Assessment of Third Wave Therapy Assumptions about the Relation between Emotional Schemas and Psychoemotional Functioning

Emily Rachel Edwards
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ASSESSMENT OF THIRD WAVE THERAPY ASSUMPTIONS ABOUT THE RELATION BETWEEN EMOTIONAL SCHEMAS AND PSYCHOEMOTIONAL FUNCTIONING

by

EMILY R. EDWARDS

A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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by

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This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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ABSTRACT

Assessment of Third Wave Therapy Assumptions about the Relation between Emotional Schemas and Psychoemotional Functioning

by

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Advisor: Peggilee Wupperman

Recent advancements in emotion theory propose that emotional schemas – individualized conceptualizations and beliefs about emotions – serve a fundamental function in guiding psychoemotional processes. These advancements have progressed alongside the development of third-wave therapies, which presume emotional schemas to be deeply involved in perpetuating psychological distress and emotional dysfunction. To critically assess the validity of this presumption, the current research proposed and evaluated an integrative model of psychoemotional functioning.

Two studies were completed using a combination of behavioral, performance-based, and self-report measures of emotional schemas and psychoemotional functioning. Though further research is needed, results suggest the integrated model of psychoemotional functioning may have viability as a clinically relevant tool to organize and guide research in this area. The model suggests complex interrelations between maladaptive emotional schemas, emotion-processing deficits, avoidant coping, emotion-regulation ineffectiveness, and behavioral dysregulation, with emotional schemas playing a key role in guiding psychoemotional experience and functioning. Given the centrality of emotional schemas and psychoemotional functioning in third-wave therapies, the proposed model may inform future research on mechanisms of change in these treatments. The model may also be used to inform the development of novel intervention strategies to improve psychoemotional functioning.
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CHAPTER 1: INTRODUCTION

Recent years have seen a rise in the popularity of so-called “third-wave behavior therapies.” Third-wave behavior therapies are characterized by experiential treatment strategies that target client’s secondary reactions to private emotional experiences (e.g., mindfulness, acceptance). Typically, these treatments theorize that strongly held beliefs about emotion drive these secondary reactions, thereby shaping psychoemotional functioning (e.g., emotion processing, emotion regulation, behavioral regulation, etc.). The current research evaluated this theorized relationship.

**Third-Wave Behavior Therapy**

Third-wave therapies conceptualize psychological dysfunction and distress as resulting, at least in part, from unhealthy patterns of responding to private emotional experiences. These responses are believed to maintain psychological dysfunction and distress through effects on emotion processing, emotion regulation, and goal-directed behavior. Third-wave therapies commonly theorize these responses to stem from core beliefs about emotion (i.e., emotional schemas). Emotional schemas that characterize emotions as dangerous, socially unacceptable, and burdensome are theorized to impede emotion processing and regulation, thereby interfering with goal-directed behavior in highly emotional contexts. Conversely, schemas that characterize emotions as valid, temporal, and controllable are theorized to foster healthy emotion processing and regulation, thereby supporting goal-directed behavior regardless of emotional context (Greenberg, 2004; Hayes & Wilson, 1994; Linehan, 1993)\(^1\).

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\(^1\) Although most third-wave therapies suggest emotional schemas to underlie psychoemotional distress, the therapies vary in the extent to which they conceptualize emotional schemas as the primary predictor of psychoemotional dysfunction. For example, although Dialectical Behavior Therapy includes consideration of emotional schemas throughout conceptualization, it
Third-wave behavior therapies have garnered widespread empirical support and have been shown to improve psychological wellbeing in a variety of populations (Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004; Hayes, Villatte, Levin, & Hildebrandt, 2011; Kahl, Winter, & Schweiger, 2012; Öst, 2008). Despite these promising efficacy data, however, third-wave behavior therapies have been subject to considerable critique. In 2001, for example, third-wave therapies were accused of “getting ahead of their data” (Corrigan, 2001, p. 192), and supporters of these therapies were accused of having low commitment to empirical research and the scientific method (Corrigan, 2001). Similarly, associated research has been criticized for having poor methodological design, suffering weak theoretical basis, and “overselling” the significance of findings (O’Donohue, Snipes, & Soto, 2016; Öst, 2008).

Supporters of third-wave therapies have countered these critiques with substantial research demonstrating the beneficial outcomes of clinical trials (e.g., Hayes, Masuda et al., 2004; Kahl et al., 2012). Consequently, three third-wave therapies are considered “empirically supported treatments” by the American Psychological Association (i.e., Acceptance and Commitment Therapy, Dialectical Behavior Therapy, and Emotion-Focused Therapy; Society of Clinical Psychology, 2016). Responses to critiques rarely, however, consider limitations to the theoretical soundness of treatment-specific techniques and mechanisms of change. Without

emphasizes deficient emotion-regulation skills as a primary predictor of psychoemotional dysfunction (Linehan, 1993). By contrast, Acceptance and Commitment Therapy strongly emphasizes the role of emotional schemas in driving psychoemotional dysfunction and distress (Hayes & Wilson, 1994). Furthermore, some treatments suggest the relation between emotional schemas and psychoemotional dysfunction is bidirectional rather than unidirectional, such that maladaptive emotional schemas contribute to poor psychoemotional functioning, which, in turn, reinforces maladaptive emotional schemas. Discussing each of the unique models and hypotheses proposed by each treatment is beyond the scope of this research.
substantial development of literature in this area, the factors driving outcomes of third-wave behavior therapies remain debatable.

Current Research

The presumptive role of emotional schemas is a pervasive and foundational element of third-wave therapies. This element strongly shapes treatment development, case conceptualization, and theories about mechanisms of change for these treatments. However, the validity of this presumption remains unclear due to shortcomings in empirical evidence. The current research addresses this limitation by assessing the potential role of emotional schemas in shaping the nature and quality of emotion processing, emotion regulation, and dysregulated behavior.

To ensure theoretical soundness of the current research, proceeding chapters begin with a comprehensive review of conceptual and theoretical literature on emotion, emotional schemas, emotion processing, and emotion and behavior regulation. Chapter 2 critically evaluates four theoretical conceptualizations of emotion to provide a working conceptualization of emotion and emotional processes for the purposes of the present research. Chapter 3 reviews literature relevant to emotional schemas, which are conceptualized as *individualized conceptualizations and beliefs about emotions and emotional experiences*. In Chapter 4, emotion processing, *the process of perceiving and deriving meaning from emotional information*, is discussed. Finally, Chapter 5 reviews literature relevant to emotion and behavioral regulation, *cognitive and behavioral responses which serve to satisfy environmental demands and achieve personal goals while modulating the nature, intensity, and/or intensity of emotion*.

In Chapters 6, 7, and 8, the methods and results of two independent studies are introduced. Using a combination of self-report, performance-based, and behavioral methods,
these studies aim to clarify the relation between emotional schemas, emotion-processing deficits, emotion-regulation difficulties, and dysregulated behavior contexts. Finally, Chapter 9 discusses results within the context of emotion theory, third-wave behavior therapies, and implications for clinical practice.
CHAPTER 2: THEORIES OF EMOTION

Third-wave behavior therapies are distinguished in part from behavior and cognitive-behavior therapies through their exceptionally high emphasis on emotion and emotional processes. The conceptual definition of emotion, however, is a target of long-standing dispute. For centuries, theorists and philosophers have debated over the fundamental nature, underlying processes, and functions of emotional experiences (e.g., Darwin, 1872/1965; Izard, 2010; James, 1884). Some have emphasized relatively universal patterns in physiology or behavior, whereas others have tended to focus more closely on neurological correlates or cognition. The following sections evaluate four modern theories of emotion – Basic Emotion Theory, Appraisal Theory, Constructionist Theory, and Differential Emotion Theory – according to empirical support and limitations. Each section begins with a brief overview of the theory’s key points, reviews empirical support and critiques, and concludes with an overall evaluation of the theory.

Basic Emotion Theory

According to Basic Emotion Theory (see Ekman, 1992; Ekman & Cordaro, 2011; Levenson, 2011; and Tomkins, 1962; 1963 for reviews), basic emotions are conceptualized as automatic, biologically based responses to events. These include various emotions, such as anger, fear, sadness, and happiness. Basic emotions are theorized to have evolved as a means of effectively responding to corresponding environmental demands. Each basic emotion is associated with a unique, culturally universal pattern of physiological, behavioral, and experiential changes that best prepare the individual to respond. See Figure 1 for an illustration of these theorized relations. Concurrent activation of two or more basic emotions result in emotion blends, such as embarrassment, pride, or hope. Within this theoretical framework, all emotions can be categorized through the lens of basic emotions and emotion blends.
Figure 1: Basic Emotion Theory

Emotions are theorized to originate in affect programs, emotion-specific neural systems located within evolutionarily old brain systems (Tomkins, 1962). Affect programs increase the likelihood of survival in potentially threatening situations by enabling emotional activation to occur prior to higher-order cognition. For example, if a person is presented with a snake, affect programs would cause the person to jump away out of fear before cognitively registering that the snake (a) has appeared and (b) poses a potential threat. Social learning shapes affect programs across the life course, resulting in sometimes notable differences in emotional experience and expression across individuals and cultures.

Empirical Support

Over a half-century of interdisciplinary research has contributed to the ever-growing body of literature on Basic Emotion Theory. Such research provides empirical evidence to support the following principles of Basic Emotion Theory: (a) universality of emotional response systems, (b) coherence across response systems, and (c) functionality of response systems.

Universality of Emotional Response Systems. Large universalities in behavioral, physiological, and subjective emotional responses systems are consistently noted across individuals, cultures, and developmental periods. For example, discrete facial expressions are
largely consistent across culture and developmental periods as early as the third trimester of pregnancy (Ekman, 1972; Ekman & Friesen, 1971; Hata et al., 2013; Oster & Ekman, 1978; Reissland, Francis, & Mason, 2013). Even people with congenital blindness display stereotypical facial expressions, suggesting these behaviors are likely evolutionarily based (Cole, Jenkins, & Shott, 1989; Matsumoto & Willingham, 2009; Rinn, 1991). Each basic emotion is also associated with a unique pattern of autonomic nervous system activity, which is consistent across age, gender, and cultural background (Christie & Friedman, 2004; Kreibig, 2010; Levenson, 1992; Matsumoto, Nezlek, & Koopman, 2007).

Languages across the globe typically contain variants of basic emotion labels, such as happiness, anger, fear, and sadness (Plutchik, 1980; Russell, 1991), suggesting subjective emotional responses are also likely universal. Investigations into linguistic metaphors for emotion similarly suggest consistency across cultures (Kövecses, 2000; 2005; 2012). For example, metaphors for anger commonly refer to feelings of pressurized heat (e.g., ready to explode), whereas metaphors for love reference feelings of increased body temperature (e.g., hot for someone; Kövecses, 2000).

**Coherence across Emotional Response Systems.** If each basic emotion is associated with reliable changes in the behavior, physiological, and experiential response systems, then it is logical to presume high coherence across systems during emotional activation. Consistent with this presumption, general coherence is generally noted across emotional response systems, especially during periods of intense emotional arousal (Levenson, 2014; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005; Sze, Gyurak, Yuan, & Levenson, 2010). Coherence enables interactions across emotional response systems so that changes in one system often induce
changes in the other systems (e.g., artificial changes in facial expression induce corresponding changes in the autonomic nervous system; Levenson, Ekman, & Friesen, 1990).

*Functionality of Emotional Response Systems.* Basic Emotion Theory posits that the unique response systems associated with each basic emotion evolved so that emotional states would prepare the individual to respond effectively to environmental demands. In other words, emotional response systems evolved largely in the service of *functionality*. For example, anger is associated with increased blood pressure and urges to aggress or defend. Such changes in the physiological and behavioral response systems allow the organism to respond quickly and effectively to threats and challenges. Consistent with the theory of functionality, as emotional intensity increases, coherence across the emotional response systems also increases (Levenson, 2014; Mauss et al., 2005; Sze et al., 2010), and behavioral responses become more likely (Mauss et al., 2005).

Basic emotions are also characterized by distinct information-processing styles (see Schwarz, 2002 for a review). Positive emotions, generally indicative of low situational demands, are typically accompanied by a flexible, low-effort processing style reliant on stereotypes and routines. Alternatively, negative emotions, indicative of high situational demands and/or threats to survival, are accompanied by increased attention to detail, causal reasoning, threat detection, and accessibility to threat-related knowledge (Schwarz, 2002; Schwarz & Clore, 2007; Schwarz & Skurnik, 2003). These correlates of emotional experience increase the ability of an organism to respond effectively and efficiently in emotional situations.

Behavioral correlates of emotion may have also evolved to serve nonverbal, communicative functions. People are remarkably consistent in their interpretations of facial expressions of emotion (Adolphs, 2006; Öhman, 2005). Although some cultures emphasize
different features when making these interpretations, rates of agreement are consistently greater than chance across cultures (Elfenbein & Ambady, 2002; Fridlund, 2014; Izard, 1971; Jack, Garrod, Yu, Caldara, & Schyns, 2012).

Critiques

Despite widespread evidence supporting Basic Emotion Theory, field-wide controversies still exist, and some research yields findings which are contradictory to the foundational principles of this theory. Ironically, the greatest critique is the question of how to operationalize basic emotions. Theorists often adopt strikingly different definitions of “basic emotion,” resulting in dramatically disparate operationalizations across research studies (e.g., Ekman & Cordaro, 2011 versus Levenson, 2011). Even efforts to identify basic emotions through statistical factor analysis or cluster analysis vary widely. Some studies identify as few as two factors (e.g., Watson, Clark, & Tellegen, 1988), whereas others identify as many as twenty-five (e.g., Shaver, Schwartz, Kirson, & O’Connor, 1987). Critics argue inconsistent operationalization of basic emotion categories may reflect adherence to a faulty theoretical basis (e.g., Barrett, 2006; Ortony & Turner, 1990; Posner, Russell, & Peterson, 2005).

A second notable critique regards the tendency for researchers to interpret greater-than-chance consistencies across cultures as evidence of universality. Although cross-cultural consistencies may be notable, emotional response systems are far from homogeneous (Elfenbein & Ambady, 2002; Fridlund, 2014). For example, agreement on facial-expression interpretation is lower when people judge expressions of out-group members versus in-group members and lower when judging negatively valenced versus positively valenced expressions (Elfenbein & Ambady, 2002; Fridlund, 2014). Emotional language is also far from universal. Some tribal African languages do not distinguish between experiences of anger and sadness (Leff, 1973; Orley,
Similarly, many languages contain emotion words for which there are not appropriate translations (e.g., litost is a Czech word representing a feeling of “grief, sympathy, remorse, and indefinable longing”; Kundera, 1979/1980, p. 121-122).

Basic Emotion Theory conceptualizes emotions as discrete events with recognizable onsets and terminations. However, growing evidence suggests that emotional responses to one event often unconsciously influence emotional responses to later, unrelated events (Schwarz, 2010; Schwarz & Clore, 1983). Similarly, person-specific learning histories may unconsciously shape the quality and/or intensity of an emotional response (Eisenberg, Cumberland, & Spinrad, 1998). It is therefore fundamentally impossible to verify the establishment of an emotional “baseline” (i.e., a state characterized by a true lack of emotionality) against which discrete emotional states can be appropriately compared. This is largely unaddressed by Basic Emotion Theory.

Lastly, even standardized stimuli are susceptible to individual differences in interpretation and emotional response (Levenson, 2003). For example, a threatening stimulus may elicit a fear response from one person but induce anger in another. Validation of emotion-induction paradigms typically rely on self-reports of emotional state, assuming that individuals are accurate reporters of their emotional state and that the subjective experiential response system most accurately reflects emotion. As a result, accuracy of other response systems (e.g., behavioral, physiological) may be underestimated due to imperfect correlations with self-reports (Mauss et al., 2005).

**Evaluation of Basic Emotion Theory**

Basic Emotion Theory suggests that activation of discrete emotions triggers predictable changes in behavioral, physiological, and subjective response systems to prepare an individual to
respond to environmental demands (Tomkins, 1962; 1963). Empirical research has accumulated in support of these claims, shedding light on the commonalities in, coherence across, and functionality of human emotional response systems. Notwithstanding, such research is often plagued by methodological and conceptual limitations which impede understanding of person-specific emotional responding and processes underlying emotional experience.

**Appraisal Theory**

In contrast to Basic Emotion Theory, Appraisal Theory suggests that emotional responses occur as a result of individualized interpretations of personally relevant, environmental cues and events (i.e., *appraisals*; see Ellsworth, 2013; Moors, Ellsworth, Scherer, & Frijda, 2013; Scherer, 1999 for reviews). Appraisals are dimensional in nature and occur within various domains, such as novelty and goal significance. Combinations across appraisal domains are theorized to contribute to infinite variations in emotional experience that are inadequately captured through fixed emotion categories.

Appraisals are shaped by individual differences in “temperament, physiology, culture, current goals, past life experiences, and current situation” (Ellsworth, 2013, p. 126). When an appraisal is made, it triggers a corresponding emotional experience through influences on behavior, physiology, subjective feeling, and motivation. These emotional experiences then contribute to future appraisals, creating a cyclical relationship. See Figure 2. Notably, Appraisal Theory assumes no variation in the association between appraisals and emotional experiences (i.e., if a snake is regarded as dangerous, the person will experience fear; if the snake is appraised as innocuous, no fear will result). A fundamental goal of research in this area is therefore the identification of appraisals which most contribute to differentiation of emotional experiences.
In accordance with the propositions of Appraisal Theory, research has accumulated to suggest a strong interrelation between cognitive appraisals and emotional experiences. Specifically, research supports the following: (a) appraisals predict emotional experience, (b) changes in appraisals predict changes in emotional experience and (c) emotional experience alters future appraisals.

**Appraisals Predict Emotional Experiences.** Research suggests notable consistency in the association between appraisals and emotional experience. For example, appraisals of an event as urgent, purposefully caused by another, and having high coping potential are typically associated with experiences of anger. Alternatively, events appraised as longstanding, occurring by chance, and having low coping potential are typically associated with feelings of sadness (Scherer, 1997; 1999). Accuracy of statistical predictions of emotional experience also generally increases as more appraisals are considered (Scherer, 1997; 1999).

**Changes in Appraisals Predict Changes in Emotional Experience.** Appraisals are sensitive to extraneous influences, such as the social environment and ongoing internal processes. As these influences impact appraisals, corresponding changes in subjective emotional
experience also occur. For example, people tend to appraise and respond to unfamiliar and ambiguous situations in a manner consistent with the emotions displayed by others (e.g., engage if others appear happy and comfortable; withdraw if others appear anxious; Mireault et al., 2014; Möller, Majdandžić, Vriends, & Bögels, 2014; Murray et al., 2008; Nishida & Lillard, 2007; Parkinson, Phiri, & Simons, 2012). Similarly, when a group collectively encounters a situation, the appraisals and emotional responses of any one individual tend to mirror those of others in the group (Rydell et al., 2008; Smith & Mackie, 2008; Smith, Seger, & Mackie, 2007).

Appraisals and corresponding emotional experiences may also shift as a result of internal experiences. Purposefully restructuring appraisals made about an emotionally evocative situation can reliably change the nature and intensity of emotional responses to that situation (Burklund, Creswell, Irwin, & Liberman, 2014; Gross & John, 2003; Jackson, Malmstadt, Larson, & Davison, 2000; Lieberman, Inagaki, Tabibnia, & Crockett, 2011; Moore, Zoellner, & Mollenholt, 2008; Ochsner, Bunge, Gross, & Gabrieli, 2002; Szasz, Szentagotai, & Hofmann, 2011).

*Emotional Experiences Alter Future Appraisals.* Also consistent with Appraisal Theory, emotions resulting from prior, unrelated experiences tend to alter perceptions of immediate experience so that appraisals are mood congruent (Schwarz & Clore, 1983; 2007). That is, when forming appraisals, people tend to ask themselves, “How do I feel about this?” and to use momentary feelings as a source of information. Consequently, people tend to make positive appraisals about objects and events when they are feeling positively and to make negative appraisals when feeling negatively, even when emotions are merely incidental (see Schwarz & Clore, 2007 for a review).
Critiques

Some theorists have refuted Appraisal Theory on the grounds that some evidence seemingly contradicts the temporal sequence between appraisals and emotions theorized by Appraisal Theory. Neurological evidence, for instance, suggests electrophysiological activity associated with emotional experiences occurs much earlier than activity associated with appraisals. Notable differences in patterns of neurological response to happy and fearful facial expressions can be noted as early as 145ms after stimulus presentation (Li, Zinbarg, Boehm, & Paller, 2008). Even when basic appraisals are held constant (i.e., valence and arousal), notable differences in neurological responses to fearful versus disgusting images can also be noted as early as 300ms after stimulus presentation (Xu et al., 2015). Priming paradigms rely heavily on this neurological primacy of emotional over cognitive processes. Within priming paradigms, emotional stimuli prime powerful emotional responses, even when stimuli are not consciously detected and corresponding appraisals do not occur (Li et al., 2008; Öhman & Soares, 1994; Winkielman, Berridge, & Wilbarger, 2005; Zajonc, 2000).

Some critics also argue that fundamental methodological flaws severely undermine Appraisal Theory (e.g., Ellsworth, 2013). For example, although Appraisal Theory asserts that appraisals contribute to individualized nuances in emotional experience, assessment of emotion relies on broad emotion categories reminiscent of Basic Emotion Theory. Whether such nuances actually exist and whether they are predicated on appraisals therefore remain unanswered empirical questions. They cannot be considered empirically-based theoretical assertions as is commonly suggested by Appraisal Theory. Assessment of appraisals also relies heavily on self-reports. However, most appraisals occur outside of awareness (Frijda, 1993; Parkinson, 1997). Cognitive dissonance theory suggests that after making a decision (e.g., identifying which
emotion is being experienced), individuals are likely to make retrospective justifications for decision making (Cooper, 2007; Festinger & Carlsmith, 1959). It is therefore unclear whether self-report appraisals are accurate estimations of participants’ initial appraisals of emotional stimuli or reflect post-hoc rationalizations of experience.

Lastly, although Appraisal Theory posits a causal relation between appraisals and emotional experience, most studies examining this relation utilize a cross-sectional or quasi-experimental design. Assessment of causality would require experimental manipulation of appraisals. However, appraisals are presumably person-specific. It therefore remains unclear whether (a) research is capable of reliable methodological control of appraisals and/or (b) research that achieves reliable methodological control is representative of the individualized appraisals proposed by Appraisal Theory.

Evaluation of Appraisal Theories of Emotion

Appraisal Theory suggests that emotional experiences occur as a result of person-specific appraisals of personally relevant cues and events. Research accumulated in support of this theoretical approach offers insight into the role of individual and environmental factors contributing to ongoing emotional experience. Nevertheless, numerous core aspects of Appraisal Theory are unable to be tested by modern scientific methods. Consequently, the utility of Appraisal Theory in understanding the origin and nature of discrete emotional experiences is limited.
Constructionist Theory & the Circumplex Model of Affect

In contrast to the emphasis of Basic Emotion Theory and Appraisal Theory on environmental cues, Constructionist Theory\(^2\) proposes that emotions result from interpretations of internal neurobiological changes (Barrett, 2006; 2009; Gendron & Barrett, 2009). Within this framework, emotions are conceptualized as qualitatively indistinct from other psychological processes, because they can be broken down into the same basic components that underlie all psychological states (e.g., neurological changes, cognitive processes, etc.; Barrett, 2006; 2009). Constructionist Theory denies the existence of emotion-specific brain regions or structures in favor of interconnected brain networks that yield all psychological experience.

The most common Constructionist Theory of emotion is the Circumplex Model of Affect. This model conceptualizes emotion as the process of making meaning out of neurobiological affect as it relates to the situation at hand, previous experience, and semantic knowledge (see Barrett, 2009; Gendron & Barrett, 2009; and Posner et al., 2005 for reviews). The Circumplex Model suggests that emotion categories (e.g., fear, sadness, etc.) inaccurately imply naturally occurring boundaries between emotional experiences. However, much like the spectrum of color, emotions can be best understood as a continuum of ambiguous and interrelated psychological states. That people often understand and describe emotions in terms of discrete categories is a mere artificial byproduct of language. Two neurophysiological systems – affective valence and affective arousal – are theorized to underlie this emotional continuum. Differences in emotional experiences stem from cognitive interpretations of activation patterns across these systems. See Figure 3.

\(^2\) Constructionist Theory has also been applied to conceptualization of other psychological states and processes, such as thinking, attention, and memory (e.g., Barrett, 2009). However, analysis of these other applications is beyond the scope of this review. This section therefore focuses exclusively on the application of Constructionist Theory to emotional states and processes.
Empirical Support

Support for the Circumplex Model stems primarily from psychometric studies and neurological evidence. Such research supports the following tenets of this theoretical model: (a) affective valence and arousal explain a greater proportion of variance in observable indicators of emotional experience than discrete emotion categories, (b) affective valence and arousal can be traced to neurobiological indicators, and (c) cognition plays a key role in translating affect into conscious emotional experience.

Taxonomic Structure of Emotion. Various studies have examined the underlying taxonomic structure of emotion using statistical factor analysis and multidimensional scaling. Many suggest that two factors – positive and negative valence – underlie the labels used to communicate and describe emotional experiences (e.g., Barrett & Fossum, 2001; Barrett & Russell, 1998; Russell, 1980; Watson et al., 1988). Affective dimensions of valence and arousal are also evident in other indicators of emotional experience. Changes in facial muscles and physiological activity correlate weakly with discrete emotion categories, but strongly with
stimulus valence and arousal (Christie & Friedman, 2004; Fridlund, 2014; Lang, Greenwald, Bradley, & Hamm, 1993). Such research collectively suggests that behavioral and physiological indicators of emotion may be better understood in terms of affective valence and arousal dimensions rather than discrete emotion categories.

**Neurobiology of Affect.** Certain neurological structures and networks are also reliably associated with affect valence and arousal. The mesolimbic dopamine system, for example, is heavily involved in processing reward and pleasure (see Wise & Rompre, 1989 for a review). Animals given the opportunity to directly stimulate the mesolimbic dopamine will continue doing so even at the risk of starvation or dehydration (Mora, Avrith, & Rolls, 1980; Rolls, Burton, & Mora, 1980). The reticular formation and limbic system are highly responsive to affective arousal (Garavan, Pendergrass, Ross, & Risinger, 2001; Jones, 2003; Rauch, Savage, Alpert, Fishman, & Jenike, 1997). Damage to these arousal-based structures results in reduced emotional arousal, deficient recognition of emotional facial expressions, and reduced ability to distinguish emotionally arousing stimuli from nonarousing stimuli (Adolphs, 2002a; 2002b; Davis & Whalen, 2001; Heilman, Watson, & Valenstein, 2003).

**Interaction between Cognition and Affect.** Structures involved in higher-order cognition function to translate neurobiological affect into conscious experience of emotion. This process stems primarily from activity in the prefrontal cortex (Posner et al., 2005). Connections with the brainstem and limbic system provide the prefrontal cortex with information about “the internal environment, the level of arousal, the drives and motives …, and the visceral concomitants of emotion” of the individual (Fuster, 2001, p. 320). The prefrontal cortex then integrates this information within the context of situational cues, past learning history, and expectations, resulting in conscious recognition of emotional experience (Cardinal, Parkinson, Hall, & Everitt,
Damage to the prefrontal cortex commonly results in poor emotion-regulation ability, little consideration of contingencies or consequences, and poor integration of emotional and cognitive systems in decision making (Bechara, Damasio, Damasio, & Anderson, 1994; Bechara, Tranel, & Damasio, 2000; Koenigs et al., 2007; Rolls, Hornak, Wade, & McGrath, 1994). Collectively, such research suggests a strong interaction between cognition and affect in guiding emotional behavior and a significant influence of the prefrontal cortex on this interaction.

