater detail, as gender has not received consistent and systematic attention regarding manifestations of empathic arousal and compassion, and findings may yield interesting implications for cultivating compassion in

relevant work environments. While many studies have suggested that women are more empathetic than men (Batson et al., 1996; Gault & Sabini, 2000; Lennon & Eisenberg, 1987; Macaskill et al., 2002; Schieman & Van Gundy, 2000), it has been suggested that these differences may stem from motivation rather than ability (Klein & Hodges, 2001). Furthermore, while studies of some related concepts, such as forgiveness, have not reported gender differences (e.g., women and men have been found to be equally forgiving; Berry et al., 2001; Macaskill et al., 2002; Toussaint & Webb, 2005), studies of other related constructs, such as self-compassion have revealed a gender difference (e.g., men report higher self-compassion than do women; Neff, 2003; Neff, et al., 2005; Raes, 2010). Overall, the role of gender as a covariate with compassion remains under-evaluated.

### Conclusions

That empathy and compassion are highly related constructs, and co-occur with each other, has been heartily observed by scientists and laypeople alike. A vast body of scientific literature has linked empathy with compassion, but has often conflated the two concepts, provided contradictory definitions of them, or been elusive in providing empirically-based, precise distinctions to differentiate their meaning and significance. Thus, the psychological and physiological mechanisms that underlie the association between empathy and compassion remain poorly understood. Despite this gap of knowledge, psychological literature has introduced the concept of "compassion fatigue", while practitioners in fields of work that necessitate compassion seek to understand best practices of self-care in order to avoid burnout. Meanwhile, thought about compassion from canons outside of the realm of western science (e.g. Buddhism), has expanded theoretical models of empathy and compassion, helping to inform conceptual frameworks about the process by which compassionate action manifests, and helping to foster an

increasingly nuanced understanding of the psychological and physiological underpinnings of empathy and compassion. The ability to downregulate emotion has garnered speculative interest as a central component of these processes, and for the role it may play in harnessing empathic arousal in a constructive way so that it results in compassion instead of burnout, moral trauma, distress, or compassion fatigue. The finding that compassion and empathic arousal, as measured through survey items, are positively associated with each other, and that emotion regulation associates with compassion as well, presents intriguing avenues for future research into the psycho-physiological pathways by which our responses to emotional arousal impact the emergence of compassion, or vice versa. Further empirical work may lead to greater insight about how thought from sectors outside of western psychology can improve our understandings of the factors that help compassion to be cultivated and sustained, and may implicate pragmatic means by which practitioners in fields with high risk of burn out can directly increase their capacity to manifest compassionate action.