Critiques

In spite of the aforementioned empirical support, Constructionist Theories (particularly the Circumplex Model of Affect) have been widely criticized by emotion researchers for failing to consider widespread evidence for discrete emotion categories (e.g., Panksepp, 2007). For example, studies indicating two underlying factors for emotion (i.e., positive valence, negative valence) are commonly cited as evidence for a dimensional approach to emotion conceptualization (e.g., Posner et al., 2005). However, there is wide disparity in the number of factors identified by taxonomic studies of emotion structure (e.g., Shaver et al., 1987 identifies twenty-five factors). Some evidence suggests that models considering discrete emotional categories yield higher goodness-of-fit statistics in comparison to two-factor constructionist models (Power, 2006). Thus, while research into affective dimensions may be justifiable, research to date does not provide enough support to abandon use of discrete emotion categories altogether.

Also contrary to assertions of Constructionist Theories, some evidence suggests neurological differences across discrete emotion categories. Meta-analyses suggest that basic emotions triggered through emotion-induction paradigms are associated with strikingly different
patterns of neurological activation (Murphy, Ninno-Smith, & Lawrence, 2003; Phan, Wager, Taylor, & Liberzon, 2002; Vytal & Hamann, 2009). Localized electrical stimuli of the brain can also reliably induce discrete emotional states, such as sadness, happiness, panic, and fear in both humans and animals (see Panksepp, 2007 for a review). These data suggest differential patterns of neurological activation across like-valenced emotions, thereby challenging the purely dimensional model popularized by Constructionist Theories.

Constructionist Theories conceptualize emotion as a continuous spectrum of experience with no qualitatively distinct categories. If this is the case, then arbitrary classification of emotional experience into rigid categories should have detrimental influences on emotion quality, processing and regulation. Nevertheless, research suggests that the availability of discrete, linguistic labels for emotions makes emotional experiences more accessible, understandable, and able to be regulated (Lieberman et al. 2011; Niles, Craske, Lieberman, & Hur, 2015). Similarly, greater ability to differentiate between like-valenced emotions is associated with superior emotional and social functioning (e.g., Barrett & Gross, 2001; Burklund et al., 2014; Edwards & Wupperman, 2017; Kashdan, Barrett, & McKnight, 2015). Thus, although Constructionist Theories suggest that emotions exist along a continuous spectrum, empirical data suggests that individuals with this experience are likely characterized by atypical, poor psychoemotional functioning.

_Evaluation of Constructionist Theory and the Circumplex Model of Affect_

Constructionist Theory and the Circumplex Model of Affect offer a unique perspective on emotion through examination of the interactions between neurological activity and subjective emotional experiences. Through these theories, the field gains understanding of the ways in which overlapping neurological systems might contribute to seemingly disparate emotion
experiences. Nevertheless, Constructionist Theory is unable to account for the wide range of research validating qualitatively distinct emotion categories. Near exclusive consideration of neurological correlates also limits the ability for this theory to be incorporated into the broader field of emotion research.

**Differential Emotion Theory**

Based largely in an evolutionary and developmental approach, Differential Emotion Theory posits a distinction between *first-order emotions* and *emotion schemas* (see Izard, 2007; 2009; 2011 for reviews). Similar to the conceptualization proposed in Basic Emotion Theory, *first-order emotions* are defined as evolutionarily-based, psychological processes that motivate and guide cognition and behavior in situations of survival and wellbeing. First-order emotions retain evolutionarily-based features, such as expressive and communicative signals, and occur automatically in the absence of higher-order cognition. Due to the minimal cognitive involvement, Differential Emotion Theory suggests that first-order emotions exist primarily in infancy, early childhood, and extremely emotionally provocative situations.

In contrast, *emotion schemas* result from the interaction between first-order emotions and higher-order cognitive processes (e.g., appraisal, learning, etc.) developed throughout life. They are the emotional experiences of everyday adult life. Emotion schemas may be adaptive or maladaptive depending on associations made between emotion feelings, cognitions, and behaviors. Whereas first-order emotions are bioevolutionarily determined, emotion schemas are influenced by extraneous factors, such as individual differences and situational or social context. As such, there is consistency across individuals in first-order emotions, but considerable

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3 *Emotion schemas* as conceptualized by Differential Emotion Theory are distinct from *emotional schemas* as conceptualized in Chapter 3. Emotion schemas refer to emotional experiences resulting from the interaction between first-order emotions and higher-order cognitive processes. In contrast, emotional schemas refer to an individual’s core beliefs about emotions and emotional processes.
variation in emotion schemas. This variation underlies the variability in results across emotion research, which tends to examine emotion schemas and not first-order emotions.

Unlike other models of emotion, Differential Emotion Theory also emphasizes the subjective feelings aspect of emotion. Differential Emotion Theory conceptualizes a feeling as “a phase of neurobiological activity that is sensed by the organism” (Izard, 2009, p. 4). Feelings are theorized to stem from evolutionary and neurobiological development. Through influences on motivation, feelings are inherently adaptive, aiding in effective emotion regulation, behavior regulation, and social functioning.

Empirical Support

Evidence supporting Differential Emotion Theory stems from various areas, including evolutionary, developmental, neurological, clinical, and social psychology. Cumulatively, research from these areas provides support for the following premises of Differential Emotion Theory: (a) emotions as evolutionarily derived; (b) occurrence of first-order emotions in the absence of higher-order cognition; (c) emotion schemas as shaped by developmental processes; and (d) motivational and adaptive purpose of feelings.

Emotions as Evolutionarily Derived. Humans display behavioral signs of emotion from infancy (e.g., facial expressions; Izard et al., 1995). These signs are automatic and emotionally distinct, and they occur predictably in reaction to environmental influences (Lewis, Ramsay, & Sullivan, 2006; Montague & Walker-Andrews, 2001; Stenberg & Campos, 1990). The young age at which infants begin to display these behaviors suggests that emotions are not learned or constructed via conceptual, cognitive processes. Rather, they appear to stem from psychological processes present at birth and evolutionarily innate to human experience (Izard, 2007).
Research on fear clearly exemplifies the evolutionary roots of emotion. Fear evolved to motivate avoidance of and escape from potential threats to survival (Öhman & Mineka, 2001). Consistent with this, experiences of fear are characterized by hypervigilance and quickness to react. The large discrepancy between typical targets of human fear and actual threat posed by such targets reflects the evolutionary basis of this emotion. Humans are more likely to fear objects that threatened the survival of human ancestors than objects that pose threats to modern survival (e.g., to fear animals and heights more than motor vehicles and firearms; Arrindell, Pickersgill, Merckelbach, Arden, & Cornet, 1991; Öhman & Mineka, 2001).

Emotion without Higher-Order Cognition. Also consistent with Differential Emotion Theory, research suggests that emotions may occur in the absence of higher-order cognition. Prior to the development of higher-order cognition, infants display various behavioral signs of first-order emotions (Izard & Malatesta, 1987; Lewis, 2008). These capacities for behavioral expression are fundamental to nonverbal communication between infants and caregivers (Termine & Izard, 1988) and have contributed to empirical development of anatomically-based coding systems for deciphering infants’ facial expressions (e.g., Izard, 1979; Oster, 2007). Case studies on children with hydraencephaly (a medical condition characterized by absent or grossly underdeveloped cerebral hemispheres) similarly suggest that stereotyped emotional behaviors may occur despite the absence of higher-order cognitive abilities (Merker, 2007).

Emotion Schemas are Shaped by Developmental Processes. Differential Emotion Theory conceptualizes emotion schemas as the interaction between cognition and emotion, implying that cognitive development plays a key role in the emergence and development of emotion schemas. Consistent with this, neural substrates underlying emotional processes develop and change in accordance with cognitive and social development throughout life (Camras et al., 1998; 2002;
Izard et al., 1995). By age two, cognitive development of self-awareness contributes to the emergence of “self-conscious emotions,” such as embarrassment and envy (Lewis, 2003; 2008). Similarly, by age three, growing ability to evaluate behavior against social standards yields the capacity for pride, guilt, and shame (Lewis, 1992; 2003). Experiences of emotion socialization, such as modeling, contingencies, and emotional coaching, also shape the ways in which emotions develop (Eisenberg et al., 1998; Halberstadt, 1991).

*Feelings as Motivational and Adaptive.* Lastly, Differential Emotion Theory posits that feelings motivate and guide cognitions and behavior, making certain responses more likely when a particular feeling is present. Consistent with this, self-reported emotional states are associated with recognizably distinct patterns of cognition and behavior (see Coherence across Emotional Response Systems, p. 7). Clinical research, stemming primarily from third-wave behavior therapies, suggests that feelings are also inherently adaptive. Across clinical trials, psychotherapies that explicitly emphasize the adaptive quality of emotions are efficacious in improving emotion-processing ability, coping, problem solving, and social competence (Izard, 2001; Stark, Schnoebelen, Simpson, Hargrave, & Glenn, 2007). Similarly, psychotherapies that emphasize the importance of working with emotional experiences rather than against them have shown great success in decreasing psychopathology and improving overall psychological wellbeing (e.g., Greenberg, 2004; Hayes & Wilson, 1994; Linehan, 1993).

*Critiques*

Though substantial research provides evidence in support of Differential Emotion Theory, some research yields results that are contradictory or open to alternative explanation. For example, some evidence suggests that negative emotional expressions, particularly in infancy, may be more appropriately interpreted as general indicators of distress rather than indicators of
discrete emotional experience (e.g., Camras, Oster, Campos, & Bakemend, 2003; Camras et al., 2007; Oster, 2005; Sroufe, 1996). Differential Emotion Theory has countered these critiques by suggesting that validation of anatomically-based coding systems for infant emotional expressions (e.g., Izard, 1979; Oster, 2007) provide evidence for discrete emotional experiences at this age. Differential Emotion Theory also suggests that first-order emotions are rarely seen in their pure form in adulthood due to the increased involvement of cognition in emotion processing and experience. As such, research on emotional experience in adult samples are likely examining emotion schemas and have only limited implications on theories of first-order emotions (Izard, 2009).

The evolutionary function of emotional expression, particularly in preverbal infants, is also challenged by empirical evidence. Infants often display facial expressions which are seemingly random and/or ill-fitted to situational context (Bennett, Bendersky, & Lewis, 2005; Camras & Shutter, 2010). The unpredictability and low specificity of infants’ facial expressions have led some theorists to equate early facial expressions with babbling – random behaviors that gain significance through socialization (Cole & Moore, 2015). Consistent with this, situational appropriateness of emotional expressions tends to increase with age (Bennett et al., 2005).

Relatedly, there are various concerns regarding the validity of measures of emotionality in infants, a commonly studied population in Differential Emotion Theory research (see Camras & Shutter, 2010 for a review). First, because infants are unable to verbally express emotional states, measures of infants’ emotionality rely on strong presumptions about the concordance between emotional behavior and emotional experience. Second, although adults are generally confident in their interpretations of infants’ emotional expressions (e.g., facial expressions, body language, etc.) inter-rater reliability of infant expressions is not very high (i.e., typically less than
60% agreement; Camras & Shutter, 2010; Izard, Huebner, Risser, McGinnes, & Dougherty, 1980; Oster, Hegley, & Nagel, 1992). Lastly, measures of infant emotionality are limited by the principle of equipotentiality – the tendency for individuals to employ various responses to achieve the same outcome (e.g., using both laughter and crying to obtain parental attention). Because of equipotentiality, covariation between different response systems (i.e., behavior and subjective experience) might not always occur (Saarni, Campos, Camras, & Witherington, 2006).

Notable methodological limitations are also associated with the empirical study of emotional feelings. Unlike other theories of emotion, Differential Emotion Theory suggests emotional feelings are highly significant for motivational purposes. However, due to their inherently subjective nature, assessment of emotional feelings is based exclusively on self-report. Though self-report measures of emotionality generally display strong psychometric properties (e.g., Watson et al., 1988), individuals vary in their ability to accurately label and report their emotional feelings (Bagby, Taylor, & Parker, 1994; Barrett & Gross, 2001). Construct validity of self-report measures of emotionality may therefore be limited for some populations.

**Evaluation of Differential Emotion Theory**

Through an evolutionary and developmental lens, Differential Emotion Theory provides a framework on the development, function, and experience of emotion. This perspective offers insight into the interaction between emotional and cognitive processes over the life course. Unlike other theories of emotion, Differential Emotion Theory has been modified multiple times since its introduction to integrate developing empirical knowledge. As a result, it has assimilated seemingly contradictory findings into a cohesive framework for conceptualizing emotion and emotional experience. Differential Emotion Theory is also, however, restricted by methodological limitations associated with the evolutionary and developmental perspective.
**Adopted Theoretical Principles**

Given the aforementioned discussion of emotion theories and associated research, the following theoretical principles were adopted for the purposes of conceptualizing emotion and emotional experience in the present research. These principles have been strongly supported throughout the literature and are consistent with conceptual approaches of third-wave behavior therapies. Principles are informed by Basic Emotion, Appraisal, Constructionist, and Differential Emotion theories. Formulation of these principles attempts to integrate findings across these seemingly conflicting theoretical approaches into a comprehensive framework to guide emotion research.

1. Emotions are bioevolutionarily-based psychological responses to ecologically valid stimuli (i.e., stimuli to which responses are evolutionarily derived) and conditioned counterparts.

2. Emotions are qualitatively distinct from other psychobiological processes, including cognition and homeostatic sensations.

3. Emotions motivate and guide cognition and behavior in situations of survival, wellbeing, and interpersonal relation.

   a. Emotions are inherently adaptive through influences on cognition and behavior.
   b. Emotions increase the likelihood of emotionally distinct patterns of cognition and behavior. These patterns are probabilistic, but not necessary for emotion to occur.
   c. Emotions induce emotionally distinct patterns of physiological and neurological change, which increase the situational appropriateness of cognitive and behavioral responses. These changes are necessary, but not sufficient for emotion to occur.
4. Basic emotions can exist independently of higher-order cognition early in development, under circumstances of extreme emotionality, and in cases of neurological damage or underdevelopment. Activation of basic emotions requires only perception of an ecologically valid stimulus or conditioned counterpart. Anger, fear, sadness, disgust, surprise, happiness, and interest are basic emotions.\textsuperscript{d}

5. Conscious experiences of emotion (i.e., feelings) are the result of an ongoing, bidirectional interaction between basic emotional processes and cognitive processes.\textsuperscript{b,c,d}

   a. Motivational influences of feelings are reflected, in part, through valence and arousal intensity.\textsuperscript{c}

   b. Cognitive processes are influenced by cognitive appraisals, socialization and learning history, situational and social context, and individual differences.\textsuperscript{b,d}

   c. The bidirectional interaction between emotional and cognitive processes allows for experience of self-conscious emotions (i.e., embarrassment, shame, guilt, pride, jealousy, and envy) and other non-basic emotions (e.g., nostalgia, amusement, confusion, frustration, etc.).\textsuperscript{b,d}

6. The nature of emotional experience, processing, expression, and regulation is shaped by developmental influences, social influences, and individual differences.\textsuperscript{d}

\textsuperscript{a}Principle stems from Basic Emotion Theory

\textsuperscript{b}Principle stems from Appraisal Theory

\textsuperscript{c}Principle stems from Constructionist Theory

\textsuperscript{d}Principle stems from Differential Emotion Theory
### Table 1: Theories of Emotion

<table>
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<tr>
<th>Conceptualization</th>
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<th>Appraisal Theory</th>
<th>Constructionist Theory</th>
<th>Differential Emotion Theory</th>
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</thead>
<tbody>
<tr>
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<td>Appraisals of personal relevance of stimuli or situations in the environment</td>
<td>Meaning analysis of internal state</td>
<td>Perception of ecologically valid stimulus or conditioned counterpart</td>
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<tr>
<td>Behavior</td>
<td>Necessary, but not sufficient for emotional experience</td>
<td>Necessary, but not sufficient for emotional experience</td>
<td>Probabilistic, but not necessary for emotional experience</td>
<td>Probabilistic, but not necessary for emotional experience</td>
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<td></td>
<td>Serves survival and communicative functions</td>
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<td></td>
<td>Serves survival and communicative functions</td>
</tr>
<tr>
<td>Cognition</td>
<td>Emotion as qualitatively different from cognition</td>
<td>Emotion as qualitatively different from cognition</td>
<td>Emotion as not qualitatively different from other forms of cognition</td>
<td>Emotion as qualitatively different from, but always interacting with, cognition</td>
</tr>
<tr>
<td>Physiology</td>
<td>Necessary, but not sufficient for emotional experience</td>
<td>Necessary, but not sufficient for emotional experience</td>
<td>Necessary, but not sufficient for emotional experience</td>
<td>Necessary, but not sufficient for emotional experience</td>
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<tr>
<td></td>
<td>Serves to prepare the organism to respond effectively</td>
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<td>Serves to prepare the organism to respond effectively</td>
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<tr>
<td>Neurology</td>
<td>Emotion-specific systems</td>
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<td>Same structures and networks underlie all psychological states</td>
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<tr>
<td>Cause of Variability</td>
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CHAPTER 3: EMOTIONAL SCHEMAS

Emotions are a core, central aspect of human experience. The processes and nature of emotional experiences are highly individualized and shaped by developmental, social, and cognitive influences. Third-wave therapies place psychotherapeutic emphasis on beliefs about emotion as a source of variability in emotional experience (e.g., Greenberg, 2004; Hayes & Wilson, 1994; Linehan, 1993). In third-wave therapies, these beliefs (i.e., emotional schemas) are core to conceptualizations of psychopathology etiology, development, and maintenance. Third-wave psychotherapies challenge emotional schemas that are maladaptive in their effects on emotion processing and regulation and foster the development of more adaptive emotional schemas. This chapter provides an overview of research on emotional schemas, including the nature of typical emotional schemas, development across the life course, historical relations to cultural norms, and relation to psychoemotional functioning. The chapter concludes with a brief discussion of methodological limitations common to this budding area of research.

Conceptualization

Theoretical basis for emotional schemas stems from the theory of meta-cognitive beliefs (Wells, 1995). According to this theory, people hold beliefs about the nature and quality of their own cognitive processes (e.g., “My worries are uncontrollable,” “I have a good memory,” etc.). The nature of these meta-cognitive beliefs shape the strategies an individual adopts to respond and control his/her own cognitive processes (Wells, 1995). Within the context of emotions, emotional schema theories suggest that core beliefs (i.e., schemas) about emotions and emotional processes drive the nature of an individual’s reactions to his/her own emotional experience (Leahy, 2002; Manser, Cooper, & Trfusis, 2012; Mitmansgruber, Beck, Höfer, & Schüßler, 2009). Emotional schemas may include beliefs about (a) typical course of emotional experience,
(b) causes and consequences of emotional experience, (c) implications of emotions on self-concept, and (d) appropriate and effective means of regulating emotion. Various types of emotional schema have been identified, including, but not limited to:

- **Validation**: predictions of others’ understanding of and receptiveness to emotional experiences
- **Uncontrollability**: extent to which emotional experiences are within the control of the individual and/or responsive to regulatory attempts
- **Guilt**: extent to which emotions are shameful or embarrassing to experience
- **Useless**: extent to which emotions are unhelpful and/or inconvenient to experience
- **Dangerousness**: extent to which emotions are damaging or harmful

When an emotion is activated, emotional schemas shape the ways in which the emotion is understood and subsequently regulated. Thus, emotions are an object to be appraised and evaluated by cognition rather than simply a cause or consequence of cognition (Leahy, 2012a; Wells, 1995). If an emotion is appraised as normal, valid, etc., then it is likely to be accepted, and expression and validation-based regulation strategies are likely to be used. In contrast, emotions appraised as abnormal, invalid, problematic, etc. are likely to be pathologized, and avoidance, rumination, or suppression are likely to result (Bastian et al., 2012; Bartsch, Vorderer, Mangold, & Viehoff, 2008; Leahy, 2002; Mendonça, 2013; Mitmansgruber et al., 2009; Norman & Furnes, 2016). As such, emotional schemas that foster self-validation and acceptance are theorized to contribute to adaptive psychoemotional functioning, whereas schemas that encourage self-judgment are theorized to perpetuate psychoemotional difficulty (Leahy, 2002; Norman & Furnes, 2016).
Assessment

Various types of emotional schemas have been assessed throughout the literature. Most measures assess individual schemas, such as beliefs about the (a) effectiveness of coping with certain emotional experiences (e.g., The Perceived Ability to Cope with Trauma Scale; Bonanno, Pat-Horenczyk, & Noll, 2011), (b) effects of expressing emotions to others (e.g., Ambivalence over Emotional Expression Questionnaire; King & Emmons, 1990), (c) controllability or changeability of emotional experiences (e.g., Implicit Beliefs about Emotion Scale; Tamir et al., 2007), and (d) consequences of emotional arousal (e.g., Anxiety Sensitivity Index; Peterson & Reiss, 1992). Other measures utilize a more holistic approach to assess a broad range of schemas (e.g., Leahy Emotional Schema Scale-II [Leahy, 2012b]; Meta-Emotion Scale [Mitmansgruber et al., 2009]; Beliefs about Emotions Questionnaire [Manser et al., 2012]). To date, all scales have relied exclusively on self-report as the mode of measurement.

Development of Emotional Schemas

Emotional schemas develop gradually across the life course as a result of person-specific experiences (Eisenberg et al., 1998; Levant, 1992; 2001). Experiences of emotion socialization, trauma, and culture likely play particularly relevant roles in the development of emotional schemas.

Emotion Socialization

Beginning early in life, patterns of emotion socialization gradually influence understandings of emotion and emotional experience. Socialization which punishes, minimizes, or otherwise conveys unacceptability of emotional experiences and expressions fosters the development of schemas of emotions as dangerous, uncontrollable, and requiring restriction or suppression (Edwards, Micek, Mottarella, & Wupperman, 2017; Krause, Mendelson, & Lynch,
Socialization may be blatant, such as hitting a child for crying, or subtle, such as expressions of anxiety in reaction to a child’s crying (Krause et al., 2003). Emotional schemas may also be learned through modeling. Routine parental engagement in avoidance or suppression-based regulation strategies contribute to child perceptions of these strategies as appropriate and effective means of emotion regulation (Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997; Eisenberg et al., 1998). Conversely, parental awareness and acceptance of emotions tends to foster a child’s ability to implement a broad repertoire of regulation strategies in accordance with situational demands (Cunningham, Kliwer, & Garner, 2009).

**Trauma**

In contrast to the gradual influences of emotion socialization, emotional schemas may also shift quickly and drastically in reaction to traumatic experiences. Following a trauma, emotions once viewed as valid, acceptable, and controllable may become viewed as dangerous, uncontrollable, and requiring avoidance or suppression (Litz et al., 1997; Paivio & Pascual-Leone, 2010; Roemer, Litz, Orsillo, & Wagner, 2001; Tull, Jakupcak, McFadden, & Roemer, 2007; Tull & Roemer, 2003). Patients diagnosed with post-traumatic stress disorder tend to hold extremely negative views of emotion and commonly fear experiencing, losing control of, and behaviorally responding to high-intensity emotions (Mazloom, Yaghubi, & Mohammadkhani, 2016; Sippel & Marshall, 2013; Tull et al., 2007).

**Culture**

Emotional schemas are also shaped by larger cultural influences, such as racial and ethnic norms, gender, family dynamics, and historical context. Schemas regarding emotional expression, for example, are closely tied to cultural values of individualism and collectivism and
are therefore strikingly different for individuals from Western versus Eastern cultures (Butler, Lee, & Gross, 2007; Wei, Su, Carrera, Lin, & Yi, 2013). African-American cultures also tend to place lower value on emotional expression and greater value on emotional and behavioral self-control in comparison to European-American cultures (Consedine & Magai, 2002; Leerkes & Siepak, 2006; Montague, Magai, Consedine, & Gillespie, 2003; Nelson, Leerkes, O'Brien, Calkins, & Marcovitch, 2012). For members of the African American community, schemas valuing expression suppression are considered necessary for avoiding undue discrimination, bias, and scrutiny in interactions with members of the majority culture (Demo & Hughes, 1990; Dodge, McLoyd, & Lansford, 2005; Hughes et al., 2006; Nelson et al., 2012).

Emotional schemas may also reflect gender socialization. In Western cultures, stereotypical masculinity is associated with emotional self-control, stoicism, and competitiveness, whereas stereotypical femininity is associated with emotional sensitivity, expressiveness, and submissiveness. These cultural values contribute to gender differences in emotion socialization, which tend to encourage the development of masculine behaviors in young boys and feminine behaviors in young girls (Adams, Kuebli, Boyle, & Fivush, 1995; Chaplin, Cole, & Zahn-Waxler, 2005).

Descriptions of emotional experiences throughout history suggest that societal emotional schemas also likely shift in accordance with historical context (Stearns, 2008). In the mid-1900s, for example, television and comic books increased in popularity, allowing emotion socialization to occur on an increasingly broader scale. Media depictions of the family suggested relationship ideals characterized by peace, harmony, and cheer (e.g., *Father Knows Best, Leave it to Beaver*, etc.). Families that did not fit this profile were considered aberrant and unhealthy (Cancian & Gordon, 1988; Kotchemidova, 2005). Comic books similarly idealized a lack of negative
emotion, particularly for men. Superheroes, such as *Superman* and *Captain America*, were routinely portrayed as overcoming difficult situations without the burden of emotional experience. They displayed America’s definition of optimal psychological functioning – calm reasoning, emotional stoicism, and psychological resilience (Stearns & Haggerty, 1991).

In contrast to the mid-1900s, media in the late 20th century and early 21st century have embraced values of individualism and emotional expression. Women have become especially encouraged to express their emotions, providing a platform to experience and express previously unacceptable feelings of anger, disappointment and entitlement (Cancian & Gordon, 1988). In what Time Magazine calls *The Mindful Revolution*, modern society avidly seeks information on the benefits of remaining open to emotional experiences, emotional acceptance, mindfulness, and related approaches to psychoemotional health (Pickert, 2014). Even elementary schools are encouraged to incorporate “social-emotional learning curriculums” and mindfulness practice into daily routines (Deruy, 2016; Greenberg et al., 2003). These emphases on emotional functioning and acceptance likely reflect a coinciding shift in emotional schemas, particularly in middle- and upper-class neighborhoods. Specifically, modern emotional schemas appear to place increased importance on ability to express, accept, and cope with sources of emotion rather than to avoid or suppress.

**Psychoemotional Functioning**

Third-wave behavior therapies hold that maladaptive emotional schemas play a critical role in the development and maintenance of psychoemotional dysfunction. On the whole,

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4 This emphasis on emotional acceptance is not uniform across the United States. Particularly in low-income neighborhoods, high value continues to be placed on emotional stoicism and suppression of vulnerable emotions (Dunbar, Perry, Cavanaugh, & Leerkes, 2015; Martini, Root, & Jenkins, 2004; Nelson et al., 2009; Nelson et al., 2012). Women are also routinely discouraged from expressing negative emotions, such as anger and frustration, particularly in the workplace (Brescoll & Uhlmann, 2008; Lewis, 2000).
schemas characterized by acceptance, self-validation, flexibility, and openness to emotional experiences are posited to be associated with better outcomes than schemas characterized by rigidity and self-judgment (Norman & Furnes, 2016). Growing literature provides preliminary support for these associations, particularly within the context of psychopathology.

Some schemas appear relatively consistent across psychopathology. For example, the belief that emotional expression will result in harmful social consequences is associated with eating, anxiety, and depressive disorders (Brockmeyer et al., 2013; Krause, Robins, & Lynch, 2000; Mongrain & Vettese, 2003; Mongrain & Zuroff, 1994; Quinton, & Wagner, 2005; Spokas, Luterek, & Heimberg, 2009). In contrast, the belief that intense emotional arousal is dangerous and, if triggered, would last indefinitely is particularly salient in generalized anxiety disorder, panic disorder, and post-traumatic stress disorder, but shows little relation to depression, obsessive-compulsive disorder, and social and specific phobias (Naragon-Gainey, 2010; Olatunji, Wolitzky-Taylor, 2009; Taylor, Koch, & McNally, 1992).

Although much of the research in this area is cross-sectional, preliminary research suggests that beliefs about emotion may play a causal role in the emergence of psychological distress. When undergraduate students were subject to biologically strenuous condition (e.g., inhaling oxygen-depleted air), students primed to view their emotions as in need of control tended to experience greater anxiety and distress than those primed to observe their emotions passively (Feldner, Zvolensky, Eifert, & Spira, 2003; Feldner, Zvolensky, Stickle, Bonn-Miller, & Feldner, 2006). Patients diagnosed with panic disorder demonstrate similar patterns. When primed to view their emotions as in need of suppression (in comparison to no prime), patients experienced greater anxiety in response to biologically strenuous task. Alternatively, when primed to view their emotions as acceptable (in comparison to no prime and suppression prime),
patients experienced less anxiety and expressed greater willingness to continue engaging in the task (Levitt, Brown, Orsillo, & Barlow, 2004).

**Methodological Limitations of Emotional Schema Research**

Despite growing popularity, research on emotional schemas is characterized by notable methodological limitations. These limitations impede empirical progress in this area by limiting theoretical integration of related constructs and restricting the extent to which related areas of research can build off one another.

First, few studies are designed from the perspective of an identified theoretical framework. Without a working, central theory, researchers rely on idiosyncratic conceptualizations, definitions, terminology, and operationalizations with unclear relations to similar constructs. For example, a wide array of terms and phrases is used to identify emotional schemas throughout the literature, including, but not limited to: “beliefs about emotion” (De Castella et al., 2013), “emotion beliefs” (De Castella et al., 2014), “meta-emotion” (Mitmansgruber et al., 2009), “anxiety sensitivity” (Reiss, Peterson, Gursky, & McNally, 1986), and “implicit beliefs about emotion” (Tamir et al., 2007). Each is accompanied by a unique conceptualization and operationalization, and many are developed and investigated with little consideration of related constructs. As a result, it remains unclear to what extent measures assess overlapping or independent constructs.

Second, although causal inferences are routinely made about the “effects” of constructs related to emotional schemas, research in this area is overwhelmingly cross-sectional and correlational in design. The dearth of longitudinal and experimental methodologies raises questions of potential confounds and limits confidence in theories about causal directionality.
Third, despite evidence suggesting that emotional schemas vary across culture, very few studies have examined emotional schemas in cultural minorities. It therefore remains unknown to what extent cultural and demographic background may moderate observed effects.

Lastly, with few exceptions, research has relied almost exclusively on self-report measures of psychoemotional functioning. The relation of emotional schemas to diagnostic, behavioral, and/or physiological indicators of psychoemotional functioning therefore remains under-examined.

**Summary & Conclusions**

Over recent decades, literature has amassed to suggest that unique schemas held about emotions may significantly shape the processes and nature of emotional experience. These emotional schemas are strongly associated with cultural norms, socialization history, and psychoemotional functioning. In modern, Western society, emotional schemas that are open, accepting, and flexible to situational context and/or personal goals are typically associated with greater, long-term psychoemotional functioning. In contrast, schemas that are judgmental and avoidant are often associated with reliance on maladaptive regulation strategies and impaired psychoemotional functioning.
CHAPTER 4: EMOTION PROCESSING

Emotional schemas are often presumed to influence psychoemotional functioning in part through influences on emotion processing (e.g., Greenburg, 2003; Hayes & Wilson, 1994; Linehan, 1993). For the purposes of this review, emotion processing is conceptualized as the process of perceiving and deriving meaning from emotional information in the self, conveyed by others, and reflected in emotionally relevant stimuli in the environment. As suggested by the theoretical principles previously outlined (see Adopted Theoretical Principles, p. 27), emotion processing results from an interaction between emotional, cognitive, and neurological processes. It is also substantially shaped by developmental and socialization history, neurological correlates, situational and social context, and individual differences. This conceptualization is adopted to distinguish emotion processing from other psychological processes associated with emotion, including emotional experience, emotion regulation, and behavioral responding.

In the sections that follow, a review of the literature on emotion processing is provided. The review begins with a brief discussion of the nature and assessment of emotion processing. Next, neurological correlates, developmental contributions, contextual influences, and individual differences are reviewed. The review concludes with discussion of psychoemotional functioning as it relates to emotion processing.

Theoretical Conceptualization

In many ways, ability to process emotional information begins with processing emotional information in the self. Such processing includes emotional awareness, emotion labeling, emotional scripts, and emotional self-reflection. Through processing emotional information in the self, an individual becomes aware of emotional experiences, develops an ability for emotional expression, forms likes and dislikes, and builds interpersonal relationships. Deficient
ability to process emotional information in the self correspondingly contributes to limitations in these areas of psychoemotional functioning, resulting in mood dysregulation, psychopathology, and relationship difficulty (Barrett, Gross, Christensen, & Benvenuto, 2001; Kret & Ploeger, 2015).

For an individual to succeed interpersonally also requires effective processing of emotional information conveyed by others. Such processing involves inferring others’ emotional states from facial expressions, vocal cues, and body language. This form of emotion processing allows for understanding of others’ moods, prediction of others’ behavior, sympathizing and empathizing, and building and maintenance of interpersonal relationships. It is therefore crucial to psychosocial functioning.

Emotion processing also involves making appraisals about nonhuman, environmental cues, such as emotional images, objects, or situations (e.g., appraising a moldy piece of bread as disgusting or a dark basement as frightening). These emotional appraisals stem primarily from processes of classical and operant conditioning but may also be evolutionarily innate. Appropriate appraisals allow for emotional and behavioral responding that is well-suited to situational demands. In contrast, inappropriate appraisals contribute to idiosyncratic views of the world and situationally inappropriate responding (Leffert, Siperstein, & Widaman, 2010; Schultz, Izard, Ackerman, & Youngstrom, 2001).

Assessment

The complex and often enigmatic nature of emotion necessitates creative means of assessing emotion processing. Various modes of assessment are therefore used throughout the literature on emotion processing. In preverbal infants, emotion-processing ability is generally inferred from behavioral indicators, such as patterns of response to emotional stimuli (e.g.,
Mastropieri & Turkewitz, 1999) and preferential attention patterns (e.g., Bushnell, 2001). This reliance on behavioral indicators allows researchers to examine the nature, function, and development of emotion processing early in life. However, these are also largely unable to examine cognitive-emotional processes underlying emotion processing at this age (Aslin & Fiser, 2005).

As a person grows older, language allows for communication of interpretations, inferences, and conclusions drawn about emotional stimuli. For example, a person can be presented with an image of a facial expression and asked to infer the emotional state of the person in the image (e.g., Ley & Strauss, 1986). These performance-based assessments are common when examining ability to process emotional information conveyed by others and/or reflected in environmental cues. Often, stimuli are standardized and population norms are established, allowing for comparison across independent samples (e.g., Ekman Faces Test [Ekman & Friesen, 1976]). However, many studies utilize stimuli that are not subject to psychometric scrutiny, potentially shedding doubt on the validity of conclusions drawn (e.g., Montagne, Kessels, De Haan, & Perrett, 2007).

Neurological assessment is also common in research on emotion processing. Some assessments, such as the fMRI and PET scan, monitor region-specific neurological activity throughout the brain. Others, such as EEG recordings, provide information about general activity and are capable of monitoring activity at the millisecond level. Recent years have seen a rise in the popularity of neurological assessments (Aue, Lavelle, & Cacioppo, 2009). However, this mode of assessment is not without limitation. Most notably, research on neurological correlates of emotion processing is almost exclusively correlational. Typically, participants are presented with emotional stimuli while psychological responses and neurological activity are observed.
Causal inferences cannot be based exclusively on such research, because (a) neurological assessments are incapable of determining temporal primacy of neurological activity versus psychological responses; (b) neurological activity is not systematically varied, limiting understanding of the true covariation of neurological activity and psychological response; and (c) it remains unclear whether replication of neurological activity (e.g., through direct stimulation) would produce corresponding psychological responses (see Aue et al., 2009 for further information about the limitations of neurological assessment in psychological theory).

A final mode of assessment within the field of emotion processing is self-report measures. Self-report measures generally instruct participants to reflect on their experiences of emotion processing to determine areas of strength and/or weakness (e.g., Toronto Alexithymia Scale-20 [Bagby et al., 1994]). The field of psychology is heavily reliant on self-report measures due to their ease of administration and high interpretability (Paulhus & Vazire, 2007). However, a number of methodological limitations threaten the validity of such measures. First, self-report measures are vulnerable to response biases, such as impression management, acquiescent and reactant responding, and extreme responding (Fisher & Katz, 2000; Paulhus & Vazire, 2007; Van de Mortel, 2008). Second, respondents are often limited in their ability to objectively reflect, evaluate, and report on their own abilities (Bell, Fiszdon, Richardson, Lysaker, & Bryson, 2007; Johnson & Fendrich, 2005; Larrick, Burson, & Soll, 2007). Third, construct validation of self-report measures rarely includes comparison to other modes of assessment, such as behavioral or performance-based assessments (Eid & Diener, 2006). These validation practices fail to account for method variance, potentially threatening construct validity (Campbell & Fiske, 1959; Wiggins, 1973).
Neurological Correlates

Healthy infants are born with the neurological structures involved in processing emotional information. As the infant matures, these structures adapt to the unique experiences and environment of the individual. Even with these idiosyncratic adaptations, however, patterns of neurological activity underlying emotion processing are largely consistent across persons. Many neurological structures involved in emotion processing also serve parallel functions at a broader, cognitive level. The multiple roles served by these neurological structures highlight the interaction between cognition and emotion throughout emotion processing.

A strong parallel exists between processing of emotions in the self and broader cognitive functions. The anterior cingulated cortex (ACC), for example, is involved in the conscious experience and awareness of internal emotional experience and in guiding awareness, attention, and response selection at a general level (Etkin, Egner, & Kalisch, 2011; Herbert, Herbert, & Pauli, 2011; Lane & McRae, 2004). Similarly, the medial prefrontal cortex (MPFC) plays a central role in reflecting on internal emotional experience and in reflecting on thoughts, personal attributes, and memories (D’Argembeau et al., 2007; Johnson et al., 2006; Ochsner et al., 2004). The posterior cingulate cortex (PCC) also plays a role in building mental representations of emotion and representations of episodic memory (Mantani, Okamoto, Shirao, Okada, & Yamawaki, 2005; Nielsen, Balslev, & Hansen, 2005).

Processing emotions conveyed by others is closely associated with activity in the amygdala and somatosensory cortices (see Adolphs, 2002a; 2006; Herba & Phillips, 2004 for reviews). The amygdala is particularly reactive to fearful expressions, even those presented outside of conscious awareness (Baird et al., 1999; Hariri, Bookheimer, & Mazziotta, 2000; Morris, DeGelder, Weiskrantz, & Dolan, 2001; Phillips et al., 2001). Somatosensory cortices are
involved in generating mental representations of somatic emotional experience (Adolphs, 2002b; Adolphs, Damasio, Tranel, Cooper, & Damasio 2000; Heberlein & Adolphs, 2007). Damage to the amygdala or somatosensory cortices results in impaired ability to recognize emotional facial expressions despite intact ability to identify structural similarities and differences across expressions (Adolphs et al., 2000; Adolphs, Tranel, Damasio, & Damasio, 1994; Anderson & Phelps, 2000; Schmolck & Squire, 2001).

Processing emotional information reflected in the environment (e.g., objects, situational cues) typically occurs as a result of emotion conditioning and/or contingency learning. Emotion conditioning is associated primarily with activity in subcortical areas. The amygdala serves a central function and is involved in all stages of conditioning, including acquisition, storage, expression, and extinction (Barad, Gean, & Lutz, 2006; Kim & Jung, 2006; Maren, 2008). Other involved structures, such as the cerebellum and hippocampus, are involved more specifically in discrete stages (Alvarez, Biggs, Chen, Pine, & Grillon, 2008; Maren, 2008; Timmann et al., 2010).

Assessment of contingency learning typically involves cognitively complex tasks (e.g., Iowa Gambling Task). Therefore, neurological activity during task completion varies greatly across tasks. Some research suggests that the caudate nucleus, a substructure of the striatum, is especially involved in reinforcement-based contingency learning (Delgado, Miller, Inati, & Phelps, 2005; Tanaka, Balleine, & O’Doherty, 2008). Areas throughout the prefrontal and parietal cortices are also involved in behavioral responding based on contingency information (Li, Chan, McAlonan, & Gong, 2010; Mullette-Gillman & Huettel, 2009).
Developmental Course

The cognitive, emotional, and neurological structures underlying emotion processing are shaped by maturational development throughout early life. As these structures advance in complexity, they allow for corresponding advancements in emotion-processing ability. Horizontal decalage (inconsistent performance across tasks requiring similar cognitive abilities; Fischer, 1980), however, may result in discordance between cognitive ability and emotion-processing ability. Therefore, emotion processing does not necessarily correspond to age or cognitive ability, and developmental arrests in emotion processing may occur despite notable advancement in other cognitive domains (Lane & Schwartz, 1987).

As mentioned previously, assessment of emotion processing in preverbal infants is significantly restricted by methodological limitations. To overcome these restrictions, research on emotion processing in early life typically focuses on the development of cognitive functions necessary for emotion processing. Studies using preferential looking paradigms suggest that abilities to make appraisals of self-relevance and to distinguish between indicators of affect develop in the first few months of life (Bushnell, 2001; Ecklund-Flores & Turkewitz, 1996; Flom & Bahrick, 2007; Johnson, Dziurawiec, Ellis, & Morton, 1991; Walker-Andrews, 1997). In contrast, development of an objective self-concept is not generally apparent until late infancy or early toddlerhood (Fasig, 2000; Povinelli, 1995). Thus, while some of the necessary cognitive precursors to emotion processing may be present in infancy, children likely remain incapable of complex emotion processing until early toddlerhood (Lewis, 2003; 2005; 2008).

A sizeable increase in emotion-processing ability occurs throughout the preschool years. By 18-24 months of age, children begin to label their emotional experiences using basic terms, such as happy and sad (Dunn, Bretherton, & Munn, 1987). By the second year, they engage in
routine talk about emotional experiences, reflect on causes of past emotions, contemplate consequences of emotional responses, and engage in pretend-based play surrounding emotional themes (Dunn et al., 1987; Dunn, Brown, & Beardsall, 1991; Gayler & Evans, 2001; Hughes & Dunn, 1997; Lagattuta & Wellman, 2002; Stagnitti & Unsworth, 2000; Wellman, Harris, Banerjee, & Sinclair, 1995). Preschool-aged children also demonstrate increasing abilities to recognize basic facial expressions and to empathize with others’ expressions of distress, suggesting advancements in ability to process emotional information conveyed by others (Eisenberg, Fabes, & Murphy, 1996; Herba, Landau, Russell, Ecker, & Phillips, 2006; Johnston et al., 2011; Repacholi, 1998).

Throughout childhood, emotional scripts (cognitive structures that guide and shape understanding and mental representations) integrate information about personal appraisals, environmental cues, social norms, and subjective experiences (Brown & Dunn, 1996; Harris, 2008; Rotenberg & Eisenberg, 1997; Saarni, 1993). Young children are able to use emotional scripts to accurately predict the emotional states of others given salient environmental cues (Denham & Auerbach, 1995; Herba et al., 2006; Wang, 2003). As emotional scripts develop in complexity, accuracy these predictions increases (Casey, 1993; Fine, Izard, & Trentacosta, 2006; Gross & Ballif, 1991). Generally, emotional scripts for basic emotions (e.g., joy, sadness) develop before scripts for more complex emotions (e.g., guilt, jealousy; Garner, Jones, & Miner, 1994; Smith & Walden, 1998).

By adolescence, most people are able to classify facial expressions according to basic emotion categories and to understand the emotional perspectives of others (Ley & Strauss, 1986; Pfeifer & Blakemore, 2012). Throughout this developmental period, adolescents often place greater value on the peer group and become more responsive to the emotional reactions of others.
They also become disproportionately sensitive to positive feedback as compared to negative feedback. This contributes to greater risk-taking behavior and a tendency to overemphasize positive emotional consequences in decision-making despite intellectual understanding of negative consequences (Cauffman et al., 2010; Figner, Mackinlay, Wilkening, & Weber, 2009; Fareri, Martin, & Delgado, 2008; Steinberg, 2008).

Emotion Socialization

Ability to understand and process emotional information is also shaped through emotion socialization occurring within the context of social interactions (Eisenberg et al., 1998). Through emotion socialization, people gain information about how to interpret and understand emotions in a manner that is socially, culturally, and situationally appropriate. This socialization process occurs through three primary forms: modeling, contingency, and coaching (Halberstadt, 1991).

Modeling. Modeling is the most informal mode of emotion socialization, because it rarely involves explicit communication about emotions or emotion processing. Through modeling, a person mirrors the emotion-processing patterns displayed by others (Halberstadt, 1991). Over time and across situations, this process contributes a developed understanding of the association between situational context and emotional interpretations (Eisenberg et al., 1998). Social environments which model emotions of moderate, variable intensity and form across situations foster ability to discriminate between situational cues and to associate situational cues with corresponding emotional states. Alternatively, environments in which emotional expression is routinely muted or exaggerated across contexts contribute to difficulties discriminating between situational cues (Denham, Zoller, & Couchoud, 1994; Eisenberg et al., 1998). Notably, although research on modeling is generally limited to infants and children, adults are also sensitive to the
effects of modeling (Mireault et al., 2014; Möller et al., 2014; Murray et al., 2008). Therefore, modeling likely plays a critical role in guiding emotion processing across the lifespan (Parkinson et al., 2012).

**Contingent Responding.** Emotion socialization may also occur through contingent responding. Contingency-based emotion socialization occurs through patterns of response by others to expressions or displays of emotional experience. Responses contingent on form or intensity of expressed emotion, situational context, and/or cultural acceptability convey information about the appropriateness of an emotional experience or expression (Darrow & Follette, 2014; Denham, Zoller, et al., 1994; Friedlmeier, Corapci, & Cole, 2011). Typically, emotion-processing is strongest when the responses of others attempt to resolve the cause of an emotion and/or offer comfort or soothing. Alternatively, responses which minimize or punish emotional expressions cultivate poor self-reflection, inability to recognize and label emotions, and poor understanding of situational cues (Darrow & Follette, 2014; Denham, Zoller, et al., 1994; Fabes, Poulin, Eisenberg, & Madden-Derdich, 2002).

**Coaching.** Lastly, emotion socialization may occur through coaching – explicit, didactic discussion about emotional experiences. Coaching conversations about emotion labeling, understanding, and expression occur frequently throughout childhood and tend to place disproportionate emphasis on management of negative emotion (Harris, 2008; Lagattuta & Wellman, 2002). Greater emotion-processing ability is associated with coaching that is diverse in the types of emotions discussed and that includes frequent discussion of emotional antecedents and consequences (Dunn et al., 1991; Garner, Dunsmore, & Southam-Gerrow 2008; Garner, Jones, Gaddy, & Rennie, 1997). In contrast, unelaborated references to emotion during coaching
are associated with increased questioning about emotions, suggesting this form of coaching may
be ineffective in fostering emotion processing (Garner et al., 1997).

**Contextual Influences**

Developmental and socialization influences cumulatively shape the processes and
structures that underlie emotion processing. In life, however, these influences interact with one
another and with contextual influences to shape perception, judgment, and/or interpretation of
emotional information. All forms of emotion processing are sensitive to the context in which the
emotional information is presented. In the sections that follow, research on the following
contextual influences is reviewed: (a) the self; (b) facial/body cues; and (c) the environment.

*Self as Context*

When processing emotional information, contextual cues stem from a variety of sources,
including the concurrent psychoemotional states and processes of the perceiver. *Feelings as
information theory* suggests that a perceiver’s feelings serve as a source of information for
making appraisals about experience and the environment (Schwarz, 2010; Schwarz & Clore,
1983). These effects occur even when (a) the feelings are incidental, (b) the source of feelings is
misattributed and/or (c) feelings occur in the absence of affect-consistent cognition (Gasper &
Clore, 2000; Pham, 2004). For example, a person feeling anxious is likely to interpret unrelated,
benign cues as dangerous (Schmid & Mast, 2010; Tiedens, 2001).

Perceiver expectation also influences emotional appraisals. When expectations align with
subsequent experience, appraisals about the emotional valence of a situation are typically
consistent with expectations and appraisals of intensity are attenuated (e.g., “I knew this date
would turn out poorly, so I’m not that disappointed”). Conversely, when expectations are
violated, valence appraisals are generally opposite of expectations and intensity appraisals are
amplified (e.g., “I thought my date would be fun, but I’m not having a good time at all!”; Berns, McClure, Pagnoni, & Montague, 2001; Golub, Gilbert, & Wilson, 2009; Shepperd & McNulty, 2002). These patterns of attenuation and amplification are especially prominent in the perceiver’s initial impression of an experience, when expectations are salient, and when the discrepancy between expectations and experience is pronounced (Golub et al., 2009).

Facial/Body Cues as Context

When processing emotional information conveyed by others, dynamics of the target’s face also have a substantial influence. The target’s gaze direction may provide context about self-relevance. For example, anger expressions with direct eye contact, in contrast to averted gaze, suggest a possibility of danger (Wieser & Brosch, 2012). Inferences about a target’s emotional state are generally more accurate when the target is making direct eye contact than averting gaze, particularly when the target’s expression is of low intensity (Bindemann, Burton, & Langton, 2008; Graham & LaBar, 2007). Inferences are also more accurate when facial expressions are accompanied by congruent body postures (e.g., a disgusted facial expression accompanied by a body holding something disgusting) rather than incongruent postures (e.g., a happy facial expression accompanied by an aggressive posture; Meeren, van Heijnsbergen, & de Gelder, 2005; Van den Stock, Righart, & De Gelder, 2007).

Environment as Context

Lastly, emotion processing may be influenced by contextual information gathered from the environment. Emotion processing is strongest when the environmental context is emotionally congruent with the target of emotion processing and weakest when the context is emotionally incongruent (e.g., interpretations of disgusted facial expressions are more accurate when accompanied by pictures of rotting food than pictures of blooming flowers). When the context is
emotionally incongruent, interpretations are typically informed by context rather than target, even when interpreters are led to believe that the context is irrelevant (Aviezer, Dudarev, Bentin, & Hassin, 2011; Mobbs et al., 2006; Righart & de Gelder, 2008). Similarly, recognition of a target’s facial expression is higher when peripheral facial expressions are emotionally congruent with the target’s expression than when peripheral expressions are incongruent (Mumenthaler & Sander, 2012).

**Individual Differences**

As with other aspects of psychology (e.g., intelligence, personality traits, etc.), individuals vary in their ability to process emotional information. Some are emotionally attuned and capable of complex emotion processing, whereas others display marked deficits. Emotion-processing ability is reliably associated with certain psychoemotional traits, including alexithymia, emotion-recognition sensitivity, emotion-situation knowledge, processing biases, and contingency sensitivity.

**Alexithymia**

Alexithymia is a psychoemotional trait closely associated with emotion-processing difficulties. Meaning *no words for feelings*, alexithymia is characterized by difficulties in translating emotional information and experiences into language and a cognitively rigid thinking style (Bagby et al., 1994; Nemiah, 1996; Sifneos, 1996; Taylor & Bagby, 2013; Taylor, Bagby, & Parker, 1997). Prototypical depictions of alexithymia include difficulty expressing emotion, inability to function under stress, repressive and/or dissociative coping style, literalism, psychosomaticism, tendency toward social conformity, and reliance on nonverbal forms of emotional communication (Haviland & Reise, 1996).
Alexithymia is associated with a broad range of emotion-processing deficits, primarily regarding the translation of emotional information across emotion-processing systems (Frawley & Smith, 2001; Lane, Ahern, Schwartz, & Kasznzniack, 1997; Taylor et al., 1997). Alexithymic persons typically have poor interoceptive awareness and experience difficulty differentiating emotions from bodily sensations (Herbert, Herbert, & Pollatos, 2011; Lane et al., 1997; Taylor et al., 1997). On cognitive tasks, they tend to process emotional information more shallowly than nonemotional information and are sensitive to cognitive interference by emotional concepts (Luminet, Vermeulen, Demaret, Taylor, & Bagby, 2006; Taylor et al., 1997). Alexithymic individuals also tend to display difficulty matching emotional themes across stimuli (e.g., matching an image of a sad facial expression to a sentence with sad content; Lane et al., 1996).

Despite these deficits, alexithymic persons display emotional behaviors (e.g., facial expressions) that are comparable to healthy individuals, even when reporting that they do not know how they feel (Constantinou, Panayiotou, & Theodorou, 2014; Papciak, Feuerstein, & Spiegel, 1985; Roedema & Simmons, 1999; Taylor et al., 1997). For this reason, alexithymia has been described as “the emotional equivalent” of blindsight – a neurological condition characterized by lack of conscious visual perception despite intact behavioral responses to visual stimuli (Lane et al., 1997, p. 834).

*Expression-Recognition Sensitivity*

The intensity at which an emotional facial expression can be recognized also varies considerably across individuals. Most people require an expression of somewhat moderate intensity before the expression is accurately recognized (Kessels, Montagne, Hendriks, Perrett, & de Haan, 2014; Montagne et al., 2007). However, some are hypersensitive to certain emotional
expressions and therefore capable of accurate recognition at low intensities. Others are hyposensitive and require high intensity expressions before accurate recognition can occur.

Some evidence suggests that expression-recognition sensitivities may develop in accordance with life experiences and environmental demands. Early instances of abuse, for example, are linked to greater sensitivity to, rapid orientation toward, and delayed disengagement from anger expressions (Pollak, Messner, Kistler, & Cohn, 2009; Shackman, Shackman, & Pollak, 2007). Alternatively, early experiences of neglect are associated with hyposensitivity to and poorer ability to discriminate between a wide variety of facial expressions (Pollak, Cicchetti, Hornung, & Reed, 2000). It is possible that sensitivity to cues of potential threat is adaptive in abusive environments, whereas this sensitivity has little adaptive value for a child living in a neglectful environment (Pollak, 2008).

*Emotion Situation Knowledge*

People also vary in emotion situation knowledge, the ability to infer or predict emotional reactions given situational cues (Fine et al., 2006). Though emotion situation knowledge is likely fundamental to processing emotional information at all developmental stages (Wang, 2003), research in this area is almost exclusively confined to preschool- and elementary-aged children. Children with greater emotion situation knowledge are generally more empathetic, behaviorally prosocial, popular, and socially engaged (Denham & Couchoud, 1991; Denham, McKinley, Couchoud, & Holt, 1990; Denham, Renwick-DeBardi, & Hewes, 1994; Garner et al., 1994; Schultz et al., 2001). By contrast, children with poor emotion situation knowledge tend to violate social norms and are more likely to be disliked by teachers and peers (Ališauskaitė & Butkienė, 2013). Children with poor verbal abilities and/or low intellectual functioning also tend to display poorer emotion situation knowledge than children with higher cognitive abilities, suggesting
emotion situation knowledge is likely related to verbal and cognitive development (Ališauskaitė & Butkienė, 2013; Brown & Dunn, 1996; Izard et al., 2001).

**Processing Biases**

Cognitive processing biases also shape the ways in which emotional information is perceived and interpreted. Attentional biases give priority to certain types of information over others. Nearly all individuals show attentional biases toward negatively-valenced emotional stimuli, allowing for quick detection of potentially dangerous situations (Öhman, Lundqvist, & Esteves, 2001; Smith, Larsen, et al., 2006). However, nature and intensity of these biases vary across individuals. People prone to anxiety typically display exaggerated attentional biases toward sources of potential threat (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van Ijzendoorn, 2007; Eysenck & Calvo, 1992; Mathews & MacLeod, 1994). Their attention is also more significantly influenced by the presentation of threat-related stimuli, even when presentation occurs outside of conscious awareness (Mathews, Ridgeway, & Williamson, 1996; Mogg, Bradley, Williams, & Mathews, 1993).