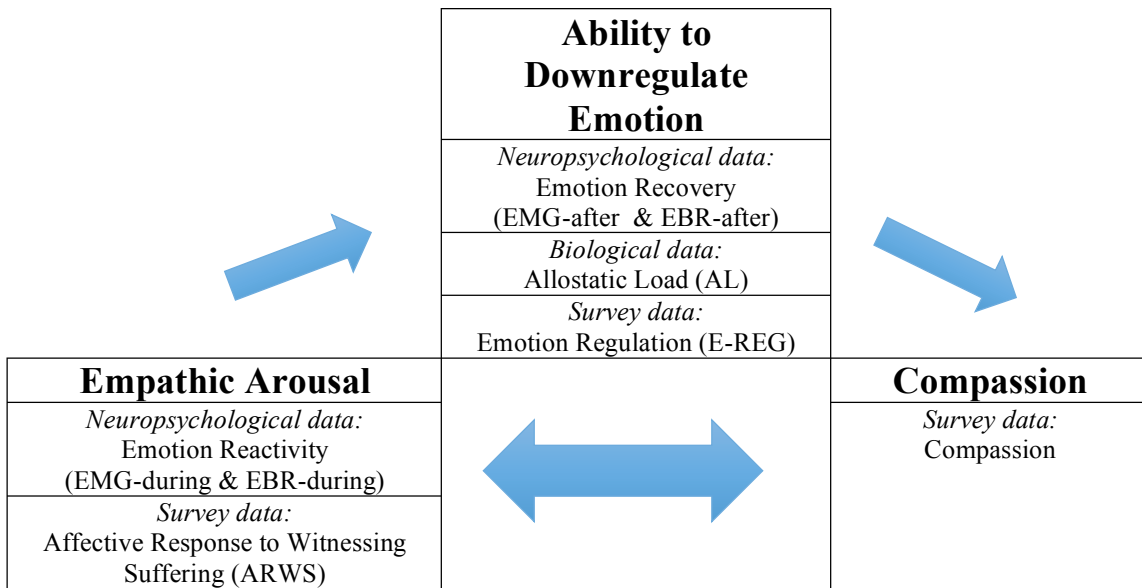


Figure 2. *Hypothesized Mediation Model*

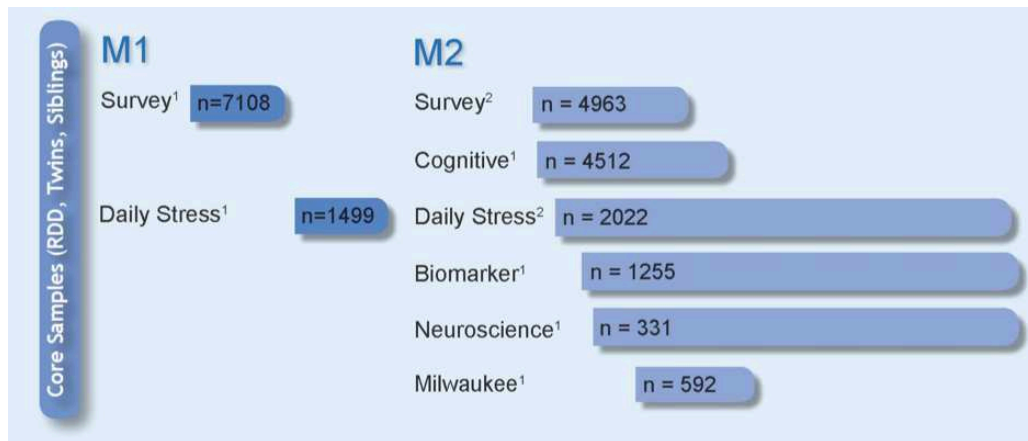


Figure 3. *MIDUS, Overview of Dataset*

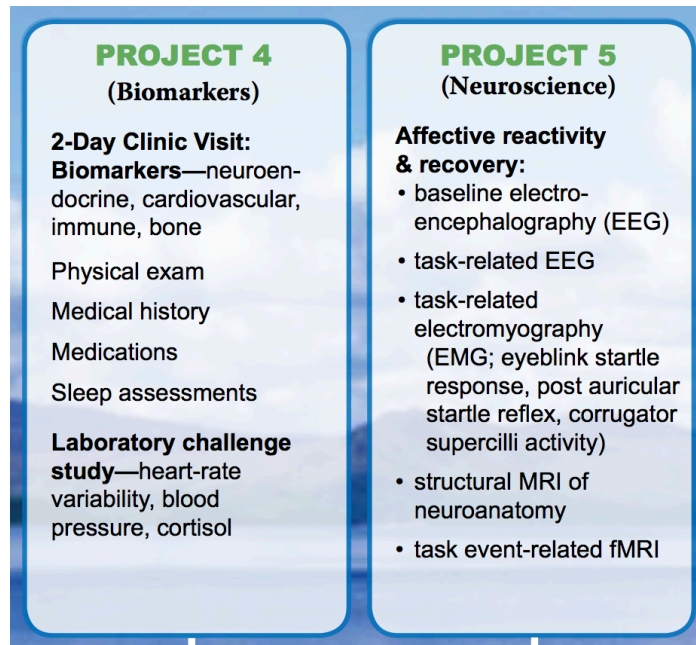


Figure 4. MIDUS-2, Overview of Project 4 and Project 5

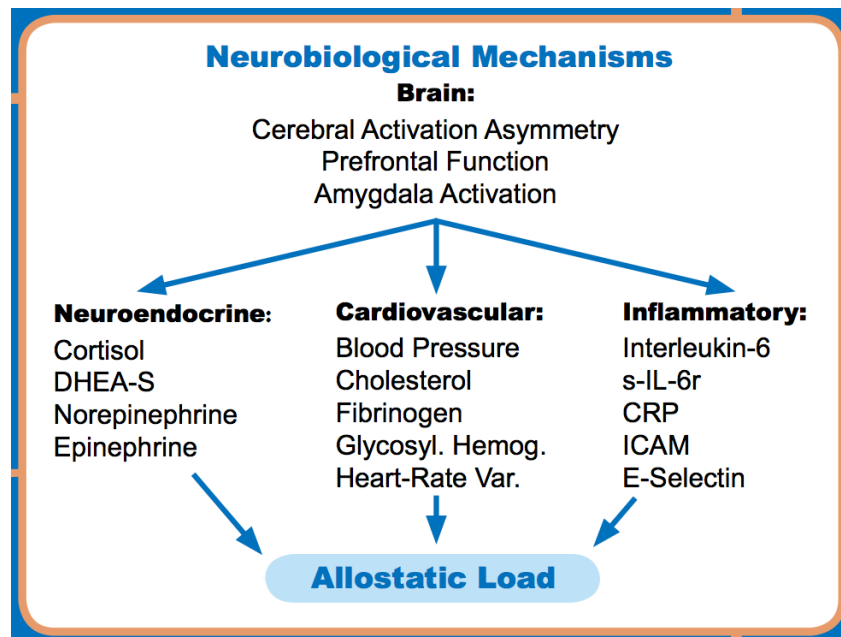


Figure 5. MIDUS-2, Project 4, Allostatic Load (AL) Biomarkers

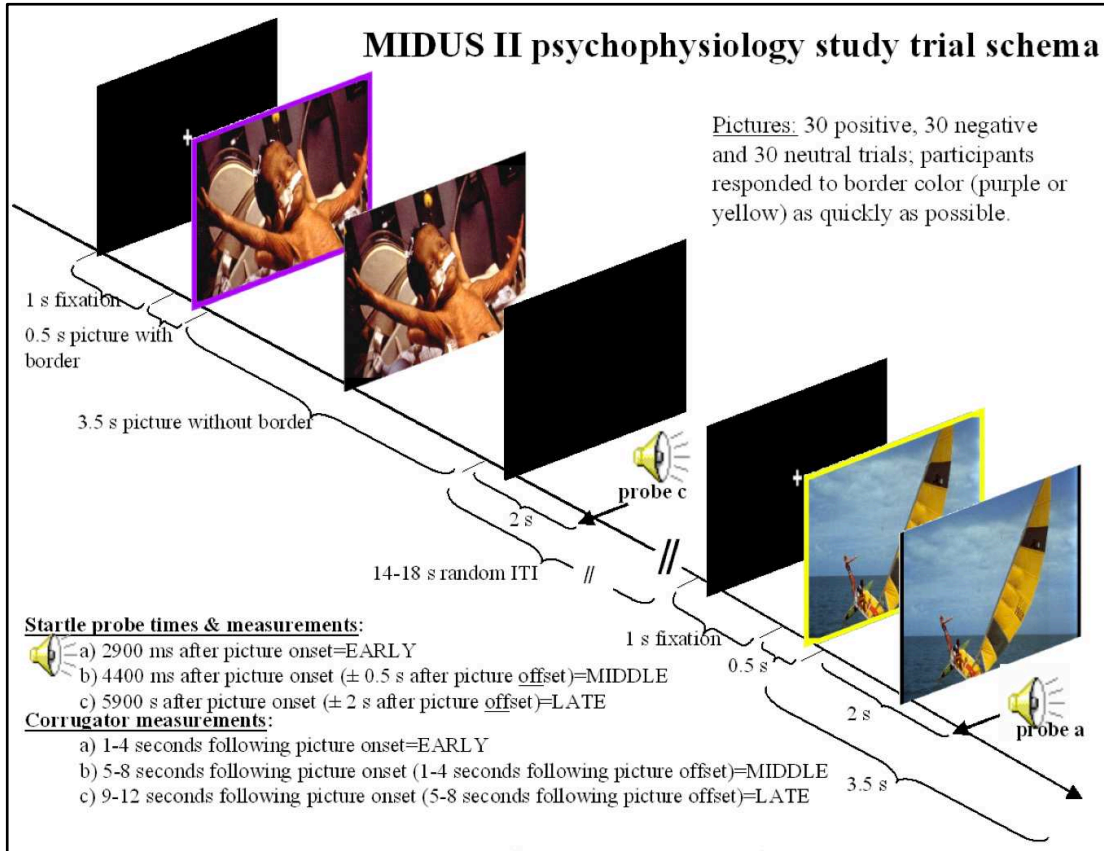


Figure 6. MIDUS-2, Project 5 Neuropsychological Data Collection Overview

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## Appendix A: Neuropsychological Data: Method and Calculation

### *Protocol for Collecting Neuropsychological Data:*

1. Both magnitude (includes nonresponses as 0 values in the composite measure) and amplitude (nonresponses are excluded from the composite measure) measures were included in the variables making up EBR-during and EBR-after. For EBR-during, startle probe measurements were taken 2900 ms after picture onset. For EBR-after, startle probe measurements were taken 5900 s after picture onset ( $\pm 2$  s after picture offset).
2. For EMG-during, corrugator measurements were taken 1-4 seconds following picture onset. For EMG-after, corrugator measurements were taken 9-12 seconds following picture onset (5-8 seconds following picture offset) = LATE.