Interpretational biases shape the nature of appraisals drawn after an individual has attended to an emotional stimulus. People with generally optimistic attitudes and high self-esteem typically appraise ambiguous situations positively (Cummins & Nistico, 2002). In contrast, individuals prone to anxiety or depression generally make negative appraisals about ambiguous situations, even when positive appraisals are available (Beck, 2002; Stopa & Clark, 2000; Wisco & Nolen-Hoeksema, 2010).

**Contingency Sensitivity**

Lastly, individuals vary in degree of sensitivity to environmental contingencies. Reinforcement Sensitivity Theory suggests that sensitivity to punishment and reward are core,
neurologically-based features of personality (Gray, 1970; 1987; 1991). Punishment sensitivity, associated with anxiety, is driven by reactivity of the fight-flight-freeze system and behavioral inhibition system. Alternatively, reinforcement sensitivity, reflected through impulsivity, is driven by reactivity of the behavioral activation system (see Table 2: Reinforcement Sensitivity Theory for a summary; Corr, 2004; Smillie, Pickering, & Jackson, 2006).

Responsiveness to environmental contingencies correspond to these sensitivities. High-anxiety individuals (high punishment sensitivity), for example, are generally more responsive to aversive conditioning paradigms than low-anxiety individuals. In complex tasks involving both aversive and rewarding contingencies, high-anxiety individuals are faster to learn behaviors which avoid aversive contingencies, whereas low-anxiety individuals show difficulty inhibiting these behaviors (Ávila & Torrubia, 2004; Pickering, Diaz, & Gray, 1995; Zinbarg & Revelle, 1989). Individuals high in impulsivity (high reinforcement sensitivity) are faster to learn behaviors which result in reward, whereas individuals low in impulsivity show difficulty learning these behaviors (Pickering et al., 1995; Zinbarg & Revelle, 1989).

Table 2: Reinforcement Sensitivity Theory

<table>
<thead>
<tr>
<th>Description</th>
<th>Presentation</th>
<th>Neurological System(s) Involved</th>
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<tbody>
<tr>
<td>Punishment Sensitivity</td>
<td>Responsivity to aversive environmental stimuli</td>
<td>Anxiety</td>
</tr>
<tr>
<td>Reinforcement Sensitivity</td>
<td>Responsivity to rewarding environmental stimuli</td>
<td>Impulsivity</td>
</tr>
</tbody>
</table>

**Psychoemotional Functioning**

Through emotion processing, an individual understands and interacts with emotional experiences, people, and situations. When deficits in emotion processing exist, co-occurring
complications in psychoemotional functioning are often pervasive. For this reason, some theorists have suggested that emotion processing is fundamental to psychoemotional functioning (Izard, 2010; Izard, Stark, Trentacosta, & Schultz, 2009; Kret & Ploeger, 2015; Panksepp, 2006; Whelton, 2004). In the sections that follow, literature in this area is reviewed; particular attention is paid to the relation of emotion processing to emotional schemas, interpersonal functioning, and psychopathology.

**Emotional Schemas**

Individuals holding maladaptive emotional schemas (e.g., emotions as invalid and uncontrollable) tend to display poorer emotion processing than individuals holding adaptive emotional schemas (e.g., emotions as normative and temporally finite). For example, alexithymic trait severity correlates positively with negative expectations about the effects of somatic emotional arousal, beliefs that emotional expression is socially harmful, and general endorsement of maladaptive emotional schemas (Devine, Stewart, & Watt, 1999; Edwards et al., 2017; Müller, Bühner, Ziegler, & Şahin, 2008; Quinton & Wagner, 2005; Sánchez, Larrieux, Rovira, & Ball, 2013; Stewart, Zvolensky, & Eifert, 2002; Zahradnik, Stewart, Marshall, Schell, & Jaycox, 2009; Zeitlin & McNally, 1993). To date, however, research has not examined the relation of emotional schemas to other indicators of emotion-processing ability.

**Interpersonal Functioning**

Emotion processing is inherently fundamental to interpersonal functioning. As a result of emotion processing, an individual makes inferences about the emotions and behavior of others, gauges emotional reactions of the self and others, and expresses emotional experiences. For some individuals, however, emotion processing is deficient, and difficulties in interpersonal dynamics, interactions, and relationships result. For example, various indicators of emotion-
processing difficulty (e.g., poor facial-processing ability, alexithymia, and low emotion-situation knowledge) are associated with poor ability to empathize and understand the perspectives of others (Besel & Yuille, 2010; Bird et al., 2010; Ciarrochi, Caputi, & Mayer, 2003; Henry, Phillips, Crawford, Ietswaart, & Summers, 2006; Denham, Cook, & Zoller, 1992; Swart, Kortekaas, & Aleman, 2009). Social skill impairments are also a common feature of disorders characterized by emotion-processing deficits (e.g., schizophrenia, depression, eating disorders, etc.; Beales & Dolton, 2000; Kee, Green, Mintz, & Brekke, 2003; Keltner & Kring, 1998). The intimate association between emotion processing and social skills often contributes to substantial limitations in functioning for people with these disorders (Greenbaum, Stevens, Nash, Koren, & Rovet, 2009).

Even when other aspects of interpersonal functioning are intact, relationships lacking intimacy are often experienced as shallow and unfulfilling. The capacity for developing and maintaining emotional bonds is closely associated with emotion-processing ability. Alexithymic individuals, for example, tend to present as standoffish, emotionally detached, and cognitively rigid in interpersonal situations, making emotionally bonding difficult (Spitzer, Siebel-Jürges, Barnow, Grabe, & Freyverger, 2005; Vanheule, Desmet, Meganck, & Bogaerts, 2007). In relationships, they struggle with interpersonal problem-solving deficits and hostility, but are also socially dependent and hypersensitive to rejection (Konrath, Grynberg, Corneille, Hammig, & Luminet, 2011; Konrath, Novin, & Li, 2012; Montebarocci, Codispoti, Baldaro, & Rossi, 2004; Spitzer et al., 2005; Vanheule et al., 2007; Yelsma, 1996). Alexithymic individuals are therefore likely motivated to build and maintain emotional connections with others but are generally unskilled in doing so.
The relation between emotional bonding and emotion processing is also salient within the context of attachment style. As early as infancy, attachment style is predictive of facial expression recognition throughout childhood (Steele, Steele, & Croft, 2008). Individuals with avoidant attachment styles – characterized by discomfort with closeness and intimacy – tend to pay less attention to emotional information and to process emotional information less thoroughly than those with secure attachment styles (Edelstein, 2006; Edelstein & Gillath, 2008; Kirsh & Cassidy, 1997). By contrast, individuals with anxious attachment styles – characterized by preoccupation with intimacy and fear of abandonment – are typically more attentive and sensitive to emotional information (Fraley, Niedenthal, Marks, Brumbaugh, & Vicary, 2006; Vrtička, Sander, & Vuilleumier, 2012).

**Psychopathology**

Emotion-processing deficits and biases are also closely associated with psychopathology etiology, maintenance, and severity and may underlie psychopathological comorbidity (Kret & Ploeger, 2015; Panksepp, 2006). In the sections that follow, the relation of emotion processing to each of the following classes of psychopathology are briefly discussed: psychotic disorders, mood disorders, anxiety and related disorders, and personality disorders. Because research in this area is vast and continually growing, comprehensive discussion of literature in this area is beyond the scope of this review. Discussion is therefore limited to findings which are well-established in the literature.

**Psychotic Disorders.** Schizophrenia is associated with a broad range of emotion-processing deficits, including elevated alexithymia and poor facial and vocal expression recognition (Li, Chan, et al., 2010; McCleery et al., 2015; Van’t Wout, Aleman, Bermond, & Kahn, 2007; Yu et al., 2011). Emotion-processing deficits are closely tied to functional outcomes
in persons with schizophrenia. Expression-recognition ability, for example, correlates negatively with symptom severity and positively with social, occupational, and independence outcomes (Hooker & Park, 2002; Kee et al., 2003; Kohler et al., 2000).

**Mood Disorders.** Mood disorders, including major depressive disorder and bipolar disorder, are also closely associated with emotion-processing deficits. Major depressive disorder is associated with heightened alexithymia, impaired and negatively biased recognition of emotional expressions, and attentional biases toward dysphoric stimuli (Kohler et al., 2011; Leweke, Leichsenring, Kruse, & Hermes, 2011; Duque & Vázquez, 2015; Teachman, Joormann, Steinman, & Gotlib, 2012). Bipolar disorder is similarly associated with moderate impairments in expression recognition during both manic and depressive states (Rocca, Huevel, Caetano, & Lafer, 2009; Samamé, Martino, & Strejilevich, 2012; Van Rheenen & Rossell, 2013; 2014). However, unlike major depressive disorder, bipolar disorder is not associated with attentional biases toward negative emotional stimuli, even during depressive states (Jongen, Smulders, Ranson, Arts, & Krabbendam, 2007; Rubinsztein, Michael, Underwood, Tempest, & Sahakian, 2006).

**Anxiety & Related Disorders.** Anxiety, obsessive-compulsive, and trauma-related disorders are broadly characterized by deficits in processing potentially threatening emotional stimuli. Individuals with anxiety disorders typically display (a) a tendency to misinterpret benign cues as threatening, (b) rapid and disproportionate orientation toward potential threat cues, (c) difficulty disengaging from threat-related stimuli, and (d) neurological hyper-reactivity to presentations of potentially threatening stimuli (Amir, Bower, Briks, & Freshman, 2003; Clark & McManus, 2002; Cooney, Atlas, Joormann, Eugene, & Gotlib, 2006; Etkin & Wager, 2007). Similarly, obsessive-compulsive and trauma-related disorders are associated with attentional
biases toward and emotional hyper-reactivity to threat-related cues (Cisler & Olatunji, 2010; Fani et al., 2012; Foa & McNally, 1986; Gaier, O’Brien, Smiley, & Hahn, 2014; Moritz, von Mühlenen, Randjbar, Fricke, & Jelinek, 2009; Wald et al., 2011).

**Personality Disorders.** Personality disorders, characterized by pervasive and enduring disturbances in mood, thought, and behavior (American Psychiatric Association, 2013), are perhaps most closely associated with limitations in emotion-processing. Borderline personality disorder (BPD) is associated with elevated alexithymia, low emotional awareness, poor emotion differentiation, and neurological and emotional hyper-reactivity to negatively valenced stimuli (Levine, Elsa, & Jane, 1997; Lynch et al., 2006; New et al., 2012; Zaki, Coifman, Rafaeli, Berenson, & Downey, 2013; Schulze, Schmahl, & Niedtfeld, 2015). Despite greater recognition sensitivity for negative facial expressions and exaggerated affective empathy (Lynch et al., 2006; Jeung & Herpertz, 2014; New et al., 2012), individuals with BPD are often unable to intellectually understand the perspectives of others (Jeung & Herpertz, 2014; New et al., 2012).

In contrast to BPD, antisocial personality disorder and psychopathic traits are typically associated with neurological hyporeactivity and low subjective emotional arousal in response to emotional stimuli (Dinn & Harris, 2000; Raine, Lencz, Bihrl, LaCasse, & Colletti, 2000). Individuals with antisocial and/or psychopathic traits are also under-responsive to aversive conditioning paradigms, suggesting poor sensitivity to punitive consequences (Schneider et al., 2000). This pervasive, emotional hyporeactivity is theorized to underlie the low emotional arousal, poor fear conditioning, lack of anxiety, and antisocial behaviors commonly noted in this population (Dinn & Harris, 2000; Raine et al., 2000).
Summary

Through emotion processing, an individual becomes aware of and understands his/her emotional experiences, recognizes the emotional experiences of others, and infers emotional information from situational cues. The depth and complexity emotion processing is dependent on neurological correlates, developmental and socialization history, situational and social context, and individual differences. When emotion processing is accurate and efficient, it provides the individual with comprehensive information about his/her emotional environment. When deficient, however, various functional impairments may result, including interpersonal difficulty and psychopathology.
CHAPTER 5: EMOTION REGULATION

Through emotion processing, emotions provide vital information about the environment, situational demands, and internal experience. Such processes guide engagement in complex, cognitive and behavioral responses to satisfy environmental demands and achieve personal goals while modulating emotional intensity. These responses are collectively termed emotion regulation (Bargh & Williams, 2007; Campbell-Sills & Barlow, 2007; Cole, Martin, & Dennis, 2004; Gratz & Roemer, 2004; Gross, 1998; 2002; Rottenberg & Gross, 2003; Sloan & Kring, 2007). Third-wave behavior therapies place high emphasis on emotion regulation and often conceptualize psychopathology and associated difficulties as resulting, at least in part, from emotion-regulation difficulties (e.g., Hayes & Wilson, 1994; Linehan, 1993; Greenberg, 2004).

Theoretical Conceptualization

Emotions stem from bioevolutionary processes that evolved to aid humans in responding to situational demands (see Adopted Theoretical Principles, p. 27). The salience of emotion within human experience suggests a central function of emotion across the course of evolution. In modern society, however, the utility of purely emotion-based responses is often questionable, particularly within the context of long-term goals and consequences. For example, a woman who feels anger and aggresses against perceived instigation may face assault charges and/or the loss of relationships. To survive in modern society, it is imperative that humans influence their emotions when emotional responses and behavior are not well matched to situational demands and/or personal goals. Emotion regulation serves this role (Gross, 1998; 2002).

A few aspects of emotion regulation require clarification. First, although literature on emotion regulation generally focuses on regulation of negative emotion, individuals regularly engage in regulation of both negative and positive emotion. For example, a person may attempt
to downregulate feelings of sadness if rejected for a promotion; they may also attempt to
downregulate feelings of happiness after receiving a promotion if talking to a friend recently
rejected for a similar position. Second, emotion regulation may be conscious, such as deciding to
leave a party due to feelings of social anxiety, or unconscious, such as instinctually avoiding
crowded places that trigger social anxiety. Third, though specific strategies are sometimes
regarded in the literature as “adaptive” or “maladaptive” the adaptive value of a particular
strategy is determined by the context in which the strategy is used. For example, suppression is
generally considered a “maladaptive” strategy. However, short-term suppression may be
adaptive when selectively applied to situations in which emotions are discordant with situational
demands (e.g., suppressing feelings of anxiety while giving a speech) or in situations that are
inescapable (e.g., suppressing feelings of horror while being assaulted). Lastly, emotion
regulation is heavily reliant on effective emotion processing. As noted in the previous chapter,
emotion processing serves to interpret emotions and emotional information (See Chapter 4:
Emotion Processing, p. 30). These interpretations are critical through their guiding influence on
emotion regulation.

Process Model of Emotion Regulation

In 1998, James Gross proposed a process model of emotion regulation (see Gross, 1998;
2002; Sloan & Kring, 2007 for reviews). The process model classifies emotion regulation into
two categories: antecedent-focused and response-focused (see Figure 4). Antecedent-focused
emotion regulation consists of strategies employed to influence future emotional experiences,
whereas response-focused emotion regulation is used to influence ongoing emotional
experiences.
Antecedent-focused emotion regulation is used prior to the activation of an emotional experience and includes situation selection, situation modification, attentional deployment, and/or cognitive change (see Gross, 1998, 2002 for reviews). Situation selection occurs earliest and consists of choosing which situations, people, places, and objects to approach and which to avoid. After engaged in a situation, situation modification may be used to influence the nature of the situation for the purposes of modifying the situation’s emotional impact. Attentional deployment may also be used to elect certain aspects of the situation on which to focus. Lastly, cognitive change may be used to alter appraisals made about the situation. Thus, if a person is invited to a social gathering, but predicts feeling socially anxious, he/she may: (a) opt to not go to the gathering at all (situation selection); (b) invite other friends to attend with whom he/she would be more comfortable (situation modification); (c) speak only with people with whom he/she has a good relationship (attentional deployment); and/or (d) view the gathering as an opportunity to meet new people rather than a source of anxiety (cognitive change).

After an emotion has been triggered, an individual may engage in response-focused emotion regulation to modulate the influence of an emotion on behavioral, physiological, and/or experiential response systems (see Gross, 1998, 2002 for reviews). Common response-focused strategies include suppression of feelings or behaviors, engagement in emotion-incongruent behavior (e.g., relaxation techniques), and self-soothing.

Notably, the distinction between antecedent-focused and response-focused emotion-regulation strategies is somewhat of a false dichotomy. Many emotion-regulation strategies (e.g., avoidance) may serve to influence both future and ongoing emotional experiences. The classification system proposed by Gross is therefore adopted only to provide a cohesive framework for organizing the function of emotion-regulation strategies.
Figure 4: Process Model of Emotion Regulation. Adapted from Gross (1998; 2002).

**Related Constructs**

A great deal of misunderstanding exists in the field about what is and is not considered emotion regulation (Bridges, Dehnham & Ganiban, 2004; Gross, 1998; Thompson, 1994). This misunderstanding likely stems in part from the large overlap in conceptualizations of emotion regulation and related constructs, such as psychological defenses, coping, emotion dysregulation, and emotion utilization. In the following sections, similarities and differences between emotion regulation and these related constructs are reviewed.

*Psychological Defenses.* Empirical and theoretical research on psychological defenses was a critical precursor to modern conceptualizations of emotion regulation (Gross, 1998). Initially proposed through the psychoanalytic tradition, psychological defenses are unconscious mental processes that serve to reduce negative and/or painful emotions (Cramer, 2000; Freud, 1894/1959, 1896/1964; Paulhus, Fridhandler, & Hayes, 1997). Like emotion regulation, psychological defenses modulate emotional experience. However, the scope of psychological defenses is markedly narrower than that of emotion regulation. Whereas psychological defenses concern exclusively unconscious downregulation of negative emotions, emotion regulation may include conscious or unconscious processes, down- or up-regulation, and negative or positive emotions.

*Coping.* Empirical research on stress and coping also contributed significantly to modern conceptualizations of emotion regulation (Gross, 1998). Coping consists of “cognitive and
behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984, p. 141). Coping may include attempts to resolve the source of taxing demands (i.e., problem-focused coping) as well as attempts to downregulate negative reactions to the demands (i.e., emotion-focused coping; Baum, Fleming, & Singer, 1983; Folkman & Lazarus, 1990; McCrae, 1982). There is therefore considerable overlap between conceptualizations of coping and emotion regulation. However, notable differences also exist. First, coping includes regulation of both emotional and non-emotional psychological processes (Lazarus, 1993), whereas emotion regulation concerns primarily regulation of emotional processes. Literature on coping is also concerned with regulation of responses to “stress,” whereas emotion regulation attempts to make finer grained distinctions between different types of emotional triggers and responses. Emotion regulation also concerns regulation of response in both positively- and negatively-valenced contexts (Gross, 1998).

*Emotion Dysregulation.* Conceptualizations of emotion dysregulation and discussions of its relation to emotion regulation vary widely across the literature (Bridges et al., 2004; Cole, Michel, & Teti, 1994; Eisenberg & Spinrad, 2004; Izard, 2010). Emotion dysregulation occurs when emotion-regulation attempts are ill-suited to personal goals and/or situational demands (Cole et al., 1994). It takes various forms, including under-regulation of emotions, over-regulation of emotions, and inflexible application of regulation strategies across contexts. Many forms of emotion dysregulation are successful in modulating immediate emotional arousal (Cole et al., 1994; Klonsky, 2007; Laye-Gindhu & Schonert-Reichl, 2005). What distinguishes emotion dysregulation from successful emotion regulation is therefore the interference of emotion
dysregulation on other areas of functioning (e.g., interpersonal relationships, progress toward long-term goals).

Relatedly, behavioral dysregulation is characterized by maladaptive, harmful, and often impulsive attempts to downregulate emotional arousal through behavior. These behaviors include binge eating, substance use, aggression, self-harm, and promiscuity, among others.

**Emotion Utilization.** A final construct sharing similarities with emotion regulation is emotion utilization. Proposed and developed through Differential Emotion Theory (Izard, 2007, 2009, 2011), emotion utilization is conceptualized as using the inherently adaptive nature of emotional experiences to guide cognition and behavior in a manner that is both situationally appropriate and goal consistent (Izard, 2009; Izard et al., 2008). Thus, whereas emotion regulation generally emphasizes controlling emotional experiences due to a mismatch between situational demands and emotional experiences, emotion utilization emphasizes working with emotional experiences to utilize the inherently adaptive quality of the emotion. For example, emotion regulation may involve use of cognitive change strategies to change one’s perception of a situation, thereby decreasing feelings of anger. Conversely, emotion utilization would involve recognizing the information provided by the anger (e.g., indications of goal obstruction) and allowing this information to inform goal-directed behavior (e.g., self-assertion). Ability to engage in emotion utilization, however, is dependent on emotion-processing and emotion-regulation abilities (Izard, 2009), suggesting these constructs likely interact with one another.

**Assessment**

Emotion regulation is relevant in nearly all psychological contexts and reflected through a myriad of behaviors. Consequently, there is substantial variability in assessment and
operationalization of emotion regulation across research (Bridges et al., 2004). Behavioral and self-report measures are the most common forms of emotion-regulation assessment.

**Behavioral Measures**

Behavioral measures of emotion regulation are especially prevalent in developmental research involving infants and young children. For these measures, coding paradigms are developed, the nature and frequency of regulatory behaviors are tracked, and inferences about the child’s emotion regulation are made (e.g., Buss & Goldsmith, 1998; Stifter & Braungart, 1995). Reliance on behavioral measures is pervasive throughout developmental research. However, results are often also open to interpretation (Bridges et al., 2004). For example, frequent engagement in emotion-regulation behavior may reflect a wide regulation-strategy repertoire. Conversely, it may suggest that implementation of strategies is generally ineffective and that various strategies are required before regulation is achieved. Furthermore, coding schemes also often fail to consider the influence of situational context on determinations of strategy appropriateness (Bridges et al., 2004).

Behavioral measures are also commonly used to evaluate the effectiveness of specific regulation strategies. Participants are presented with an emotional stimulus and provided explicit instruction on how to regulate emotional responses. Emotional outcomes, such as physiological arousal, subjective distress and neurological reactivity, are then coded and interpreted as reflecting the effectiveness of the strategy used. Most studies utilizing these measures randomly assign participants to different strategy conditions, allowing the efficacy of strategies to be directly compared (e.g., Gross & Levenson, 1997; Jackson et al., 2000; Szasz et al., 2011).

Lastly, behavioral measures may be used to assess within-person patterns or styles of emotion regulation. Participants are presented with an emotional stimulus, and only limited
instruction is provided on how to respond. For many studies, little to no guidance is provided, and participants respond freely (e.g., Maughan & Ciccetti, 2002; Wang & Saudino, 2013). For others, participants are instructed to choose from a list of strategies to use in responding (e.g., Scheibe, Sheppes, & Staudinger, 2015; Sheppes et al., 2014). Use and/or effectiveness of emotion-regulation strategies are then coded and interpreted as reflecting the participant’s typical pattern or style of emotion regulation.

Self-Report Measures

Within-person patterns of emotion regulation are also commonly assessed via self-report measures. These measures vary widely in scope and content. Some assess frequency of use of specific strategies, such as suppression, catastrophizing, or rumination (e.g., Emotion Regulation Questionnaire [Gross & John, 2003]). Others emphasize overall effectiveness or difficulty of emotion-regulation attempts (e.g., Difficulties in Emotion Regulation Scale [Gratz & Roemer, 2004]). Reliance on self-report measures is widespread throughout research on emotion regulation (Aldao, Nolen-Hoeksema, & Schweizer, 2010). However, these measures suffer the same methodological limitations as all self-report measures, including vulnerability to response biases and validity threats stemming from limited introspection ability (Bell et al., 2007; Fisher & Katz, 2008; Paulhus & Vazire, 2007; Van de Mortel, 2008).

Strategies for Emotion Regulation

Various strategies for emotion regulation have been identified throughout the literature. Effectiveness, psychological correlates, and underlying mechanisms of these strategies have received increasing empirical attention in recent years. According to the process model of emotion regulation, emotion-regulation strategies can be classified according to five categories – situation selection, situation modification, attentional deployment, cognitive change, and
response modulation. In the sections that follow, common emotion-regulation strategies are discussed within the context of these categories. Although some regulation strategies may be classified into various categories (e.g., avoidance has been conceptualized as a strategy for situation selection, attentional deployment, or response modulation), classification according to the aforementioned categories will be used to aid in conceptual organization.

**Situation Selection**

Situation selection involves choosing which situations or experiences to approach and from which to withdraw. Generally, individuals are motivated to approach situations and experiences predicted to result in positive emotion and to withdraw from those predicted to result in negative emotion (Gross, 1998).

Of the many strategies involved in situation selection, avoidance has received the most empirical attention. Avoidance strategies are attempts to evade or disengage from situations or experiences believed to result in negative or otherwise uncomfortable emotion. Avoidance strategies take many forms, including denial, behavioral disengagement, mental disengagement, and drug or alcohol abuse (Sica et al., 2008). Immediate effects of avoidance include downregulation of emotional arousal and reduced distress (Holahan, Moos, Holahan, Brennan, & Schutte, 2005). Habitual avoidance, however, is associated with various psychological difficulties, including depression, post-traumatic stress, substance abuse, and increased long-term emotional distress (Coriale et al., 2012; Holahan et al. 2005; Krause, Kaltman, Goodman, & Dutton, 2008; Seiffge-Krenke & Klessinger, 2000). Possibly because avoidance strategies prevent an individual from confronting and overcoming the source of negative emotion, degree of reliance on these strategies correlates positively with (a) frequency of chronic and acute life stressors over time, (b) vulnerability to the effects of life stress, and (c) maladjustment when
stressors are unavoidable (Crockett et al., 2007; Holahan et al., 2005; Holahan, Moos, & Bonin, 1999; Petersen et al., 1993; Sandler, Tein, & West, 1994).

Avoidance-based regulation strategies are maintained through negative reinforcement schedules (Delgado, Jou, LeDoux, & Phelps, 2009; Sidman, 1953). When facing a potentially emotional situation, predictions about the emotional consequences of engaging in the situation are made. If the predicted potential for experiencing negative emotion is salient and distressing, the situation may be avoided, decreasing feelings of distress. This reduction in distress, coupled with the perception of avoided future negative emotion, serves as negative reinforcement for the choice to engage in avoidance-based regulation strategies. Because avoidance prevents the individual from confronting the source of negative emotion, avoidance is maintained even when the stressor is no longer present (Delgado et al., 2009; Sidman, 1953).

Situation Modification

After choosing to engage in a situation, situation-modification strategies target the nature of the situation so as to alter the resulting emotion (Gross, 1998). The most common situation-modification strategy is problem solving. Problem solving is used to change or resolve a perceived source of emotional provocation. It involves generation of potential strategies, evaluation of the pros and cons of each strategy, and implementation of steps toward resolving the source of provocation (Lazarus & Folkman, 1984). Behaviors resulting from problem solving may be subtle, such as changing a topic of conversation, or blatant, such as asking another person to leave (Chang, D’Zurilla, Thomas, & Sanna, 2004).

The effectiveness of problem solving in downregulating emotion is dependent on the extent to which the situation is within control of the individual. Problem solving is most effective when used in situations that are malleable to change. When used in situations that are resistant to
change, problem solving tends to increase negative affect, particularly frustration (Chang et al., 2004; D’Zurilla & Nezu, 2010; Greitemeyer, Lebek, Frey, & Traut-Mattausch, 2011).

Deficient problem-solving ability is associated with various psychoemotional difficulties, including psychosis, depression, post-traumatic stress, eating disorders, personality disorders, suicidal and self-harm behavior, and aggressive behavior (Donaldson & Lam, 2004; D’Zurilla, Chang, & Sanna, 2003; Holt & Espelage, 2002; Maurex et al., 2010; Revheim et al., 2006; Speckens & Hawton, 2005; Sutherland & Bryant, 2008; Watkins & Baracaia, 2002). Problem solving is also unlikely to be used by persons with high trait neuroticism, high pessimism, poor emotional awareness, low self-esteem, and/or poor confidence in their ability to influence situations (Baker & Berenbaum, 2007; Endler & Parker, 1990; MacNair & Elliott, 1992; O’Brien & DeLongis, 1996; Parkes, 1986; Scheier, Weintraub, & Carver, 1986).

Attentional Deployment

Whereas situation modification strategies aim to alter external sources of emotional distress, attentional deployment strategies are used to alter the internal experiences, particularly in situations perceived as unchangeable and unavoidable (Gross, 1998). These strategies may involve diverting attention away from or intensely focusing on the source of emotional provocation (i.e., distraction or rumination, respectively). Results of a recent meta-analysis suggest that distraction is generally effective in downregulating immediate negative emotion, whereas rumination is largely ineffective (Webb, Miles, & Sheeran, 2012).

Distraction. Distraction involves shifting attention away from the emotional aspects of a situation or away from the situation itself (Gross, 2008). This strategy is often accompanied by behavioral changes, such as engagement in a distracting activity or a shift in gaze orientation. However, it may also occur internally, such as thinking of information unrelated to the situation.
Distraction results in swift, moderate reductions in emotional arousal (Greitemeyer et al., 2011; Thiruchselvam et al., 2011; Webb et al., 2012). It is therefore adaptive in situations that require short-term relief from temporary or and/or unchangeable stressors. Emotional downregulation is greatest when distraction is purposeful rather than passive (Webb et al., 2012).

Distraction may also serve to avoid uncomfortable thoughts, emotions, etc. (Boulanger, Hayes, & Pistorello, 2010; Chapman, Gratz, & Brown, 2006). Avoiding internal experiences through distraction is a common motivation for dysregulated behavior, such as self-harm and binge eating (Klonsky, 2007; Laye-Gindhu & Schonert-Reichl, 2005; Macht, Haupt, & Ellgring, 2005). Like avoidance strategies, distraction inhibits ability to confront and overcome the source of emotional distress, thereby increasing risk of engagement in these dysregulated behaviors (Boulanger et al., 2010; Freeman & Gil, 2004; Nower, Derevensky, & Gupta, 2004).

*Rumination.* Whereas distraction seeks to shift attention away from the source of emotional distress, rumination involves perseverative focus on the source, symptoms, and potential causes and consequences of emotional distress (Gross, 2008; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Rumination is a largely internal, cognitive experience. However, it may also be accompanied by social or behavioral withdrawal (Nolen-Hoeksema et al., 2008). Rumination results in increased emotional arousal and duration and is therefore generally considered maladaptive (Gross, 2008; Nolen-Hoeksema et al., 2008; Webb et al., 2012). Intensity and frequency of ruminative strategies are associated with various forms of psychopathology, including depression, anxiety, eating, and substance abuse disorders (Eckern, Stevens, & Mitchell, 1999; Lyubomirsky & Tkach, 2004; Mellings & Alden, 2000; Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007; Nolen-Hoeksema et al., 2008). Rumination is also associated with various maladaptive emotion-
processing, including negative attribution thinking styles, hopelessness, self-criticism, dependency, and neuroticism (Lam, Smith, Checkley, Rijsdijk, & Sham, 2003; Nolen-Hoeksema, Parker, & Larson, 1994; Roberts, Gilboa, & Gotlib, 1998).

Reported motivations for engaging in rumination include releasing negative affect, understanding emotional distress, and developing plans to avoid future distress (Lyubomirsky & Nolen-Hoeksema, 1993; Papageorgiou & Wells, 2003; Simpson & Papageorgiou, 2003; Watkins & Baracaia, 2002). However, rumination actively hinders these outcomes (Nolen-Hoeksema et al., 2008; Watkins & Baracaia, 2002). Some evidence suggests that rumination may also serve an avoidant function by preoccupying time and attention away from aversive experiences and by justifying hopelessness, withdrawal and lack of constructive activity (Lyubomirsky & Nolen-Hoeksema, 1993; Martell, Addis, & Jacobson, 2001; Nolen-Hoeksema et al., 2008).

Cognitive Change

Unlike attentional deployment strategies, cognitive-change strategies allow for maintained engagement in emotional situations and experiences by targeting appraisals made about the source of emotion (Gross, 1998). Three cognitive change strategies – reappraisal, acceptance, and mindfulness – have received substantial attention throughout the literature.

Reappraisal. Reappraisal involves considering and adopting positive or benign appraisals of a distressing stimulus or situation in order to change the nature or intensity of an emotional response (Gross, 1998; Lazarus & Alfert, 1964; Urry, 2010). Engaging in this strategy yields reliable reductions in both subjective and physiological emotional arousal (Gross, 2002; John & Gross, 2004; Urry, 2010). The magnitude of regulatory effects is generally greater than many alternative strategies, such as suppression and distraction (Gross, 2002; Gross & John, 2003; Lieberman et al., 2011; Webb et al., 2012). Habitual use of reappraisal as a regulation strategy is
associated with greater positive affect, interpersonal functioning, psychological adjustment, and life satisfaction and inversely associated with negative affect and psychopathological symptom severity (Aldao et al., 2010; Gross, 2002; Gross & John, 2003; Haga, Kraft, & Corby, 2009; John & Gross, 2004; Mauss, Cook, Cheng, & Gross, 2007; Wilson & Gilbert, 2008).

Acceptance. In contrast to reappraisal, acceptance involves observing the source of emotional provocation as it exists without attempts to alter its form, frequency, or intensity (Follette, Palm, & Hall, 2004). The goal of acceptance strategies is therefore not modification of emotional form or intensity per se. Rather, these strategies target the experience of emotions and emotional situations to decrease distress. Consistent with this, the beneficial effects of acceptance on mental health are not dependent on ability to modify negative emotional experience (Berking et al., 2012).

Engagement in acceptance strategies yields reliable reductions in emotional arousal and distress. Experimental studies suggest that responding to stressful experiences with acceptance, in comparison to suppression, yields lower emotional arousal, distress, and catastrophic thoughts and faster recovery from negative affect (Campbell-Sills, Barlow, Brown, and Hofmann, 2006; Eifert & Heffner, 2003; Low, Stanton, & Bower, 2008). The magnitude of these regulatory effects is approximately equal to that of reappraisal strategies (Wolgast, Lundh, & Viborg, 2011). Habitual use of acceptance-based strategies is also associated with greater distress tolerance, psychological adjustment, and psychological resilience (Masedo & Esteve, 2007; Thompson, Arnkoff, & Glass, 2011).

Mindfulness. Related to acceptance, mindfulness involves purposeful attention to and awareness of present-moment experiences from a perspective of openness, curiosity, and acceptance (Bishop et al., 2004; Kabat-Zinn, 1982; Shapiro, Carlson, Astin, & Freedman, 2006).
Like acceptance strategies, mindfulness includes a nonjudgmental mindset, which persists regardless of the pleasantness or unpleasantness of ongoing experience (Kabat-Zinn, 1982; 1994). However, whereas acceptance typically targets perception of sources of emotional provocation, mindfulness includes purposeful, active awareness and nonjudgment of internal experiences occurring in reaction to emotional provocation. Mindfulness therefore stands in contrast to mental states which are distracted, automatic, judgmental, and/or emotionally constricted. Maintaining a mindful approach promotes self-awareness and self-acceptance, thereby decreasing the extent to which emotions unconsciously motivate impulsive or otherwise automatic behavior (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Carson & Langer, 2006; Hollis-Walker & Colosimo, 2011; Hölzel et al., 2011; Jimenez, Niles, & Park, 2010; Shapiro et al., 2006; Siegel, Germer, & Oldenzki, 2009; Thompson & Waltz, 2008; Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006). Consistent with this, mindfulness is inversely related to psychological distress associated with psychopathological symptoms (Chadwick, Barnbrook, & Newman-Taylor, 2007; Coffey & Hartman, 2008; Taylor, Harper, & Chadwick, 2009).

**Response Modulation**

According to the process model of emotion regulation, situation selection, situation modification, attentional deployment, and cognitive change strategies typically occur prior to full activation of an emotional response (Gross, 1998). After an emotional response is activated, response-modulation strategies are used to modulate experiential, physiological, and/or behavioral responses. These include suppression, self-soothing, relaxation, and emotion labeling, among others.
Suppression. Suppression involves conscious efforts to inhibit emotional experience (Gross & Levenson, 1993). This strategy takes multiple forms, which vary in effectiveness – suppression of behavioral expression, suppression of subjective experience, and suppression of thoughts (Webb et al., 2012). The overall regulatory effects of suppression are small and sometimes paradoxical (Webb et al., 2012). In the classic “White Bear Experiment,” researchers instructed participants to suppress thoughts of a white bear. Results suggested that greater efforts to suppress were associated with higher frequency and intensity of thoughts about a white bear (Wegner, Schneider, Carter, & White, 1987). The rebound effect of thought suppression has been replicated in a variety of samples and contexts (see Abramowitz, Tolin, & Street, 2001 for a meta-analytic review). However, some research suggests that thought suppression may initially yield effective inhibition of the target thought, reinforcing continued engagement in the strategy. However, this inhibition is temporary, and the rebound effect occurs only as time passes and/or as suppression efforts begin to relax (Abramowitz et al., 2001).

The regulatory effects of behavioral suppression are less clear. Some studies suggest that suppression of emotional facial expressions may, like thought suppression, result in a paradoxical increase in experiential and physiological emotional arousal (e.g., Gross, 1998; Gross & John, 2003). Conversely, others suggest that suppression of facial expressions aids in decreasing experiential arousal through a facial feedback loop stemming from the interrelation between emotional response systems (e.g., Davis, Senghas, & Oschner, 2009; Goldin, McRae, Ramel, & Gross, 2008; see Coherence across Emotional Response Systems, p. 7). Consistent with the latter, results of a recent meta-analysis suggest small-to-moderate regulatory effects of facial expression suppression (Webb et al., 2012).
Suppression of subjective experience is generally associated with poor psychological functioning. In both clinical and nonclinical samples, habitual use of suppression to decrease subjective emotional arousal correlates with lower positive affect, interpersonal functioning, and life satisfaction, and higher negative affect and psychopathological symptom severity (Aldao et al., 2010; Gross & John, 2003; Haga et al., 2009; Moore et al., 2008; Srivastava, Tamir, McGonigal, John, & Gross, 2009). Recent research, however, suggests that some of these negative associations may be confined to Western cultures. For individuals with Eastern cultural values, the association between suppression and psychological wellbeing is weaker and, in some cases, reversed (Butler et al., 2007; Soto, Perez, Kim, Lee, & Minnick, 2011; Wei et al., 2013).

**Self-Soothing.** Another form of response modulation is self-soothing. Self-soothing strategies take many forms, including thumb sucking, nail biting, skin picking, listening to pleasant music, and drinking herbal tea. At the core of these strategies is an attempt to change emotions by introducing soothing and/or comfortable physical sensations. Self-soothing behaviors generally yield downregulation of negative emotion and sometimes contribute to increases in positive emotion (Roberts, O’Connor, & Bélanger, 2013; Snorrason, Smari, & Olafsson, 2010; Stein, Chamberlain, & Fineberg, 2006; Williams, Rose, & Chisholm, 2007). However, habitual engagement in certain self-soothing behaviors, such as hair pulling and skin picking, is considered pathological (American Psychiatric Association, 2013). These forms of self-soothing may contribute to feelings of shame and embarrassment and are often experienced as compulsive and uncontrollable (Bohne, Keuthen, & Wilhelm, 2005; Gupta, Gupta, & Haberman, 1986; Odlaug & Grant, 2008). For individuals who routinely engage in this emotion regulation strategy, feelings of tension are common prior to engaging in the behavior; engagement in the behavior then decreases the feelings of tension and downregulates other
negative emotions (Arnold, Auchenbach, & McElroy, 2001; Odlaug and Grant, 2008; Tucker, Woods, Flessner, Franklin, & Franklin, 2011). It is therefore likely that negative reinforcement plays a role in maintaining these behaviors.

Other forms of self-soothing may be adaptive in certain contexts. For example, when participants are asked to freely list routine emotion-regulation strategies, they commonly include self-soothing behaviors, such as taking a bath, listening to music, and exercising (e.g., Parkinson & Totterdell, 1999; Thayer, Newman, & McClain, 1994). Engagement in these behaviors is commonly considered adaptive so long as engagement does not interfere with other goal-directed behavior and/or serve an avoidant function (Lindenboim, Comtois, & Linehan, 2007; Linehan, 2014).

Relaxation. Similar to self-soothing, relaxation strategies aim to change emotions by targeting physical sensations. However, whereas self-soothing involves the introduction of comforting physical sensations, relaxation strategies aim to alter existing somatic experience. Relaxation can take many forms, such as progressive muscle relaxation or yoga. Possibly due to the interactional nature between emotional and somatic systems, these strategies are generally effective in increasing positive affect and reducing negative affect (Conrad & Roth, 2007; Lavey et al., 2005; Menezes et al., 2015; Niedenthal, 2007; Philippot, Chapelle, & Blairy, 2002). For some, however, relaxation instructions may increase emotional tension when relaxation does not come easily (Adler, Craske, & Barlow, 1987; Heide & Borkovec, 1983).

Emotion Labeling. A final form of response modulation is emotion labeling (a.k.a. affect labeling). Emotion labeling is the process of consciously examining and applying a linguistic label to emotional experiences and/or emotional content (Kircanski, Lieberman, & Craske, 2012). Research stemming primarily from neurological data suggest that this strategy improves
emotion regulation by fostering emotion processing and decreasing emotional reactivity (Lieberman et al., 2007). In comparison to passively experiencing or observing emotions and emotional content, emotion labeling contributes to lower reactivity in neurological, experiential, and somatic emotion systems (Burklund et al., 2014; Constantinou, Van Den Houte, Bogaerts, Van Diest, & Van den Bergh, 2014; Lieberman et al., 2007; Lieberman et al., 2011). The magnitude of these effects is comparable to that of reappraisal and distraction (Lieberman et al., 2011).

**Adaptive v Maladaptive Emotion-Regulation Strategies**

Decades of research have accumulated on the various strategies used for emotion regulation. The effects of strategy use on immediate emotional arousal and long-term psychological health have contributed to classifications of these strategies as “adaptive” or “maladaptive.” However, a more wholesome perspective suggests that the effectiveness and adaptiveness of regulation strategies are heavily dependent on situational demands and personal goals.

Routine engagement in maladaptive strategies is predictive of elevated psychopathological symptoms, suggesting some validity to the classification of certain strategies (e.g., suppression, rumination, etc.) as “maladaptive” if habitually used across contexts (Aldao & Nolen-Hoeksema, 2012). However, after controlling for maladaptive strategy use, engagement in strategies traditionally considered “adaptive” (e.g., reappraisal, distraction, etc.) actually shows little relation to overall psychopathology (Aldao & Nolen-Hoeksema, 2012). Studies using experience sampling methods suggest that flexibility in implementation of emotion-regulation strategies across contexts is a better predictor of psychological adjustment than use of any one particular strategy. Flexibility also contributes to greater ability to discern situational demands

Over-reliance on any singular strategy (whether “adaptive” or “maladaptive”) is generally associated with deleterious long-term outcomes, such as psychopathology, poor psychological adjustment, low distress tolerance, and increased negative affect (Aldao et al., 2010; Holahan & Moos, 1987; Holahan et al., 2005). Even reappraisal strategies, which are generally considered highly adaptive (Gross & John, 2003), are not adaptive in all situations. For example, whereas continuous positive appraisals may decrease emotional arousal, negative appraisals are sometimes necessary to successfully respond to situational demands (Freund & Staudinger, 2015). Furthermore, although reappraisal is effective in situations of low emotional intensity (such as those created in psychological research), it is generally ineffective in situations of high emotional intensity (Sheppes & Meiran, 2008; Sheppes, Catran, & Meiran, 2009).

Third-wave therapies commonly assert that maladaptive emotion-regulation strategies typically serve an avoidant function (e.g., Chawla & Ostafin, 2007; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). That is, they serve to decrease the level of contact an individual has with the source of emotional arousal. Consistent with this, many strategies traditionally considered “maladaptive” can be conceptualized as serving an avoidant function. For example, distraction and rumination strategies draw attention away from the emotional aspects of a situation, thereby decreasing contact with the source of emotional provocation (Boulanger et al., 2010; Nolen-Hoeksema et al., 2008). By contrast, problem solving, acceptance, and emotion labeling strategies maintain contact, allowing sources of emotional provocation to be resolved and/or tolerated (Follette et al., 2004; Lazarus & Folkman, 1984; Lieberman et al., 2007).
Developmental Course

Ability to regulate emotions within the context of situational demands and personal goals is a skill which develops gradually over the course of development. In early life, emotion-regulation strategies are heavily dependent on external sources of regulation, and they are motivated exclusively toward meeting personal goals. Newborns rely almost exclusively on caregivers as this source of regulation. As such, early regulation strategies consist primarily of attempts to recruit environmental resources (e.g., crying, cooing, etc.; Calkins & Hill, 2007; Thompson & Meyer, 2007). As cognitive and motor skills develop across the first few months of life, other regulation strategies also become available, such as self-soothing (e.g., thumb sucking), attention modulation, and avoidance (Calkins, 1994; Kopp, 1989).

As a child enters the preschool years, development of language provides a myriad of other emotion-regulation strategies, including cognitive understanding of emotions and emotional situations, labeling of emotional experiences, and increasingly complex problem solving (e.g., asking caregivers for help). Expressive language skill is particularly important in the generation of emotion-regulation strategies as preschool-aged children grow older (Cole, Dennis, Smith-Simon, & Cohen, 2009). Notwithstanding these advancements, preschool-aged children continue to rely heavily on the social support of caregivers for emotion regulation (Bernzweig, Eisenberg, & Fabes, 1993; Zimmer-Gembeck & Skinner, 2011). When social support is not immediately available, escape and avoidance strategies are commonly used (Bernzweig et al., 1993; Zimmer-Gembeck & Skinner, 2011).

As children grow older, they are faced with increasingly complex personal and situational demands, prompting the development of a larger and more complex array of regulation strategies. Throughout childhood, use of strategies reliant on internal sources of regulation (e.g.,
problem solving) increases, whereas use of strategies reliant on external sources (e.g., social support) remains relatively constant (Zimmer-Gembeck & Skinner, 2011). Strategies also tend to increase in complexity to more effectively address varying situational demands. For example, as children grow older, they decrease reliance on caregivers, increase support-seeking from alternative sources (e.g., peers and teachers), and seek advice rather than assistance in handing emotional situations (Fields & Prinz, 1997; Zimmer-Gembeck & Skinner, 2011).

Breadth and complexity of emotion-regulation strategies continue to develop throughout adolescence (Compas et al., 2014; Zimmer-Gembeck & Skinner, 2011). Use of complex strategies does not override use of more basic strategies characteristic of earlier developmental states (e.g., seeking caregiver support). Rather, complex strategies contribute to diversification of an individual’s regulation repertoire (Fields & Prinz, 1997; Zimmer-Gembeck & Skinner, 2011).

Throughout adulthood, complexity and effectiveness of emotion-regulation strategies continue to increase. Regulation strategies of older adults tend to emphasize immediate reduction of emotional arousal over long-term adaptation to emotional triggers. For example, when presented with distressing images or situations, older adults are faster to look away and more likely to prefer disengagement strategies (e.g., distraction, withdrawal, denial, etc.) over strategies that increase engagement (e.g., reappraisal, interpersonal confrontation, etc.; Birditt, Fingerman, & Almeida, 2005; Blanchard-Fields, Stein, & Watson, 2004; Noh, Lohani, & Isaacowitz, 2011; Scheibe et al., 2015).

*Emotion Socialization*

Development of emotion regulation is also heavily dependent on the socioemotional environment, particularly within the family (Eisenberg et al., 1998; Morris, Silk, Steinberg,
Emotion socialization occurs in three primary forms: modeling, contingent responding, and coaching (Eisenberg et al., 1998).

**Modeling.** Many emotion-regulation strategies are learned through modeling (Parke, 1994). As young as infancy and continuing throughout adulthood, emotional expressivity in the home correlates positively with children’s emotional expressivity (Denham & Grout, 1992; Garner, Robertson, & Smith, 1997; Termine & Izard, 1988). Valence of a parent’s typical emotional expressions is also predictive of children’s emotion-regulation style. Positively-valenced parent expressions are associated with greater emotion-regulation ability, whereas negatively-valenced expressions (particularly those that are consistent and intense across contexts) are associated with difficulties in emotion regulation and engagement in dysregulated behaviors (Denham & Grout, 1993; Carson & Parke, 1996; Isley, O’Neil, Clatfelter, & Parke, 1999).

**Contingent Responding.** The responsiveness of others to the emotional needs and expressions of an individual also serves as a means of emotion socialization. Particularly in infancy, caregiver responsiveness is key to emotion-regulation development. Optimal regulation develops when caregivers are moderately sensitive and responsive to infant emotionality; poor emotion regulation tends to develop when caregivers are overly- or under-sensitive (Cohn & Tronick, 1983; Denham et al., 1997; Eisenberg et al., 1998; Gable & Isabella, 1992; Mayes & Carter, 1990; Stifter & Moyer, 1991). As the child grows older, caregiver responses influence the types of strategies adopted. Responses which punish, minimize, or otherwise discourage emotional experience and/or expression contribute to the development of maladaptive, avoidance-based strategies and externalizing behaviors. Conversely, emotionally supportive responses are associated with the development of adaptive, acceptance-based, and problem-
solving strategies (Eisenberg et al., 1996; Krause et al., 2003; Mirabile, 2015; Sauer & Baer, 2009; Snyder, Stoolmiller, Wilson, & Yamamoto, 2003).

**Coaching.** Lastly, emotion socialization may occur via direct, didactic-like discussion about emotion-regulation and/or emotion regulation strategies. Across samples, parental coaching that is frequent, supportive, and validating generally correlates with lower child engagement in dysregulated behavior and greater child ability to implement effective and situationally-appropriate regulation strategies (Gottman, Katz, & Hooven, 1996; Hooven, Gottman, & Katz, 1995; Mize & Pettit, 1997).

**Other Considerations Regarding Emotion Socialization.** Although literature tends to emphasize the role of the family and caregiver, all social relationships contribute to the socioemotional environment. Friends, acquaintances, coworkers, and even the broader cultural context may influence the nature, complexity, and effectiveness of emotion-regulation strategies (Butler et al., 2007; Haga et al., 2009; Matsumoto, Yoo, & Nakagawa, 2008; Valkenburg & Peter, 2013). For example, maladaptive self-soothing strategies modeled by members of a peer group are often adopted by other members of the group (Heath, Ross, Toste, Charlebois, & Nedecheva, 2009; Heilbron & Prinstein, 2008; Prinstein et al., 2010). Similarly, observing media portrayals of maladaptive regulation strategies on television, social media, and video games increases risk of engaging in the portrayed maladaptive strategy, especially for individuals who are young, lacking social support and/or lacking more adaptive regulation strategies (Gould, Jamieson, & Romer, 2003; Stack, 2003; Valkenburg & Peter, 2013).

Emotion socialization also occurs as a transaction between the socializer (e.g., parent, peer, or coworker) and the individual, not as a one-way influence (Eisenberg et al., 1998). For example, a temperamental infant may cause a parent to become less attentive to the infant’s
crying, which would, in turn, limit the child’s ability to learn appropriate emotion-regulation strategies.

**Psychoemotional Functioning**

Emotion regulation is relevant and necessary in nearly all contexts of human experience. Therefore, ability to implement emotion-regulation strategies that are effective, adaptive, and well suited to situational contexts and personal goals is fundamental to psychoemotional functioning. Correspondingly, difficulties in emotion regulation are typically associated with deficient psychoemotional functioning. Difficulties may take many forms, including overreliance on maladaptive regulation strategies, inability to apply strategies flexibly in accordance with situational demands, and overall ineffectiveness in strategy implementation. The psychoemotional implications of such difficulties are reflected through maladaptive emotional schemas, poor emotion processing, high engagement in dysregulated behavior, interpersonal dysfunction, and elevated rates of psychopathology.

**Emotional Schemas**

Emotion-regulation difficulties are common in individuals holding maladaptive emotional schemas (e.g., emotions as invalid, indefinite, etc.). Overreliance on suppression and avoidance-based regulation, for example, correlates with negative expectations about the effects of somatic emotional arousal and emotional expression (Krause et al., 2003; Quinton & Wagner, 2005; Simpson, Jakupcak, & Luterek, 2006; Stewart et al., 2002). A wide range of maladaptive emotional schemas, including beliefs that emotions are uncontrollable, intolerable, and dangerous, are also commonly endorsed by individuals who habitually engage in dysregulated behaviors (Corstorphine, 2006; Manser et al., 2012; Stewart, Zvolensky, & Eifert, 2001).
Emotion Processing

Ability to implement regulation strategies that are situational appropriate is also heavily dependent on sound emotion processing, because emotion processing provides information about the nature, causes, and consequences of emotional experiences and situations. Consistent with this reliance, deficient or atypical emotion processing is typically accompanied by difficulties in emotion regulation. Negative attention biases, for example, contribute to disproportionately intense negative affect and engagement in avoidance, suppression, and rumination strategies (Donaldson, Lam, & Mathews, 2007; Lavy & van den Hout, 1994; MacLeod, Rutherford, Cambell, Ebsworthy, & Holker, 2002; Wenzlaff, Rude, Taylor, Stultz, & Sweatt, 2001). Alexithymic trait severity is similarly associated with ineffectiveness of emotion-regulation strategies, overreliance on avoidance-based strategies, and low confidence in regulation ability (Berrocal, Pennato, & Bernini, 2009; Coriale et al., 2012; Edwards & Wupperman, 2017; Stasiewicz et al., 2012; Stewart et al., 2002; Swart et al., 2009). Poor facial expression recognition is also associated with inability to modify behavior in accordance with social and situational demands and self-reported difficulties in emotion regulation (Harrison, Sullivan, Tchanturia, & Treasure, 2009; Kornreich et al., 2002; Verdejo-García, Rivas-Pérez, Vilar-López, & Pérez-García, 2007).

Behavioral Dysregulation

Difficulties in emotion regulation are also theorized to underlie behavioral dysregulation. The Emotional Cascade Model (Jungmann, Vollmer, Selby, & Witthöft, 2016; Selby, Anestis, & Joiner, 2008) proposes a relation, maintained by deficits in emotion-regulation ability, between behavioral dysregulation and emotional lability. According to this model, an “emotional cascade” begins with ruminative thinking and attempted suppression of intrusive, negative
thoughts. Negative thoughts and ineffective regulation attempts increase negative affect, which reciprocally increases engagement in ineffective regulation strategies. The reciprocal relation continues until negative affect is experienced as painful, overwhelming, and even unbearable. Dysregulated behaviors are then used to “short-circuit” the emotional cascade and provide temporary relief by downregulating negative emotion and distracting away from upsetting thoughts. The Emotional Cascade Model is broadly supported as a model of many dysregulated behaviors, including substance use, binge eating, self-harm, and excessive reassurance seeking (Arbuthnott, Lewis, & Bailey, 2015; Jungmann et al., 2016; Selby et al., 2008; Selby, Anestis, Bender, & Joiner, 2009; Selby, Connell, & Joiner, 2010; Selby, Franklin, Carson-Wong, & Rizvi, 2013; Selby & Joiner, 2013).

Behavioral dysregulation is also the result of negative urgency – the tendency to act impulsively when emotionally distressed (Cyders & Smith, 2007, 2008; Whiteside & Lynam, 2001). For individuals with high negative urgency, intense emotions are experienced as overwhelming, and engagement in dysregulated behaviors are used to reduce psychological distress (Cyders & Smith, 2008). Even after controlling for other risk factors, negative urgency is associated with a variety of dysregulated behaviors, including binge eating, affect-driven alcohol abuse, and suicidal and self-harm behavior, among others (Anestis & Joiner, 2011; Cyders & Smith, 2008; Fischer, Smith, & Cyders, 2008; Kaiser, Milich, Lynam, & Charnigo, 2012).