## Appendix B: Allostatic Load Scores: Method of Data Collection

### *How Measurements for Allostatic Load (AL) Were Attained:*

The measurements that comprise the variable "Allostatic Load" were attained during Project 4 of MIDUS 2. Participants were assigned to data collection sites based on their place of residence, and data were collected during a 24-hr stay at one of three General Clinical Research Centers (Washington, D.C., Los Angeles, CA, and Madison, WI) between July 2004 and May, 2009. The protocol included a physical exam, 12-hour overnight urine sample and fasting morning blood draw (for details of the protocol, see Love, Seeman, Weinstein, & Ryff, 2010). The biomarkers reflect functioning of the hypothalamic-pituitary-adrenal axis, the autonomic nervous system, the immune system, cardiovascular system, musculoskeletal system, antioxidants, and metabolic processes. Specimens (fasting blood draw, 12-hour urine, saliva) allow for assessment of multiple indicators within these major systems. The protocol also included assessments by clinicians or trained staff, including vital signs, morphology, functional capacities, bone densitometry, medication usage, and a physical exam. Project staff obtained indicators of heart-rate variability, beat to beat blood pressure, respiration, and salivary cortisol assessments during an experimental protocol that included both a cognitive and orthostatic challenge.

## Appendix C: State-Anxiety Measure

### Spielberger State-Trait Anxiety Inventory, "NOW" Form:

Instructions: "A Number of statements which people have used to describe themselves are given below. Read each statement and then circle the response option to the right to indicate how you feel *right now*, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to describe your present feelings best."

(Continuous variable based on 20 items) Items: 20 items

1. I feel calm; 2. I feel secure; 3. I am tense; 4. I am regretful; 5. I feel at ease;
6. I feel upset; 7. I am presently worrying about possible misfortunes; 8. I feel rested;
9. I feel anxious; 10. I feel comfortable; 11. I feel self-confident; 12. I feel nervous;
13. I am jittery; 14. I feel "high strung"; 15. I am relaxed; 16. I feel content;
17. I am worried; 18. I feel over-excited and rattled; 19. I feel joyful; 20. I feel pleasant.

Coding: 1 (Almost Never) 2 (Sometimes) 3 (Often) 4 (Almost Always)

Scale was constructed by taking the mean of responses to the items. The following questions were reverse-scored: 1, 2, 5, 8, 10, 11, 15, 16, 18 and 20. Reverse- scoring means that instead of giving the participants 2 points for answering "2 – Sometimes," they were given 3 points. The reverse-scoring scale is as follows: 4 = 1, 3 = 2, 2 = 3, and 1 = 4.

## Appendix D: ARWS-Improved Items

### *ARWS-Improved Items (8 item scale)*

1. The sight of someone who is badly injured affects me strongly.
2. A picture of a starving child would really depress me.
3. A picture of a violent car accident makes me feel sick to my stomach.
4. A description of a badly wounded war victim would affect me strongly.
5. I am not affected by the moods of others (reverse scored)
6. If a person hurts someone close to me, I feel personally hurt as well.
- 7 I think nothing is more important than to be sympathetic to others.
8. I am moved when I hear of another person's hardship.

## Appendix E: E-REG-Improved Items

### *E-REG-Improved Items (10 item scale)*

1. When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.
2. When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.
3. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
4. When I want to feel more positive emotion, I change the way I'm thinking about the situation.
5. I control my emotions by changing the way I think about the situation I'm in.
6. When I want to feel less negative emotion, I change the way I'm thinking about the situation.
7. One can be a better person only through changing one's thoughts and feelings.
8. I control my emotions by changing the way I think about the situation I'm in.
9. When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
10. I do my best to maintain a calm mind.

Appendix F: Summary Table of Statistical Findings

Confounding variables and Compassion (C), controlled for in analyses:

state anxiety and C	$F(1, 312) = 9.44, p < .01$
gender and C	$F(1, 324) = 4.06, p < .05$

Empathic Arousal (3 components) and Compassion (C):

1. Affective Response to Witnessing Suffering (ARWS) and C	$r(323) = .26, p < .001$
2. Emotion Reactivity (EMG-during) and C	$F(1, 277) = .01, p = .937$
3. Emotion Reactivity (EBR-during) and C	$F(1, 251) = .04, p = .842$

Ability to Downregulate Emotion (4 components) and Compassion:

1. Emotion Regulation (E-REG) and C	$r(117) = .22, p < .01$
2. Emotion Recovery (EMG-after) and C	$r(288) = -.03, p = .573$
3. Emotion Recovery (EBR-after) and C	$r(266) = -.14, p < .05$
4. Allostatic Load (AL) and C	$r(304) = -.05, p = .373$

Ability to Downregulate Emotion (4 components) and Empathic

Arousal, operationalized by Affective Response to Witnessing

Suffering (ARWS):

1. Emotion Regulation (E-REG) and ARWS	$r(108) = .14, p = .143$
2. Emotion Recovery (EMG-after) and ARWS	$r(288) = .08, p = .178$
3. Emotion Recovery (EBR-after) and ARWS	$r(269) = .03, p = .640$
4. Allostatic Load (AL) and ARWS	$r(306) = .02, p = .711$