**Interpersonal Functioning**

Difficulties in emotion regulation also interfere with building and maintaining interpersonal relationships. People with emotion-regulation difficulties tend to have chaotic relationships characterized by lack of intimacy, fears of abandonment, feelings of inauthenticity, and repetitive emotional upheavals (Linehan, 1993). They are also at higher risk of both
perpetration and victimization of domestic and relational violence (Gratz, Paulson, Jakupcak, & Tull, 2009; Shields & Cicchetti, 2001; Sullivan, Helms, Kliwer, & Goodman, 2010).

Interpersonal functioning shows consistent relation to habitual use of certain emotion-regulation strategies. Reliance on suppression-based strategies, for example, is associated with feelings of inauthenticity in relationships, reluctance to share emotional experiences, discomfort with and avoidance of closeness or intimacy, fears of rejection, and rejection sensitivity (English, John, Srivastava, & Gross, 2012; Gross & John, 2003; Luterek, Harb, Heimberg, & Marx, 2004; Srivastava et al., 2009). Rumination strategies also contribute to relationship difficulty by impairing interpersonal problem solving (Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky, Tucker, Caldwell, & Berg, 1999; Yoon & Joormann, 2012). In contrast, habitual use of reappraisal strategies is typically associated with closer interpersonal relationships, greater liking by peers, higher social status, and comfort in sharing emotional experiences with others (English et al., 2012; Gross & John, 2003).

Psychopathology

Ability to apply effective and contextually appropriate emotion-regulation strategies is also fundamental to maintaining mental health. Accordingly, difficulties in emotion regulation are associated with various forms of psychopathology and are commonly considered a transdiagnostic target for psychological interventions, particularly third-wave behavior therapies (Berking et al., 2008; Berking & Wupperman, 2012; Kring & Sloan, 2009).

Psychotic Disorders. In comparison to healthy controls, individuals diagnosed with schizophrenia tend to engage in more maladaptive regulation strategies and less adaptive strategies (Livingstone, Harper, & Gillanders, 2009; van der Meer, van’t Woot, & Aleman, 2009, but see Henry, Rendell, Green, McDonald, & O’Donnell, 2008). When adaptive strategies are
used, they also tend to be less effective in regulating emotions (Henry et al., 2007; Straus et al., 2013). Emotion-regulation deficits associated with schizophrenia are closely tied to symptom severity and functional outcomes in this population. Auditory hallucinations, for example, are often triggered by unregulated increases in anxious or depressed mood and overuse of suppression strategies (Badcock, Paulic, & Maybery, 2011; Lysaker & Salyers, 2007; Smith, Fowler, et al., 2006). Flat and blunted affect are similarly tied to difficulties in emotion regulation (Henry et al., 2007; Kring & Wener, 2004; van der Meer et al., 2009).

**Mood Disorders.** Individuals with depression also tend to engage in more maladaptive emotion-regulation strategies (particularly rumination, suppression, and catastrophizing) and less adaptive regulation strategies (e.g., reappraisal and problem solving) than healthy controls (Aldao et al., 2010; Campbell-Sills et al., 2006; Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010; Garnefski & Kraaij, 2006; Martin & Dahlen, 2005). Overreliance on rumination strategies is particularly implicated in the development and maintenance of depressive symptoms (for reviews, see Lyubomirsky & Tkach, 2004; Nolen-Hoeksema, 2004; Nolen-Hoeksema et al., 2008).

People with bipolar disorder tend to employ disproportionately more frequent and effortful regulation strategies than healthy controls (Gruber, Harvey, & Gross, 2012; Gruber, Kogan, Mennin, & Murray, 2013). Despite these added efforts, however, intense, persistent emotional reactions, high emotional lability, and overall rigidness and ineffectiveness of regulation strategy-implementation are commonly experienced, even during euthymic periods (Gruber et al., 2012; Gruber, Harvey, & Johnson, 2009; Gruber, Johnson, Oveis, & Keltner, 2008; Henry, Van den Bulke, et al., 2008). Unique to bipolar disorder, manic episodes are characterized by experience intense and contextually inappropriate feelings of euphoria.
American Psychiatric Association, 2013). Thus, whereas most psychopathologies are associated with deficient regulation of negative emotions, bipolar disorder is also associated with inability to downregulate positive emotions (Gruber, 2011; Gruber et al., 2009; Johnson, McKenzie, & McMurrich, 2008).

Anxiety & Related Disorders. Anxiety, obsessive compulsive, and trauma-related disorders are also associated with notable difficulties in emotion regulation. Avoidance regulation-strategies are particularly implicated in the development and maintenance of these disorders. For example, agoraphobic avoidance after experience of a panic attack is predictive of subsequent development of anxiety disorders (Craske, Miller, Rotunda, & Barlow, 1990). Similarly, avoidance of triggers for trauma-related memories is predictive of PTSD symptom severity (Marx & Sloan, 2005; Tull & Roemer, 2003). Many of the behaviors associated with anxiety and related disorders also serve an avoidance function. Worry decreases emotional reactivity, thereby avoiding unexpected, sharp increases in negative affect (Llera & Newman, 2014; Newman, Llera, Erickson, Przeworski, & Castonguay, 2013). Similarly, compulsive behaviors (e.g., checking and washing) often serve to avoid perceived threats to wellbeing (Ecker & Gönner, 2008; Ettelt et al., 2008). Decreasing engagement in avoidance strategies through exposure-based psychotherapy correspondingly reduces symptom severity for anxiety, obsessive-compulsive, and trauma-related disorders (Abramowitz, 1996; Feske & Chambless, 1995; Powers & Emmelkamp, 2008; Taylor et al., 2003).

Anxiety and related disorders are also characterized by difficulty disengaging from threatening or otherwise negative emotional stimuli (Aupperle, Melrose, Stein, & Paulus, 2012; Cisler & Koster, 2010; Cisler & Olatunji, 2010; Yiend & Mathews, 2001), suggesting ineffective use of attentional deployment strategies in this population. For individuals diagnosed with OCD,
obsessive thoughts are commonly experienced as intrusive, uncontrollable, and inescapable (García-Soriano, Belloch, Morrillo, & Clark, 2011; Morillo, Belloch, & García-Soriano, 2007). Similar patterns of experience are noted for individuals with PTSD experiencing intrusive trauma-related thoughts and memories (Ehlers et al., 2002). Inability to disengage from these distressing stimuli are strongly predictive of illness course and severity (Abramowitz, Khandker, Nelson, Deacon, & Rugwall, 2006; Ehlers, Clark, Hackmann, McManus, & Fennell, 2005; McFarlane, 1992; Morillo et al., 2007; Pineles, Shipherd, Welch, & Yovel, 2007).

**Personality Disorders.** Although difficulties in emotion regulation are present in all forms of psychopathology (Aldao et al., 2010), they are inarguably most pervasive in borderline personality disorder (BPD). Individuals diagnosed with BPD display marked emotional lability, high emotional intensity, poor emotional control, and persistent engagement in maladaptive emotion-regulation strategies and dysregulated behaviors (Glenn & Klonsky, 2009; Linehan, 1993; Yen, Zlotnick, & Costello, 2002). In comparison to healthy control samples, individuals with BPD engage in more suppression, rumination, and avoidance strategies. They also experience greater difficulty effectively engaging in reappraisal, distraction, and problem-solving strategies, particularly when experiencing intense negative affect (Baer & Sauer, 2011; Conklin, Bradley, & Westen, 2006; Dixon-Gordon, Chapman, Lovasz, & Walters, 2011; Selby & Joiner, 2009). As a result of these difficulties, individuals with BPD often engage in impulsive and otherwise dysregulated behaviors when emotions become overwhelming (Gratz & Gunderson, 2006; Selby & Joiner, 2009).

**Summary**

Through emotion regulation, the nature, intensity, and duration of emotional experiences are influenced to better satisfy environmental demands and achieve personal goals. The
strategies used to influence emotional experiences can be classified according to five categories: situation selection, situation modification, attentional deployment, cognitive change, and response modulation. Strategies develop and increase in complexity across the course of development through emotion socialization, developmental processes, and encountering of novel situational demands.

Some strategies, such as avoidance and suppression, are traditionally considered “maladaptive,” whereas others, such as reappraisal and distraction, are traditionally considered “adaptive.” However, the adaptive value and appropriateness of strategy use is heavily dependent on contextual demands and personal goals. When ineffective and/or situationally inappropriate regulation strategies are used habitually, psychopathology and functional impairment commonly result.
CHAPTER 6: STUDY RATIONALE

Empirical and conceptual research on emotion processing and regulation has accumulated over a long history, contributing to the development of widely accepted, empirically supported theories about emotion (e.g., Gross, 1998; Eisenberg et al., 1998). In recent years, however, increased attention has focused on underlying emotional belief systems and their effects on the nature and course of emotional processes (e.g., Bishop et al., 2004; Hayes, Follette, & Linehan, 2004; Leahy, 2015; Roemer & Orsillo, 2003). Research has just begun to explore how emotional schemas may shape processing of emotional information, choices surrounding emotion-regulation, and resulting emotional and behavioral experiences.

Research on emotional schemas has been largely motivated by the rising popularity of third-wave behavior therapies, such as Acceptance and Commitment Therapy, Dialectical Behavior Therapy, and Emotion-Focused Therapy. Although these therapies vary in the extent to which they emphasize emotional schemas (in comparison to other factors, such as skills deficits, operant conditioning, etc.), third-wave therapies consistently suggest that schemas of emotions as invalid, dangerous, and unacceptable contribute to impairments in emotion processing and overreliance on maladaptive emotion-regulation strategies, thereby interfering with goal-oriented behavior, particularly under conditions of intense emotionality (Greenberg, 2004; Hayes & Wilson, 1994; Linehan 1993). Despite the widespread nature of these suggestions, however, empirical support for theories of emotional schemas is limited. The small body of literature examining emotional schemas and psychoemotional functioning is fragmented by inconsistent operationalization and lack of a central, theoretical basis across research. Such literature is also built largely on young-adult samples, raising questions of generalizability. Because of these methodological limitations, the role of emotional schemas in psychoemotional functioning and as
a potential mechanism of change in third-wave behavior therapies remains largely unclear. This lack of lucidity has garnered substantial critique from traditional behaviorists, who have questioned the commitment of third-wave researchers to empirically-based treatment development. It has also contributed to an ever-growing number of treatment protocols that, while demonstrating high efficacy in clinical trials, overlap greatly in theoretical basis. The centrality of emotional schemas for third-wave therapies requires well-designed research capable of addressing some of these concerns.

The current research was comprised of two independent studies. Study 1 utilized a combination of self-report and performance-based measures with a young adult sample, whereas Study 2 utilized a combination of self-report, performance-based, and behavioral measures with a community sample. Cross-sectional designs were used in both studies to evaluate the relation of emotional schemas to the nature and quality of psychoemotional functioning.

Path analysis was used to clarify the relation between emotional schemas and psychoemotional functioning. Based on previous research, a theoretical model was evaluated wherein effects of maladaptive emotional schemas/beliefs on dysregulated behavior are at least partially mediated by deficits in emotion processing, use of avoidance-based regulation, and emotion-regulation ineffectiveness. See Figure 5.

For Study 1, it was hypothesized that:

_Hypothesis 1:_ All path coefficients would be positive

_Hypothesis 2:_ Maladaptive emotional schemas would predict at least 15% of the variance (\(R^2 = 0.15\)) in emotion-processing deficits and avoidance-based regulation.
*Hypothesis 3:* Maladaptive emotional schemas, emotion-processing deficits, and avoidance-based regulation would cumulatively predict at least 25% of the variance ($R^2 = 0.25$) in emotion-regulation ineffectiveness.

*Hypothesis 4:* Maladaptive emotional schemas, emotion-processing deficits, avoidance-based regulation, and emotion-regulation ineffectiveness would cumulatively predict at least 35% of the variance ($R^2 = 0.35$) in behavioral dysregulation.

For Study 2, it was hypothesized that:

*Hypothesis 5:* All path coefficients would be positive.

*Hypothesis 6:* Maladaptive emotional schemas would predict at least 10% of the variance ($R^2 = 0.10$) in emotion-processing deficits and avoidance-based regulation.

*Hypothesis 7:* Maladaptive emotional schemas, emotion-processing deficits, and avoidance-based regulation would cumulatively predict at least 15% of the variance ($R^2 = 0.15$) in emotion-regulation ineffectiveness.

*Hypothesis 8:* Maladaptive emotional schemas, emotion-processing deficits, avoidance-based regulation, and emotion-regulation ineffectiveness would cumulatively predict at least 25% of the variance ($R^2 = 0.25$) in behavioral dysregulation.
Figure 5: Proposed Theoretical Model

To best understand potential mediational relationships, a series of path analyses was also used to compare variations of the proposed theoretical model (see Figures 6, 7, 8, and 9). Given the preliminary nature of the current research, these comparisons were considered an exploratory research question, and no specific hypotheses were made about the superiority of one variation over others.

Figure 6: Proposed Model, Variant A.

Includes multiple partial mediations: (a) emotion-processing deficits and avoidance-based regulation partially mediate effects of emotional schemas on emotion-regulation ineffectiveness; (b) emotion-processing deficits and avoidance-based regulation partially mediate effects of emotional schemas on behavioral dysregulation; and (c) emotion-regulation ineffectiveness partially mediate effects of emotional schemas, emotion-processing deficits, and avoidance-based regulation on behavioral dysregulation.
Figure 7: Proposed Model, Variant B.
Dashed lines reflect paths from Variant A that are not included in Variant B. Emotion-processing deficits, avoidance-based regulation, and emotion-regulation ineffectiveness fully mediate effects of emotional schemas on behavioral dysregulation. Multiple partial mediations: (a) emotion-processing deficits and avoidance-based regulation partially mediate effects of emotional schemas on emotion-regulation ineffectiveness; (b) emotion-regulation ineffectiveness partially mediates effects of emotion-processing deficits and avoidance-based regulation on behavioral dysregulation.

Figure 8: Proposed Model, Variant C.
Dashed lines reflect paths from Variant A that are not included in Variant C. Emotion-regulation ineffectiveness fully mediates effects of emotion-processing deficits and avoidance-based regulation and on behavioral dysregulation. Emotion-processing deficits and avoidance-based regulation partially mediate effects of emotional schemas on emotion-regulation ineffectiveness.
Figure 9: Proposed Model, Variant D.

Dashed lines reflect paths from Model A that are not included in Model D. Emotion-regulation effectiveness fully mediates effects of emotional schemas, emotion-processing deficits, and avoidance-based regulation strategies on behavioral dysregulation. Emotion-processing deficits and avoidance-based regulation partially mediate effects of emotional schemas on emotion-regulation ineffectiveness.
CHAPTER 7: STUDY 1

The current research aimed to evaluate the potential role of emotional schemas in shaping the nature and quality of psychoemotional functioning. Specifically, research compared effects of maladaptive emotional schemas on (a) quality of emotion processing, (b) nature and quality of emotion regulation, and (c) tendency to act impulsively when emotionally distressed. (Maladaptive emotional schemas include views of emotions as dangerous and unacceptable, whereas adaptive schemas include views of emotions as valid and controllable.) Aims were addressed through completion of two, independent studies.

Study 1 Method

Study 1 utilized a cross-sectional design to evaluate the overall relation between variables of interest – emotional schemas, emotion-processing deficits, emotion-regulation style, emotion-regulation ineffectiveness, and behavioral dysregulation. Completing Study 1 with a young-adult sample allowed for comparison of results against earlier findings with similar samples. Correlational analyses and statistical modeling using recursive path analysis were used to extend previous findings on the relations between study variables.

Participants

A total of 322 undergraduate students were recruited to participate in Study 1 through the departmental research-experience program at the University of Central Florida. Of these, 33 participants were disqualified due to invalid responding and 21 participants were excluded due to incomplete participation. After these exclusions, 268 participants were included in the final sample. This sample size provided adequate power to complete necessary correlational and

---

5 Defined as providing an incorrect response to at least one of five attention-check questions included throughout the course of the study. Attention-check questions were formatted in the following manner: “If you are paying attention, mark five for this question.”
regression analyses involved in path analysis (Faul, Erdfelder, Lang, & Buchner, 2007). Each subject was offered points toward their course grades (in accordance with course and departmental requirements) in exchange for their participation.

Materials

Study 1 assessed emotional schemas and psychoemotional functioning using a combination of self-report and performance-based measures. Though self-report measures are associated with various methodological limitations (e.g., potential for biased responding; Paulhus & Vazire, 2005), most research in this area has relied heavily on this mode of measurement. The integration of self-report measures in Study 1 was therefore made to increase comparability of results to previous findings.

Many of the measures included in Study 1 include multiple subscales; however, psychometric properties vary widely across subscales. By contrast, total scores of the study measures have received far more empirical investigation and have typically displayed acceptable to strong psychometric properties across populations. For this reason, only total scores were included in analyses. Discussion of measure psychometric properties is therefore limited to that of total scores unless otherwise stated. For a summary of measures included in Study 1, see Table 3.

---

6 Based on power analysis for linear multiple regression: Power (1-β) = 0.99 when estimated effect size (f²) = 0.15 (medium), α = 0.05, and number of predictors = 4 (emotional schemas, emotion processing, avoidance-based regulation, and emotion-regulation effectiveness).
Table 3: Study 1 Measures

<table>
<thead>
<tr>
<th>Construct/Operationalization</th>
<th>Measure(s)</th>
</tr>
</thead>
</table>
| Maladaptive Emotional Schemas  
*Individualized conceptualizations and beliefs about emotions and emotional experiences* | Leahy Emotional Schema Scale-II |
| Emotion-Processing Deficits  
*Misperception and misunderstanding of emotional cues and information* | Perception of Affect Task  
( Words-Sentences and Faces-Sentences Subtasks ) |
| Avoidance-based Regulation  
*Tendency to adopt avoidance-based regulation strategies to manage experience* | Cognitive-Behavioral Avoidance Scale |
| Emotion-Regulation Ineffectiveness  
*Ineffectiveness of down-regulating emotional intensity in emotionally-provocative situations* | Generalized Expectancy for Negative Mood Regulation |
| Behavioral Dysregulation  
*Inability to persist in goal-directed behavior in emotionally-provocative situations* | UPPS-P Impulsive Behavior Scale (Negative Urgency Subscale) |

**Maladaptive Emotional Schemas.** Endorsement of maladaptive emotional schemas was assessed using the Leahy Emotional Schema Scale-II (LESS-II; Leahy, 2012b). The LESS-II is a 28-item self-report measure which assesses endorsement of 14 common beliefs about emotions and emotional experiences ([1] expectations emotions will be validated by others, [2] comprehensibility of emotions, [3] guilt-worthiness of emotions, [4] preference for simplicity in emotions, [5] relation of emotions to values, [6] controllability of emotions, [7] emotional numbness, [8] rationality over emotionality, [9] duration of emotions, [10] emotions as representative of others’ experiences, [11], acceptance of emotions, [12] beliefs about rumination, [13] beliefs about emotional expression, and [14] perceptions of blame for emotional experiences; Leahy, 2002). Participants respond to items using a 6-point Likert-type scale to describe the extent to which items reflect their personal beliefs about emotions and emotional experiences (e.g., *I feel ashamed of my feelings*). Total score reflects degree of general endorsement of maladaptive emotional schemas. The LESS-II total score has demonstrated good internal reliability (α = 0.76 – 0.88) and concurrent validity in a variety of samples (e.g., Batmaz
& Özdel, 2015; Edwards et al., 2017; Leahy, 2015). In the current sample, internal reliability was good ($\alpha = 0.84$). See Appendix A for a copy of this measure.

*Emotion-Processing Deficits.* A computerized version of the Perception of Affect Task (PAT; Rau, 1988) was used to assess participants’ emotion-processing ability. The PAT is a performance-based measure consisting of 140 items divided into four, 35-item tasks. Previous research has validated each PAT task independently as well as the PAT as a whole. To decrease time and burden of study completion, Study 1 included only Tasks 1 and 3. Task 1 involves matching emotional content in sentences with emotional words. Task 3 involves matching emotional content in sentences with emotional facial expressions. (Tasks not included involve matching emotional facial expressions with emotional words and matching emotional photographic scenes with emotional facial expressions). Tasks 1 and 3 were specifically chosen, because they cumulatively assess ability to process words, sentences, and images (other task combinations would limit assessment of one or more of these abilities). See Appendix B for emotional words and sentences to be included in Tasks 1 and 3. For copyright reasons, emotional facial expressions are not included in Appendix B.

For each participant, the proportion of accurate matches within each task is calculated and interpreted as reflecting that participant’s emotion-processing ability, with higher scores denoting greater ability. In previous research, PAT Tasks 1 and 3 have demonstrated adequate internal reliability ($\alpha = 0.74$-$0.83$ and $0.77$-$0.83$, respectively) in both clinical and nonclinical samples (Lane et al., 1996; Lane, Sechrest, Riedel, Shapiro, & Kaszniak, 2000; Rau, 1988; 1992). The PAT has also demonstrated strong concurrent validity in comparisons to self-report measures of alexithymia and performance-based measures of emotional awareness (Lane et al.,
1996; Lane et al., 2000). In the current sample, the internal reliability of PAT Task 1 and 3 were adequate ($\alpha = 0.74$ and 0.84, respectively).

*Emotion-Regulation Ineffectiveness.* Emotion regulation may be assessed in a variety of ways (see Assessment, p. 67). In the current research, both *form* and *effectiveness* of emotion regulation were assessed. Form was assessed by measuring the tendency to adopt avoidance-based regulation strategies in emotional situations. Ineffectiveness was assessed by measuring participants’ perceived ability to regulate unwanted, negative emotions.

The tendency to adopt avoidance-based regulation strategies was assessed using the Cognitive-Behavioral Avoidance Scale (CBAS; Ottenbreit & Dobson, 2004). The CBAS consists of 31 self-report items describing behavioral and cognitive avoidance strategies commonly used in social and nonsocial contexts (e.g., *I just wait out tension in my relationships hoping that it will go away*). Participants respond to each item using a 5-point Likert-type scale to indicate the extent to which items reflect their own behavior. The CBAS has demonstrated strong internal reliability ($\alpha = 0.91 – 0.96$), test-retest reliability, and concurrent and discriminant validity in nonclinical samples (Carvalho & Hopko, 2011; Moulds, Kandris, Starr, & Wong, 2007; Ottenbreit & Dobson, 2004). Scores on the CBAS reflect degree of reliance on avoidance-based regulation strategies, with higher scores indicating greater reliance. Unlike many other self-report measures of avoidance (e.g., Acceptance and Action Questionnaire; Hayes et al., 1996), items included in the CBAS do not assess related constructs, such as emotional schemas or persistence of goal-directed behavior; rather, items assess only the nature of emotion-regulation strategies. In the current study, the CBAS demonstrated good internal reliability ($\alpha = 0.94$). See Appendix C for a copy of this measure.
Emotion-regulation ineffectiveness was assessed using the Generalized Expectancy for Negative Mood Regulation (NMR; Catanzaro & Mearns, 1990). The NMR is a 30-item, self-report measure of expected emotion-regulation effectiveness. Participants respond to items using a 5-point Likert scale to indicate agreement with statements about the effectiveness or ineffectiveness of their emotion-regulation attempts (e.g., *When I’m upset, I believe that I can do something to feel better*). High scores on the NMR reflect high confidence in emotion-regulation ability, whereas low scores reflect difficulties in emotion regulation. The NMR has demonstrated strong internal reliability (α = 0.87 – 0.93) and concurrent and predictive validity in a variety of clinical and nonclinical samples (Bardeen, Fergus, Hannan, & Orcutt, 2016; Catanzaro & Mearns, 1990; Totterdell & Leach, 2001). Internal reliability in the current study was good (α = 0.89). See Appendix D for a copy of this measure.

*Behavioral Dysregulation.* Behavioral dysregulation was assessed using the negative urgency subscale of the UPPS-P Impulsive Behavior Scale (UPPS-P; Lynam, Smith, Whiteside, & Cyders, 2006). The negative urgency subscale is a 12-item measure of the tendency to engage in impulsive behavior, particularly when feeling high-intensity emotions. Participants respond to each item using a 4-point Likert-type scale to indicate the extent to which statements reflect their own behavior (e.g., *When I feel bad, I will often do things I later regret in order to make myself feel better now*). High scores on this scale reflect an inability to persist in goal-directed behavior when experiencing high-intensity emotions. The negative urgency subscale of the UPPS-P has shown good internal reliability (α = 0.85 – 0.89), test-retest reliability, and concurrent validity in a variety of samples (Adams, Kaiser, Lynam, Charnigo, & Milich, 2012; Anestis, Smith, Fink, & Joiner, 2009; Pearson, Combs, Zapolski, & Smith, 2012; Racine et al., 2013). Internal reliability in the current study was good (α = 0.90). See Appendix E for a copy of this measure.
Demographic Information. To compare collected data to previously published norms, participants were also asked to provide basic demographic information, including age, race, ethnicity, gender, sexual orientation, socioeconomic status, and country of origin. No hypotheses were made about the relation of demographic variables to other study variables.

Procedure

Potential participants for Study 1 were recruited using online advertising available through the departmental research-experience program at the University of Central Florida. After registering to participate, participants were directed to an online webpage to provide consent and complete study measures. Embedded within study measures, five attention-check questions (e.g., “If you are paying attention, mark five for this question.”) were also included to identify invalid response patterns. Upon completion of the study, participants were granted course credit as compensation for their participation. All methods were pre-approved through the City University of New York Human Research Protection Program and University of Central Florida Institutional Review Board.

Data Analysis Plan

Participants’ responses to each measure were scored in accordance with previously published scoring instructions. Only total scores were included in statistical analyses. Total scores for the PAT and NMR were multiplied by -1 so that higher scores on all measures could be interpreted as reflecting maladaptive or deficient psychoemotional functioning. After this transformation, descriptive statistics (i.e., mean, standard deviation, range, skew, and kurtosis) for each total score was compared to previously established norms (if available).

The following corrections were used to ensure that data satisfied assumptions of multivariate analyses (Kline, 2015):
- Mahalanobis distances were used to identify multivariate outliers. Scores with distances greater than 18.47 (critical value for a multiple regression with four predictors – emotional schemas, emotion processing, avoidance-based regulation, emotion-regulation effectiveness) were excluded from subsequent analyses. Sensitivity analyses was also used to evaluate the impact of deleting these cases.

- If the ratio of largest to smallest variance was greater than 10, scores were multiplied by a constant (e.g., 10) to decrease the relative difference between score variances. Rescaled scores were then used in place of raw scores in all subsequent analyses.

The relation of study variables (i.e., maladaptive emotional schemas, emotion-processing deficits, avoidance-based regulation, emotion-regulation ineffectiveness, and behavioral dysregulation) to collected demographic variables (i.e., gender, age, race, sexual orientation, and socioeconomic status) was then examined through exploratory correlational and t-test analyses. Demographic variables showing significant relation to study variables (defined as \( p < .05 \)) were used as covariates in all subsequent path analyses.

Path analysis using the `lavaan` package for R (v 3.4.4) was then used to assess the proposed theoretical model (Figure 5) and estimate the relations between maladaptive emotional schemas (LESS-II), emotion-processing deficits (PAT), use of avoidance-based regulation (CBAS), emotion-regulation ineffectiveness (NMR), and behavioral dysregulation (UPPS-P). LESS-II total score was the exogenous variable in the model; PAT, CBAS, NMR, and UPPS-P scores were endogenous variables; demographic variables showing statistically significant correlation to study variables and statistically significant contribution to predictions in path
analyses were included as covariates. Potential mediational relationships were examined by calculating z-tests and standard errors for all indirect effects. Model fit statistics, residuals, and local fit were also analyzed using procedures outlined in Kline, 2015. Evaluation of the proposed theoretical model (Figure 5) was used to test Hypotheses 1-4.

To better understand potential mediational relationships between study variables, Models A, B, C, and D were also compared. For each model, mediational relationships were examined by calculating z-tests and standard errors for all indirect effects. Model fit statistics, residuals, and local fit were also analyzed using procedures outlined in Kline, 2015. Lastly, chi-square difference tests were used to compare model-fit statistics across models.

Study 1 Results

Descriptive Statistics

Participant Demographics. Of the 268 participants who completed the study, three-quarters identified as female. Consistent with an undergraduate population, most participants were under age 21 (79.6%; n = 211), with ages ranging from 18 to 49. More than 90% of participants identified their sexual orientation as “heterosexual / straight.” Regarding socioeconomic status, approximately 85% of participants identified as either “lower middle class,” “middle class,” or “upper middle class.” Consistent with demographics of the university, only approximately half of participants identified their race as Non-Hispanic White. This diversity was also reflected in reported places of birth, which included 25 of the states in the United States, the Caribbean Islands, South America, Asia, Europe, Central America, and Africa. For a summary of participant demographic characteristics, see Table 4.

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7 Given the cross-sectional design of Study 1, determination of exogenous and endogenous variables could not be made unequivocally for proposed models. These determinations were made on theoretical bases to maximize comparability of study results to previous research and to the results of Study 2.
Table 4: Study 1 Demographic Characteristics

<table>
<thead>
<tr>
<th>Demographic</th>
<th>n*</th>
<th>N%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>65</td>
<td>24%</td>
</tr>
<tr>
<td>Female</td>
<td>201</td>
<td>75%</td>
</tr>
<tr>
<td>Transgender</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>130</td>
<td>49%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>35</td>
<td>13%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>68</td>
<td>25%</td>
</tr>
<tr>
<td>Asian</td>
<td>19</td>
<td>7%</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Native American</td>
<td>2</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Mixed Race</td>
<td>12</td>
<td>4%</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual/Straight</td>
<td>248</td>
<td>93%</td>
</tr>
<tr>
<td>Homosexual/Gay/Lesbian</td>
<td>7</td>
<td>3%</td>
</tr>
<tr>
<td>Bisexual/Other</td>
<td>12</td>
<td>4%</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working Class</td>
<td>36</td>
<td>13%</td>
</tr>
<tr>
<td>Lower Middle Class</td>
<td>34</td>
<td>13%</td>
</tr>
<tr>
<td>Middle Class</td>
<td>144</td>
<td>54%</td>
</tr>
<tr>
<td>Upper Middle Class</td>
<td>51</td>
<td>19%</td>
</tr>
<tr>
<td>Upper Class</td>
<td>2</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Birthplace</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>233</td>
<td>87%</td>
</tr>
<tr>
<td>Asia</td>
<td>5</td>
<td>2%</td>
</tr>
<tr>
<td>Europe/Russia</td>
<td>5</td>
<td>2%</td>
</tr>
<tr>
<td>Africa</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Caribbean Islands</td>
<td>11</td>
<td>4%</td>
</tr>
<tr>
<td>South America</td>
<td>6</td>
<td>2%</td>
</tr>
<tr>
<td>Central America</td>
<td>2</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Pacific Islands</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Australia</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

*Totals may not add up to 268 due to missing data.

Study Measures. On average, participants reported generally moderate emotional schemas on the Leahy Emotional Schema Scale-II, viewing emotions and emotional experiences as neither overly negative nor overly positive ($M = 3.20$, $SD = 0.61$, range = 1.75 – 4.86 on scale of 1 – 6.). Participants performed generally well on the Perception of Affect Task, with slightly better performance on Task 1 ($M = 0.92$, $SD = 0.10$, range = 0.20 – 1.00 on scale of 0 – 1) than
Task 3 \( (M = 0.81, SD = 0.15, \text{range} = 0.14 \text{–} 1.00 \text{ on scale of } 0 \text{ – } 1) \). On the Cognitive-Behavioral Avoidance Scale, participants reported moderate reliance on avoidant-based coping overall \( (M = 2.12, SD = 0.68, \text{range} = 1.00 \text{ – } 5.00 \text{ on scale of } 1 \text{ – } 5) \). Participants’ emotion-regulation ability, as assessed by the Generalized Expectancy for Negative Mood Regulation, was also in the moderate range \( (M = 3.37, SD = 0.56, \text{range} = 1.33 \text{ – } 4.63 \text{ on scale of } 1 \text{ – } 5) \). Lastly, participants’ responses to the Negative Urgency subscale of the UPPS-P suggested generally moderate tendencies toward impulsive behavior in emotionally provocative situations \( (M = 2.41, SD = 0.68, \text{range} = 1.00 \text{ – } 4.00 \text{ on scale of } 1 \text{ – } 4) \).

Scores across measures were similar to those observed in other college samples (e.g., Carvalho & Hopko, 2011; Catanzaro & Mearns, 1990; Edwards et al., 2017; Moulds, Kandris, Starr, & Wong, 2007). However, mean scores for PAT Task 1 (matching emotional themes in sentences with emotion words) were slightly higher and means for PAT Task 3 (matching emotional themes in sentences with emotional facial expressions) were slightly lower than those observed in other samples (0.92 versus 0.87 and 0.81 versus 0.84 – 0.87, respectively; Lane et al., 1996; Rau, 1988). Scores on the Negative Urgency subscale of the UPPS-S were also slightly higher than those observed in other non-clinical samples (2.41 versus 1.93 – 2.03; Fischer, Settles, Collins, Gunn, & Smith, 2012; Racine et al., 2013; Settles et al., 2012).

Transformations & Verifying Assumptions of Multivariate Analyses

Total scores for the PAT and NMAS were first multiplied by -1. This allowed higher scores on all measures to be interpreted as reflecting maladaptive or deficient psychoemotional functioning. Second, because variance scores on the PAT were less than 10% that of other scales, all PAT scores were multiplied by 10 to decrease the relative difference between score variances. Rescaled scores were then used in place of raw scores in all subsequent analyses.
Last, Mahalanobis distances were calculated for each case to identify multivariate outliers. Resulting scores ranged from 0.39 to 52.58. Cases with distance scores greater than 18.47 (critical value for a multiple regression with four predictors – emotional schemas, emotion processing, avoidance-based regulation, emotion-regulation effectiveness) were excluded from subsequent analyses ($n = 7$). Descriptive statistics for study measures after these transformations and exclusions of outliers are listed in Table 5.

**Table 5: Study 1 Measure Descriptive Statistics**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESS-II</td>
<td>3.19</td>
<td>0.61</td>
<td>0.06</td>
<td>-0.31</td>
</tr>
<tr>
<td>PAT Task 1 (Words/Sentences)</td>
<td>9.2</td>
<td>5.73</td>
<td>1.95</td>
<td>5.36</td>
</tr>
<tr>
<td>PAT Task 3 (Faces/Sentences)</td>
<td>8.28</td>
<td>1.30</td>
<td>0.85</td>
<td>0.18</td>
</tr>
<tr>
<td>PAT Total a, b</td>
<td>-8.77</td>
<td>0.90</td>
<td>0.98</td>
<td>0.61</td>
</tr>
<tr>
<td>CBAS</td>
<td>2.10</td>
<td>0.65</td>
<td>0.56</td>
<td>-0.10</td>
</tr>
<tr>
<td>NMR a</td>
<td>-3.38</td>
<td>0.57</td>
<td>0.44</td>
<td>0.51</td>
</tr>
<tr>
<td>UPPS-P (Negative Urgency)</td>
<td>2.41</td>
<td>0.68</td>
<td>0.13</td>
<td>-0.47</td>
</tr>
</tbody>
</table>

Demographic Correlates

The relation of study variables (i.e., maladaptive emotional schemas, emotion-processing deficits, avoidance-based regulation, emotion-regulation ineffectiveness, and behavioral dysregulation) to collected demographic variables (i.e., gender, age, race, sexual orientation, and socioeconomic status) was examined through exploratory correlational and ANOVA analyses. Results reflected significant relations between study variables and gender and race. No significant relations were observed between study variables and age, sexual orientation, or socioeconomic status. Given these patterns of association, gender and race were explored as potential covariates in path analyses.

**Gender.** Female participants performed significantly superior to male participants on both PAT Task 1 (matching emotional content in sentences with emotion words), $F(1, 257) = 7.07, p$
< .01, $d = 0.35$, and PAT Task 2 (matching emotional content in sentences with emotional facial expressions), $F(1, 257) = 5.01, p = .03, d = 0.31$. This superior performance across tasks contributed to higher overall scores on the PAT for female participants as compared to male participants, $F(1, 257) = 7.24, p < .01, d = 0.37$. These gender differences are consistent with previous research, which suggests superior emotion-processing ability in female as compared to male samples (e.g., Kirkland, Peterson, Baker, Miller, & Pulos, 2013; Thompson & Voyer, 2014). No other significant relations were observed between study variables and gender.

**Race.** Results also reflected significant differences across racial groups in reported emotional schemas, $F(5, 253) = 3.63, p < .01$. Overall, participants identifying as Non-Hispanic White reported less maladaptive emotional schemas than participants identifying as mixed race, $t(137) = 2.80, p = .01, d = -0.89$, Black, $t(160) = 2.67, p < .01, d = -0.51$, and Hispanic, $t(191) = 2.23, p = .03, d = -0.35$. To date, racial differences in emotional schemas have not been formally examined. However, results are somewhat consistent with literature on emotion socialization, which suggests members of racial minority groups may restrict certain forms of emotional expression to manage experiences of discrimination (Nelson et al., 2012).

Significant differences across racial groups were also observed with regard to performance on PAT Task 3 (matching emotional content in sentences with emotional facial expressions), $F(5, 253) = 2.45, p = .03$. Participants identifying as Hispanic showed poorer performance on PAT Task 3 than participants identifying as Asian, $t(82) = 2.69, p < .01, d = -0.78$, mixed race, $t(74) = 2.21, p = .02, d = -0.77$, and Non-Hispanic White, $t(191) = 2.16, p = .03, d = -0.32$. These patterns of emotion-processing were also noted in overall PAT performance, $F(5, 253) = 2.42, p = .04$; participants identifying as Hispanic earned lower overall scores on the PAT than participants identifying as Asian, $t(82) = 2.31, p = .02, d = -0.67$, mixed
race, $t(74) = 2.01, p = .03, d = -0.69$, and Non-Hispanic White, $t(191) = 2.77, p < .01, d = -0.42$.

Previous research consistently reflects a same-race bias in facial processing; people perform best when judging facial expressions of members of their own race (Elfenbein & Ambady, 2002).

Because Ekman Faces used in the PAT are exclusively Caucasian, the same-race bias may explain, at least in part, observed racial differences. No other significant relations were observed between study variables and race.

**Path Analysis**

Correlations and covariances were first analyzed to understand the overall relation between study variables, LESS-II total score (maladaptive emotional schemas); PAT total score (emotion-processing deficits); CBAS total score (avoidance-based regulation); NMR total score (emotion-regulation ineffectiveness); and UPPS-Negative Urgency total score (behavioral dysregulation). See Table 6 for these analyses. Results reflected statistically significant correlations between maladaptive emotional schemas and avoidance-based regulation, emotion-regulation ineffectiveness, and behavioral dysregulation. Emotion-regulation ineffectiveness also showed significant correlations with avoidance-based regulation and dysregulated behavior.

Emotion-processing deficits showed no significant correlations with other study measures.

Table 6: Correlations & Covariances between Study 1 Variables

<table>
<thead>
<tr>
<th></th>
<th>LESS-II</th>
<th>PAT</th>
<th>CBAS</th>
<th>NMR</th>
<th>UPPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maladaptive Emotional Schemas</td>
<td>--</td>
<td>0.03</td>
<td>0.22</td>
<td>0.20</td>
<td>0.07</td>
</tr>
<tr>
<td>Emotion-Processing Deficits</td>
<td>.06 (.31)</td>
<td>--</td>
<td>0.06</td>
<td>0.05</td>
<td>-0.02</td>
</tr>
<tr>
<td>Avoidant Coping Style</td>
<td>.55 (&lt;.01)</td>
<td>.11 (.06)</td>
<td>--</td>
<td>0.22</td>
<td>0.00</td>
</tr>
<tr>
<td>Emotion-Regulation Ineffectiveness</td>
<td>.59 (&lt;.01)</td>
<td>.09 (.13)</td>
<td>.60 (&lt;.01)</td>
<td>--</td>
<td>0.06</td>
</tr>
<tr>
<td>Behavioral Dysregulation</td>
<td>.17 (&lt;.01)</td>
<td>-.04 (.58)</td>
<td>-.01 (.88)</td>
<td>0.16 (.01)</td>
<td>--</td>
</tr>
</tbody>
</table>

Correlations and p-values reflected in lower triangle; covariances reflected in upper triangle

Next, the lavaan package for R was used to assess the proposed theoretical model (**Figure 5: Proposed Theoretical Model**) by conducting a series of recursive path analyses using maximum likelihood estimation. Given their statistically significant association with study
variables, gender and race were dummy-coded and included as exogenous variables in path analyses, with gender predicting PAT total scores and race predicting PAT total scores and LESS-II total scores (for gender, male was used as the reference category; for race, Non-Hispanic White was used as the reference category). Analyses first examined the contribution of race and gender to predictions in the model to determine their inclusion as covariates in subsequent analyses. Next, analyses tested Hypotheses 1-4 to further explore the proposed model.

**Demographic Covariates.** Including gender as a predictor of PAT total scores and race as a predictor of PAT total scores and LESS-II total scores, chi-square statistics suggested the model showed good fit to the data, \( \chi^2 (22, N = 261) = 20.58, p = .55 \). To provide an omnibus test of whether the effects of gender and race were significantly different from zero, a chi-square difference test compared (a) the original model to (b) the original model with effects of gender and race fixed to zero. Chi-square statistics suggested the latter model was a poor fit for the data, \( \chi^2 (35, N = 261) = 69.15, p < .01 \). A chi-square difference test suggested the difference between models was statistically significant, \( \chi^2 (13) = 48.57, p < .01 \), thereby suggesting that effects of gender and race were significantly different from zero. As such, gender and race were included in all subsequent analyses as covariates. Notably, because demographic covariates are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed in graphical representations of results. For details regarding these paths, see Table 7.

**Hypothesis 1.** To provide an omnibus test for the hypothesis that path coefficients between variables of interest would be positive, a chi-square difference test was used to determine whether observed results were significantly different from zero. As noted previously,
observed results suggested the proposed model was a good fit for the data, $\chi^2 (22, N = 261) = 20.58, p = .55$. Fixing effects of all variables of interest (LESS-II, PAT, CBAS, NMR, and UPPS) to zero resulted in a model that was a poor fit to the data, $\chi^2 (32, N = 261) = 295.24, p < .01$. A chi-square difference test comparing the original model and the model in which variable effects were fixed to zero was statistically significant, $\chi^2 (10) = 274.66, p < .01$. Hypothesis 1 – that overall, path coefficients between variables of interest would be positive – was therefore supported.

Examination of individual paths suggested some inconsistency in the strength and direction of association between variables of interest. Emotion-processing deficits showed no significant conditional associations with other variables of interest, $\beta$s = -0.04 – 0.12, $ps = .05 – .56$. These findings are consistent with correlational analyses, which suggested no significant correlations between scores on the PAT and other study measures. Also inconsistent with hypotheses, avoidance-based regulation showed a significant, negative conditional association with dysregulated behavior ($\beta = -0.22, p < .01$). Because avoidance-based regulation was not significantly associated with dysregulated behavior in correlation analyses, such results suggest avoidance may have conflicting effects on behavioral dysregulation. Specifically, it is possible that avoidance is maladaptive when it interferes with emotion-regulation ineffectiveness, yet adaptive when it does not interfere with emotion-regulation ineffectiveness. In correlation analyses, these conflicting effects may result in a near-zero overall association. Figure 10: provides a graphical representation of these results, with significant path coefficients denoted in bold. See Table 7 for a summary of observed path coefficients and residual variance.

Hypothesis 2-4. The proposed theoretical model explained approximately 11% of the variance in emotion-processing deficits, $R^2 = 0.11, SE = 0.03, 95\% CI [0.04 – 0.18], 31\%$ of
variance in avoidance-based regulation, $R^2 = 0.31$, SE = 0.05, 95% CI [0.21 – 0.40], 45% of variance in emotion-regulation ineffectiveness, $R^2 = 0.45$, SE = 0.04, 95% CI [0.37 – 0.54], and 7% of variance in behavioral dysregulation, $R^2 = 0.07$, SE = 0.03, 95% CI [0.01 – 0.12]. These results were in partial support of Hypotheses 2-4, which hypothesized at least 15% explained variance in emotion-processing deficits and avoidance-based regulation, 25% explained variance in emotion-regulation ineffectiveness, and 35% explained variance in dysregulated behavior, respectively.

Figure 10: Study 1, Proposed Theoretical Model
*Because demographic correlates are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed. For details regarding these paths, see Table 7.
Table 7: Study 1, Proposed Theoretical Model Path Coefficients

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unstandardized Coefficient</th>
<th>SE</th>
<th>z-value</th>
<th>p</th>
<th>Standardized Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESS-II → PAT</td>
<td>0.05</td>
<td>0.09</td>
<td>0.59</td>
<td>.56</td>
<td>0.04</td>
</tr>
<tr>
<td>LESS-II → CBAS</td>
<td>0.60</td>
<td>0.06</td>
<td>10.73</td>
<td>&lt; .01</td>
<td>0.55</td>
</tr>
<tr>
<td>LESS-II → NMR</td>
<td>0.35</td>
<td>0.05</td>
<td>6.74</td>
<td>&lt; .01</td>
<td>0.37</td>
</tr>
<tr>
<td>LESS-II → UPPS</td>
<td>0.22</td>
<td>0.09</td>
<td>2.42</td>
<td>.01</td>
<td>0.19</td>
</tr>
<tr>
<td>PAT ↔ CBAS</td>
<td>0.06</td>
<td>0.03</td>
<td>1.94</td>
<td>.05</td>
<td>0.12</td>
</tr>
<tr>
<td>PAT → NMR</td>
<td>0.02</td>
<td>0.03</td>
<td>0.63</td>
<td>.53</td>
<td>0.03</td>
</tr>
<tr>
<td>PAT → UPPS</td>
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<td>0.05</td>
<td>-0.69</td>
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<td>-0.04</td>
</tr>
<tr>
<td>CBAS → NMR</td>
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<td>0.05</td>
<td>7.03</td>
<td>&lt; .01</td>
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<td>CBAS → UPPS</td>
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<td>0.08</td>
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<td>LESS</td>
<td>0.34</td>
<td>0.03</td>
<td>11.42</td>
<td>&lt; .01</td>
<td>0.93</td>
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<td>PAT</td>
<td>0.73</td>
<td>0.06</td>
<td>11.42</td>
<td>&lt; .01</td>
<td>0.89</td>
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<td>CBAS</td>
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<td>0.03</td>
<td>11.42</td>
<td>&lt; .01</td>
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<tr>
<td>NMR</td>
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<td>0.02</td>
<td>11.42</td>
<td>&lt; .01</td>
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<td>UPPS</td>
<td>0.44</td>
<td>0.04</td>
<td>11.42</td>
<td>&lt; .01</td>
<td>0.93</td>
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<table>
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<th>Demographic Covariates</th>
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<td>Hispanic → LESS-II</td>
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<tr>
<td>Black → LESS-II</td>
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<tr>
<td>Asian → LESS-II</td>
</tr>
<tr>
<td>Native American → LESS-II</td>
</tr>
<tr>
<td>Pacific Islander → LESS-II</td>
</tr>
<tr>
<td>Mixed Race → LESS-II</td>
</tr>
<tr>
<td>Gender → PAT</td>
</tr>
<tr>
<td>Hispanic → PAT</td>
</tr>
<tr>
<td>Black → PAT</td>
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<tr>
<td>Asian → PAT</td>
</tr>
<tr>
<td>Native American → PAT</td>
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<tr>
<td>Pacific Islander → PAT</td>
</tr>
<tr>
<td>Mixed Race → PAT</td>
</tr>
</tbody>
</table>

Analysis of A-Priori Model Variants

Variants A, B, C, and D of the proposed model (Figures 6, 7, 8, and 9, respectively) were then analyzed in accordance with a-priori hypotheses using the lavaan package for R.

Comparisons across models provided additional information about potential mediational effects underlying the observed relations between behavioral dysregulation and maladaptive emotional schemas, emotion-processing deficits, and avoidance-based regulation.
Variant A. Variant A represented the full proposed theoretical model, results of which are discussed above. See also Hypothesis 1 and Table 7 for a summary of these results and Figure 10 for a graphical representation of results, with statistically significant paths coefficients marked in bold.

Global & Local Fit. Variant A had 22 degrees of freedom stemming from demographic covariates. Global fit statistics suggested that Variant A was a good fit to the data, $\chi^2 (22, N = 261) = 20.58, p = .55$, CFI = 1.00, RMSEA = 0.00, 90% CI [0.00 – 0.05], SRMR = 0.03. Notably, because the theoretically meaningful portion of Variant A was a saturated model, these global fit statistics should be interpreted with caution.

Correlation and standardized residuals reflected no appreciable disagreements between the data and Variant A (using absolute discrepancy cutoff of .10 for correlation residuals; Kline, 2016). See Table 8 for correlation and standardized residuals in Variant A.

Table 8: Study 1-Variant A, Residuals

<table>
<thead>
<tr>
<th></th>
<th>LESS</th>
<th>PAT</th>
<th>CBAS</th>
<th>NMR</th>
<th>UPPS</th>
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<tr>
<td>Correlation Residuals</td>
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<tr>
<td>LESS</td>
<td>0.00</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBAS</td>
<td>0.00</td>
<td>-0.02</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NMR</td>
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<td>-0.01</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>UPPS</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

| Standardized Residuals |       |       |       |       |       |
| LESS  | 0.00  |       |       |       |       |
| PAT   | -0.02 | -0.07 |       |       |       |
| CBAS  | 0.00  | -0.34 | 0.00  |       |       |
| NMR   | 0.00  | -0.14 | -0.01 | -0.01 |       |
| UPPS  | 0.00  | 0.05  | 0.01  | 0.01  | 0.00  |

Variant B. Variant B trimmed from the original model the path from maladaptive emotional schemas to behavioral dysregulation, therefore testing whether emotion-processing deficits, avoidance-based regulation, and/or emotion-regulation ineffectiveness fully mediated
the association between maladaptive emotional schemas and behavioral dysregulation. Figure 11 provides a graphical representation of results, with statistically significant path coefficients marked in bold.

**Global & Local Fit.** The theoretically meaningful portion of Variant B had one degree of freedom, allowing for statistics of global fit. An additional 22 degrees of freedom stemmed from demographic covariates. Global fit statistics suggested the model showed good fit to the data, \( \chi^2(23, N = 261) = 26.58, p = .27, \) CFI = 0.99, RMSEA = 0.02, 90% CI [0.00 – 0.06], SRMR = 0.03.

Despite this strong global fit, however, Variant B was a poor fit at the local level. Specifically, correlation residuals suggested that omitting the path between maladaptive emotional schemas and behavioral dysregulation resulted in an underestimation of the association between these variables. This is consistent with the positive path coefficient noted for this path in Variant A. No other appreciable disagreements between the data and Variant B were noted. See Table 9 for correlation and standardized residuals for Variant B.

**Explained Variances & Path Coefficients.** Omitting the path from maladaptive emotional schemas to behavioral dysregulation decreased the proportion of explained variance in behavioral dysregulation to 4%, \( R^2 = 0.04, SE = 0.03, 95\% CI [0.00 – 0.09]. \) Like Variant A, observed path coefficients in Variant B were predominantly positive and statistically significant. Again, emotion-processing deficits showed no statistically significant conditional associations with other variables of interest, \( \beta s = -0.05 – 0.12, ps = .05 – .56. \) Avoidance-based regulation also showed a negative conditional association with behavioral dysregulation, \( \beta = -0.16, p = .03, \) though the association was slightly weaker than that observed in Variant A. See Table 12 for observed path coefficients and residual variances.
Mediation Analysis. Mediation analyses suggested that the indirect effects of maladaptive emotional schemas on behavioral dysregulation through avoidance-based regulation and emotion-regulation ineffectiveness were significant ($\beta = -0.09, p = .04$ and $\beta = 0.10, p < .01$, respectively), whereas indirect effects through emotion-processing deficits were not significant, $\beta = 0.00, p = .65$. Coupled with correlation residuals suggesting poor fit at the local level, such findings suggest that avoidance-based regulation and emotion-regulation ineffectiveness at least partially mediated effects of maladaptive emotional schemas on behavioral dysregulation in this sample.

Figure 11: Study 1, Variant B

*Because demographic correlates are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed. For details regarding these paths, see Table 7*
Table 9: Study 1-Variant B Residuals

<table>
<thead>
<tr>
<th></th>
<th>LESS</th>
<th>PAT</th>
<th>CBAS</th>
<th>NMR</th>
<th>UPPS</th>
</tr>
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<tr>
<td></td>
<td>Correlation Residuals</td>
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<tr>
<td>LESS</td>
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<td></td>
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<td>PAT</td>
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<td>0.00</td>
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<tr>
<td>CBAS</td>
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<td>NMR</td>
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<td>UPPS</td>
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<tr>
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<tr>
<td>PAT</td>
<td>-0.02</td>
<td>-0.07</td>
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<td>0.00</td>
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<td>NMR</td>
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<td>UPPS</td>
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<td>0.01</td>
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**Variant C.** Variant C trimmed from the original proposed model the path from avoidance-based regulation to behavioral dysregulation and the path from emotion-processing deficits to behavioral dysregulation, therefore testing whether emotion-regulation ineffectiveness fully mediated effects of emotion-processing deficits and avoidance-based regulation on behavioral dysregulation. Figure 12 provides a graphical representation of results, with significant path coefficients marked in bold.

**Global & Local Fit.** The theoretically meaningful portion of Variant C had two degree of freedom, allowing for statistics of global fit. An additional 22 degrees of freedom stemmed from demographic covariates. Global fit statistics suggested the model showed good fit to the data, $\chi^2(24, N = 261) = 29.27, p = .21$, CFI = 0.98, RMSEA = 0.03, 90% CI [0.00 – 0.06], SRMR = 0.03.

Despite strong global fit, Variant C was a poor local fit regarding the relation between avoidance-based regulation and behavioral dysregulation. The correlation residual (-0.13) suggested that omitting this path from the original model resulted in an overestimation of the association between these variables. This is consistent with the negative path coefficient noted.
for this path in Variant A. No other appreciable disagreements between the data and Variant C were noted. See Table 10 for correlation and standardized residuals in Variant C.

**Explained Variances & Path Coefficients.** Omitting paths from avoidance-based regulation and emotion-processing deficits to behavioral dysregulation decreased the proportion of explained variance in behavioral dysregulation to 3%, $R^2 = 0.03$, $SE = 0.02$, 95% CI [-.01 – 0.08]. All path coefficients in Variant C were positive. Nevertheless, as in Variants A and B, emotion-processing deficits showed no statistically significant conditional associations with other variables of interest, $\beta$s = 0.03 – 0.12, $ps = .05 – .56$. Unlike earlier models, behavioral dysregulation also showed no statistically significant associations with other variables, $\beta$s = 0.08 – 0.12, $ps = .10 – .26$. See Table 12 for observed path coefficients and residual variance in Variant C.

**Mediation Analysis.** Mediation analyses suggested the indirect effects of emotion-processing deficits and avoidance-based regulation on behavioral dysregulation through emotion-regulation ineffectiveness were not significant ($\beta = 0.00$, $p = .58$ and $\beta = 0.03$, $p = .27$, respectively), suggesting emotion-regulation ineffectiveness did not significantly mediate these effects. These results are consistent with the lack of association between emotion-processing deficits and behavioral dysregulation observed in correlation analyses and Variant A and with the conflicting effects of avoidance-based regulation on behavioral dysregulation noted in Variant A.
*Because demographic correlates are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed. For details regarding these paths, see Table 7

**Table 10: Study 1-Variant C Residuals**

<table>
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<tr>
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<th>CBAS</th>
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<th>UPPS</th>
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<td><strong>Standardized Residuals</strong></td>
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**Variant D.** Variant D trimmed from the original model all paths that were omitted in Variants B and C (i.e., paths from maladaptive emotional schemas, emotion-processing deficits,
and avoidance-based regulation to behavioral dysregulation), thereby testing whether emotion-regulation ineffectiveness fully mediated effects of maladaptive emotional schemas, emotion-processing deficits, and avoidance-based regulation on behavioral dysregulation. Figure 13 provides a graphical representation of these results, with significant path coefficients marked in bold.

**Global & Local Fit.** The theoretically meaningful portion of Variant D had three degrees of freedom, allowing for statistics of global fit. An additional 22 degrees of freedom stemmed from demographic covariates. Global fit statistics suggested the model showed good fit to the data, $\chi^2 (25, N = 261) = 31.92$, $p = .16$, CFI = 0.98, RMSEA = 0.03, 90% CI [0.00 – 0.06], SRMR = 0.03.

Consistent with Variant C, Variant D was a poor local fit regarding the relation between avoidance-based regulation and transience of goal-directed behavior. The correlation residual (-0.11) suggested that omitting this path from the original model resulted in an overprediction of the association between these variables. This is consistent with the negative path coefficient noted for this path in Variant A. No other appreciable disagreements between the data and Variant D were noted. See Table 11 for correlation and standardized residuals in Variant D.

**Explained Variances & Path Coefficients.** Omitting paths from maladaptive emotional schemas, emotion-processing deficits, and avoidance-based regulation to behavioral dysregulation decreased the proportion of explained variance in behavioral dysregulation to 2%, $R^2 = 0.02$, SE = 0.02, 95% CI [-0.01 – 0.06]. All path coefficients in Variant D were positive. Nevertheless, as in earlier variants, emotion-processing deficits showed no statistically significant conditional associations with other variables of interest, $\beta$s = 0.03 – 0.12, $p$s = .05 –
.56. All other path coefficients were statistically significant. See Table 12 for a summary of path coefficients observed in Variant D.

Mediation Analysis. Mediation analyses suggested that the indirect effect of emotion-processing deficits on behavioral dysregulation through emotion-regulation ineffectiveness was not significant, $\beta = 0.01, p = .61$. These results are consistent with the lack of association between emotion-processing deficits and behavioral dysregulation observed in correlation analyses and Variant A and with the lack of significant indirect effects in Variant C.

Regarding effects of avoidance-based regulation, mediation analyses suggested a significant indirect effect of avoidance-based regulation on behavioral dysregulation through emotion-regulation ineffectiveness, $\beta = 0.06, p = .02$. Such findings are inconsistent with results from Variant C, which suggested no significant indirect effects in this association. Coupled with correlation residuals reflecting poor fit at the local level, results suggest emotion-regulation ineffectiveness did not fully mediate effects of avoidance-based regulation on behavioral dysregulation.

Lastly, the indirect effect of maladaptive emotional schemas on behavioral dysregulation through emotion-regulation ineffectiveness was also statistically significant, $\beta = 0.06, p = .02$. Coupled with correlation residuals suggesting good fit at the local level, results suggest emotion-regulation ineffectiveness fully mediated effects of maladaptive emotional schemas on behavioral dysregulation in this sample.
Figure 13: Study 1, Variant D

*Because demographic correlates are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed. For details regarding these paths, see Table 7

Table 11: Study 1-Variant D Residuals

<table>
<thead>
<tr>
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<th>PAT</th>
<th>CBAS</th>
<th>NMR</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>CBAS</td>
<td>0.00</td>
<td>-0.02</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NMR</td>
<td>0.00</td>
<td>-0.01</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>UPPS</td>
<td>0.08</td>
<td>-0.06</td>
<td>-0.11</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standardized Residuals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LESS</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>-0.02</td>
<td>-0.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBAS</td>
<td>0.00</td>
<td>-0.34</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NMR</td>
<td>0.00</td>
<td>-0.14</td>
<td>-0.01</td>
<td>-0.01</td>
<td></td>
</tr>
<tr>
<td>UPPS</td>
<td>1.28</td>
<td>-0.87</td>
<td>-1.73</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Table 12: Study 1- Variant A, B, C, and D Path Coefficients & Residual Variances

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Variant A Standardized Coefficient</th>
<th>Variant B Standardized Coefficient</th>
<th>Variant C Standardized Coefficient</th>
<th>Variant D Standardized Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESS-II → PAT</td>
<td>0.04, p = .56</td>
<td>0.04, p = .56</td>
<td>0.04, p = .56</td>
<td>0.04, p = .56</td>
</tr>
<tr>
<td>LESS-II → CBAS</td>
<td>0.55, p &lt; .01</td>
<td>0.55, p &lt; .01</td>
<td>0.55, p &lt; .01</td>
<td>0.55, p &lt; .01</td>
</tr>
<tr>
<td>LESS-II → NMR</td>
<td>0.37, p &lt; .01</td>
<td>0.37, p &lt; .01</td>
<td>0.37, p &lt; .01</td>
<td>0.37, p &lt; .01</td>
</tr>
<tr>
<td>LESS-II → UPPS</td>
<td>0.19, p = .01</td>
<td>omitted</td>
<td>0.12, p = .10</td>
<td>omitted</td>
</tr>
<tr>
<td>PAT ↔ CBAS</td>
<td>0.12, p = .05</td>
<td>0.12, p = .05</td>
<td>0.12, p = .05</td>
<td>0.12, p = .05</td>
</tr>
<tr>
<td>PAT → NMR</td>
<td>0.03, p = .53</td>
<td>0.03, p = .53</td>
<td>0.03, p = .53</td>
<td>0.03, p = .53</td>
</tr>
<tr>
<td>PAT → UPPS</td>
<td>-0.04, p = .49</td>
<td>-0.05, p = .46</td>
<td>omitted</td>
<td>omitted</td>
</tr>
<tr>
<td>CBAS → NMR</td>
<td>0.39, p &lt; .01</td>
<td>0.39, p &lt; .01</td>
<td>0.39, p &lt; .01</td>
<td>0.39, p &lt; .01</td>
</tr>
<tr>
<td>CBAS → UPPS</td>
<td>-0.22, p = .01</td>
<td>-0.16, p = .03</td>
<td>omitted</td>
<td>omitted</td>
</tr>
<tr>
<td>NMR → UPPS</td>
<td>0.18, p = .03</td>
<td>0.26, p &lt; .01</td>
<td>0.08, p = .26</td>
<td>0.16, p = .01</td>
</tr>
<tr>
<td>LESS</td>
<td>0.93, p &lt; .01</td>
<td>0.93, p &lt; .01</td>
<td>0.93, p &lt; .01</td>
<td>0.93, p &lt; .01</td>
</tr>
<tr>
<td>PAT</td>
<td>0.89, p &lt; .01</td>
<td>0.89, p &lt; .01</td>
<td>0.89, p &lt; .01</td>
<td>0.89, p &lt; .01</td>
</tr>
<tr>
<td>CBAS</td>
<td>0.69, p &lt; .01</td>
<td>0.69, p &lt; .01</td>
<td>0.69, p &lt; .01</td>
<td>0.69, p &lt; .01</td>
</tr>
<tr>
<td>NMR</td>
<td>0.55, p &lt; .01</td>
<td>0.55, p &lt; .01</td>
<td>0.55, p &lt; .01</td>
<td>0.55, p &lt; .01</td>
</tr>
<tr>
<td>UPPS</td>
<td>0.93, p &lt; .01</td>
<td>0.96, p &lt; .01</td>
<td>0.97, p &lt; .01</td>
<td>0.98, p &lt; .01</td>
</tr>
</tbody>
</table>

Comparison of A-Priori Model Variants

Comparisons across a-priori model variants provided additional information about potential mediational effects underlying the relations between behavioral dysregulation and maladaptive emotional schemas, emotion-processing deficits, and avoidance-based regulation. See Figure 14 for a graphical representation of these variants. Chi-square difference tests were first used to determine which of these variants best fit the data. Patterns in local fit across variants were then examined to investigate potential mediational effects.

Chi-square statistics suggested that Variant A best fit the data, $\chi^2 (22, N = 261) = 20.58$, $p = .55$. Chi-square difference tests also suggested that Variant A was significantly superior to all other proposed variants (Variant B, $p = .01$; Variant C, $p = .01$; Variant D, $p = .01$).
Because demographic correlates are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed. For details regarding these paths, see Table 7.

Examination of local fit statistics suggested that omission of certain paths resulted in inaccurate estimation of the association between variables. Specifically, omission of the path between avoidance-based regulation and behavioral dysregulation resulted in an overestimation of the association between these variables in both Variant C and Variant D. Coupled with mediation analyses, such findings suggest that emotion-regulation ineffectiveness only partially mediated this association. Omission of the path between maladaptive emotional schemas and
behavioral dysregulation also resulted in an underestimation of the association between these variables in Variant B, but not in Variant D. Findings suggested the effects of maladaptive emotional schemas on behavioral dysregulation were partially mediated by avoidance-based regulation and fully mediated by emotion-regulation ineffectiveness.

Cumulatively, results suggest that Variant A best reflected the data as they occurred in Study 1. Variant A reflected no full mediational effects between variables of interest and instead suggested that effects of behavioral dysregulation likely stem from a combination of maladaptive emotional schemas, avoidance-based regulation, and emotion-regulation ineffectiveness. Contrary to hypotheses, Variant A also suggested that emotion-processing deficits had little effect on and/or relation to other variables of interest.

**Study 1 Discussion**

Results of Study 1 suggested Variant A to best fit the data in this sample of predominantly middle class, undergraduate students. Variant A suggested emotional schemas underlie various aspects of psychoemotional functioning, including an avoidance-based coping style, emotion-regulation ineffectiveness, and behavioral dysregulation. Specifically, schemas characterized by self-judgment, rigidity, and rejection of emotional experiences were associated with poorer outcomes than schemas characterized by acceptance, self-validation, and flexibility. Findings are consistent with previous research suggesting maladaptive emotional schemas to be associated with a wide range of psychoemotional dysfunction (Norman & Furnes, 2016). Results also expand on previous research by highlighting the importance of conceptualizing emotional schemas within the context of psychoemotional functioning more broadly, particularly as it relates to emotional and behavioral regulation.
In partial support of Hypothesis 1, conditional associations between assessed aspects of psychoemotional functioning were predominantly positive in Study 1. However, two exceptions were noted. First, emotion-processing deficits showed small, non-significant associations with other aspects of psychoemotional functioning in both correlational and path analyses. These findings are inconsistent with previous research suggesting emotion processing as a fundamental aspect of psychoemotional functioning (Izard, 2010; Kret & Ploeger, 2015; Panksepp, 2006; Whelton, 2004). There are various potential explanations for this lack of association. For example, it may have stemmed from a characteristic of the sample. Participants in Study 1 were sampled from an undergraduate subject pool. It is therefore plausible to assume that participants were generally high functioning (i.e., intelligent, able to sustain performance in an undergraduate setting, etc.) and, by extension would earn consistently high scores on a performance-based measure. Such homogeneity in scores would limit the extent to which emotion-processing deficits were represented in the dataset and restrict variability in the dataset, thereby limiting the extent to which associations between emotion processing and psychoemotional functioning could be observed. Exploring emotion-processing deficits in a more heterogeneous sample may therefore be necessary to reveal associations not reflected in this sample.

Alternatively, the lack of significant association may have stemmed from an issue of construct validity. The Perception of Affect Task assesses abilities to match emotional themes in sentences with emotion words and emotional facial expressions. The task could therefore be conceptualized as assessing a combination of emotion-situation knowledge, emotion language, and facial-processing ability. It is possible that while the proposed model was unable to explain these deficits, it may explain other emotion-processing deficits that were not assessed in Study 1. Overall, these results suggest ongoing research is needed to further clarify the role of emotion
processing within the context of psychoemotional functioning. Future research should be conducted in heterogenous samples to clarify which aspects of emotion processing are most associated with emotional schemas, coping style, emotion-regulation ineffectiveness, and behavioral dysregulation.

Also inconsistent with hypotheses, path analyses suggested that while avoidant coping had a positive conditional association with emotion-regulation ineffectiveness, it had a negative conditional association with behavioral dysregulation. Many third-wave treatments conceptualize avoidant coping as maladaptive given its effects on emotion-regulation effectiveness (e.g., Chawla & Ostafin, 2007; Hayes et al., 1996). Results of Study 1, however, suggest this may not always be the case. Rather, avoidant coping may have beneficial effects on behavioral dysregulation so long as it does not interfere with emotion-regulation effectiveness. This pattern of results is consistent with the perspective that flexibility in emotion-regulation strategies across contexts is a better predictor of psychoemotional functioning than style of emotion regulation (Bonanno et al., 2004; Cheng & Cheung, 2005; Gloster et al., 2011). Accordingly, treatments targeting psychoemotional functioning may benefit from teaching clients how to match emotion-regulation strategies to situational demands and personal goals rather than labeling strategies as adaptive or maladaptive.

Cumulatively, results of Study 1 provide preliminary evidence to suggest emotional schemas underlie a broad range of psychoemotional functioning, particularly coping style, emotion-regulation ineffectiveness, and behavioral dysregulation. Emotional schemas that are self-judging, rigid, and rejecting of emotional experience likely contribute to disruptions in psychoemotional functioning by promoting avoidance and hampering emotional and behavioral regulation.
CHAPTER 8: STUDY 2

To date, research on the psychoemotional correlates of emotional schemas has relied heavily on self-report methods. Although self-report methods often ease the burden of data collection, their ability to predict behavior is limited by social desirability biases, impression management, and poor respondent insight (Paulhus & Vazire, 2005). For this reason, multiple methods of data-collection, including self-report, behavioral, and performance-based measures, were adopted in Study 2.

Study 2 Method

A cross-sectional design\(^8\) was used to evaluate relations between variables of interest – emotional schemas, emotion-processing deficits, emotion-regulation ineffectiveness, and behavioral dysregulation. Whereas the young-adult sample of Study 1 maximized comparability of results to previous research, Study 2 sampled members of the community to increase applicability of findings to the general population. Furthermore, whereas Study 1 examined all factors at the trait-level using self-report measures, Study 2 introduced behavioral measures to examine the extent to which the model could explain state-level psychoemotional behavior in real time. Correlational analyses and statistical modeling using recursive path analysis were used to extend previous findings on the relations between study variables.

Participants

Potential participants for Study 2 were recruited using online advertising (e.g., Craigslist) in the New York City area. A total of 219 participants completed the study in full. The sample size provided adequate power to complete necessary correlational and regression analyses.

\(^8\) An experimental design was originally intended for Study 2. However, because emotional schemas could not be effectively manipulated through pilot testing, the study design was changed to a cross-sectional design. See Appendix G for details about pilot testing.
involved in path analysis\(^9\) (Faul et al., 2007). Each subject was given $10.00 and one round-trip NYC Metro Card ($5.50 value) as compensation for time and travel. Data collection was completed predominantly during off-work hours (i.e., on weekends and after 6:00pm on weekdays) to avoid overrepresentation of unemployed and under-employed persons.

**Materials**

Study 2 assessed emotional schemas and psychoemotional functioning using a combination of self-report, behavioral, and performance-based measures. Though some of these measures include multiple subscales, only total scores were included in analyses. Psychometric properties of measure subscales vary widely; by contrast, total scores typically display acceptable to strong psychometric properties across populations and have received far more empirical investigation. Discussion of measure psychometric properties is therefore limited to that of total scores unless otherwise stated. For a summary of measures in Study 2, see Table 13.

Table 13: Study 2 Measures

<table>
<thead>
<tr>
<th>Construct/Operationalization</th>
<th>Measure(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maladaptive Emotional Schemas</td>
<td>Leahy Emotional Schema Scale-II</td>
</tr>
<tr>
<td>Individualized conceptualizations and beliefs about emotions and emotional experiences</td>
<td></td>
</tr>
<tr>
<td>Emotion-Processing Deficits</td>
<td>Perception of Affect Task (Words-Sentences and Faces-Sentences Tasks)</td>
</tr>
<tr>
<td>Misperception and misunderstanding of emotional cues and information</td>
<td></td>
</tr>
<tr>
<td>Avoidance-based Regulation</td>
<td>Cognitive-Behavioral Avoidance Scale</td>
</tr>
<tr>
<td>Tendency to adopt avoidance-based regulation strategies to manage experience</td>
<td></td>
</tr>
<tr>
<td>Emotion-Regulation Ineffectiveness</td>
<td>Self-reported interference of emotions on task performance</td>
</tr>
<tr>
<td>Ineffectiveness of down-regulating emotional intensity in emotionally-provocative situations</td>
<td></td>
</tr>
<tr>
<td>Behavioral Dysregulation</td>
<td>Mirror Tracing Persistence Task</td>
</tr>
<tr>
<td>Inability to persist in goal-directed behavior in emotionally-provocative situations</td>
<td></td>
</tr>
</tbody>
</table>

\(^9\) Based on power analysis for linear multiple regression: Power (1-\(\beta\)) = 0.99 when estimated effect size (\(f^2\)) = 0.15 (medium), \(\alpha = 0.05\), and number of predictors = 4 (emotional schemas, emotion processing, avoidance-based regulation, and emotion-regulation effectiveness).
**Maladaptive Emotional Schemas.** Emotional schemas were assessed using the Leahy Emotional Schema Scale-II (LESS-II; Leahy, 2012b). The LESS-II is a 28-item self-report measure of emotional schemas. Scores reflect endorsement of common maladaptive emotional schemas, with higher scores indicating more severe maladaptive emotional schemas. See *Maladaptive Emotional Schemas*, p. 102 for further information about the LESS-II.

**Emotion-Processing Deficits.** A computerized version of the Perception of Affect Task (PAT; Rau, 1988) was used to assess the quality of participants’ emotion processing. To minimize burden on participants, only Tasks 1 (Words-Sentences) and 3 (Faces-Sentences) of the PAT were included in Study 2. See *Emotion-Processing Deficits*, p. 103 for a review of PAT structure, psychometric information, and scoring procedures.

**Avoidance-Based Regulation**. Participants’ preference for avoidance-based regulation was using the Cognitive-Behavioral Avoidance Scale (CBAS; Ottenbreit & Dobson, 2004). See *Emotion Regulation Ineffectiveness*, p. 104 for a review of CBAS structure, psychometric information, and scoring procedures.

**Behavioral Dysregulation.** Behavioral dysregulation was assessed using a computerized version of the Mirror Tracing Persistence Task (MTPT-C; Strong, Lejuez, Daughters, Marinello, Kahler, & Brown, 2003). The MTPT-C requires participants to trace a complex, geometric figure (e.g., star) using a computer mouse. To increase difficulty and frustration of the task, MTPT-C is designed such that movement of the mouse corresponds to reverse movements of the on-screen cursor. Errors in tracing (i.e., gross deviations of tracing from the outline of the geometric figure) and prolonged lack of movement (i.e., 2+ seconds) sound a loud buzzer and prompt the

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10 Initially, avoidance-based regulation was intended to be assessed using the Emotion-Regulation Choice Task (ERCT; Sheppes, Scheibe, Suri, & Gross, 2011). Information about this task and reasons for abandoning its use are discussed in Appendix F.
participant to restart the task from the starting position. Consistent with initial development of the MTPT-C, participants were allowed a maximum of five minutes to complete the task and the option to discontinue the tracing task at any time. Persistence of goal-directed behavior was operationalized as the length of time from task start to termination. Average number of errors per second were also calculated to statistically control for skill level on persistence scores.

Emotion Regulation Ineffectiveness. Following completion of the MTPT-C, participants rated the extent to which their emotions interfered with their ability to complete the MTPT-C (i.e., “How much did your emotions interfere with your ability to complete the tracing task?”). Ratings were completed using a Likert-format scale of 1 (no interference) to 9 (extreme interference). Reported interference was interpreted as ineffectiveness of emotion regulation during task completion.

Demographic Information. To aid in comparing data to previously published norms, participants were asked to provide basic demographic information, including age, race, ethnicity, gender, sexual orientation, socioeconomic status, and country of origin. No hypotheses were made about the relation of demographic variables to other study variables.

Procedure

Potential participants were recruited using online advertising (e.g., Craigslist) throughout the greater New York City area. Interested persons were directed to a website to confirm eligibility (i.e., aged 18+ and fluent in reading and writing English) and to schedule an appointment for study completion. Appointments were available on weekends and weekday evenings to avoid underrepresentation of employed persons.

Data collection appointments were held in a computer lab at John Jay College in groups of up to 25 participants. Upon arrival to the research space, each participant was seated at a
computer to complete the study independently. Headphones to be used during the MTPT-C were also provided to each participant. At least two researchers were present throughout each data collection appointment to monitor participant engagement and to answer any questions.

Participants began the study by completing the PAT tasks (assessing emotion-processing deficits) and CBAS (avoidance-based regulation). Next, participants completed the LESS-II (emotional schemas). One attention-check question (i.e., “If you are paying attention, mark three for this question.”) was included in the LESS-II to determine participant attention to the study; participants failing this question (i.e., marking anything other than three) were excluded from analyses. Participants concluded by completing the MTPT-C (behavioral dysregulation) and emotion-regulation effectiveness question (ineffectiveness of emotion regulation). After participants completed all study measures, they were debriefed and compensated for their time and travel. Total completion time was approximately forty-five to sixty minutes. All methods were pre-approved through the City University of New York Human Research Protection Program.

Data Analysis Plan

Participants’ responses to each measure were scored in accordance with previously established scoring instructions. To aid in ease of result interpretation, PAT and MTPT-C scores were multiplied by -1 so that higher scores on all measures may be interpreted as reflecting deficient psychoemotional functioning. For each score, descriptive statistics (i.e., mean, variance, standard deviation, range, skew, and kurtosis) were compared to previously established norms (if available). As in Study 1, data corrections were used as needed to ensure satisfaction of assumptions of multivariate analyses (see Data Analysis Plan, p. 106 for discussion of possible corrections).
The relation of study variables (i.e., LESS-II, PAT, CBAS, emotion-regulation effectiveness question, and MTPT-C) to collected demographic variables (i.e., age, race, ethnicity, gender, sexual orientation, socioeconomic status, and country of origin) were then examined through exploratory analyses. Demographic variables showing statistically significant relation to study variables (defined as p < .05) and that made statistically significant contributions to model predictions were used as covariates in all subsequent path analyses.

Path analysis using the lavaan package for R (v 3.4.4) was then used to assess the proposed theoretical model (Figure 5) and estimate the relations between maladaptive emotional schemas (LESS-II), emotion-processing deficits (PAT), use of avoidance-based regulation (CBAS), emotion-regulation ineffectiveness (emotion-regulation effectiveness question), and behavioral dysregulation (MTPT-C). LESS-II total score was the exogenous variable in the model; PAT, ERCT, emotion-regulation effectiveness question, and MTPT-C scores were endogenous variables; demographic variables showing statistically significant relation to study variables and statistically significant contribution to model predictions were included as covariates. Consistent with previous research, the average number of errors per second were also included as an exogenous variable, predicting MTPT-C scores to control for skill level on MTPT-C (Szasz, Szentagotai, & Hofmann, 2011). Potential mediational relationships were examined by calculating z-tests and standard errors for all indirect effects. Model fit statistics, residuals, and local fit were also analyzed using procedures outlined in Kline, 2015. Evaluation of the proposed theoretical model (Figure 5) was used to test Hypotheses 5-8.

11 Given the cross-sectional design of Study 2, determination of exogenous and endogenous variables could not be made unequivocally for proposed models. These determinations were made on theoretical bases to maximize comparability of study results to previous research and to the results of Study 1.
To better understand potential mediational relationships between study variables, Models A, B, C, and D were also compared. For each model, mediational relationships were examined by calculating z-tests and standard errors for all indirect effects. Model fit statistics, residuals, and local fit were also analyzed using procedures outlined in Kline, 2015. Lastly, chi-square difference tests were used to compare model-fit statistics across models.

**Study 2 Results**

**Descriptive Statistics**

*Participant Demographics.* Of the 219 participants who completed the study, approximately half identified as female, approximately half identified as male, and 1 participant identified as trans-female. Participants’ reported ages varied widely, from 18 to 75 ($M = 37.75$, $SD = 13.25$). Consistent with the rich diversity of New York City, notable racial diversity was noted in the sample, with nearly half of participants identifying as “Black” and only 30% identifying as “Non-Hispanic White.” Most participants identified their sexual orientation as “heterosexual/straight”, whereas 10% identified as “homosexual,” “gay,” or “lesbian” and 7% identified as “other” sexual orientation. Regarding socioeconomic status, 40% identified as “working class” and approximately half identified as “lower middle class” or “middle class.” Diversity was also reflected in participants’ reported places of birth, which included 20 of the states in the United States, Asia, Europe/Russia, Africa, the Caribbean Islands, South America, Central America, Pacific Islands, and Australia. See Table 14 for a summary of participant demographic characteristics.
Table 14: Study 2 Demographic Characteristics

<table>
<thead>
<tr>
<th>Demographic</th>
<th>n*</th>
<th>N%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>116</td>
<td>53%</td>
</tr>
<tr>
<td>Female</td>
<td>101</td>
<td>46%</td>
</tr>
<tr>
<td>Transgender</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>66</td>
<td>30%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>91</td>
<td>42%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>24</td>
<td>11%</td>
</tr>
<tr>
<td>Asian</td>
<td>25</td>
<td>11%</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Native American</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Mixed Race</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Sexual Orientation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual/Straight</td>
<td>181</td>
<td>83%</td>
</tr>
<tr>
<td>Homosexual/Gay/Lesbian</td>
<td>22</td>
<td>10%</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>7%</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working Class</td>
<td>87</td>
<td>40%</td>
</tr>
<tr>
<td>Lower Middle Class</td>
<td>38</td>
<td>17%</td>
</tr>
<tr>
<td>Middle Class</td>
<td>74</td>
<td>34%</td>
</tr>
<tr>
<td>Upper Middle Class</td>
<td>18</td>
<td>8%</td>
</tr>
<tr>
<td>Upper Class</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Birthplace</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>176</td>
<td>80%</td>
</tr>
<tr>
<td>Asia</td>
<td>13</td>
<td>6%</td>
</tr>
<tr>
<td>Europe/Russia</td>
<td>7</td>
<td>3%</td>
</tr>
<tr>
<td>Africa</td>
<td>5</td>
<td>2%</td>
</tr>
<tr>
<td>Caribbean Islands</td>
<td>2</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>South America</td>
<td>2</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Central America</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Pacific Islands</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Australia</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

*Totals may not add up to 219 due to missing data.

After screening data for invalid response patterns, 29 participants were excluded from analyses for failing the attention-check question. After these exclusions, the sample size included in subsequent analyses was 190.

*Study Measures.* Overall, participants reported moderate emotional schemas on the Leahy Emotional Schema Scale-II, viewing emotions and emotional schemas as neither overly negative
nor overly positive ($M = 3.03, SD = 0.72, \text{range} = 1.54 – 5.11$ on a scale of 1 – 6). Participants demonstrated generally mediocre performance in emotion processing as defined by the Perception of Affect Task, with slightly better performance on Task 1 ($M = 0.87, SD = 0.12$, range = 0.29 – 1.00 on a scale of 0 – 1) than Task 3 ($M = 0.69, SD = 0.17, \text{range} = 0.20 – 0.97$ on a scale of 0 – 1). Regarding emotion-regulation style, participants reported low-to-moderate reliance on avoidance-based coping on the Cognitive Behavioral Avoidance Scale ($M = 1.88, SD = 0.62, \text{range} = 1.00 – 3.58$ on a scale of 1 – 5). Performance on the Mirror Tracing Persistence Task varied widely. Some participants terminated the task after only a few seconds, and others persisted for the entire five minutes of the task ($M = 164.52$ seconds, $SD = 114.33$ seconds, range = 10.58 – 300.00 seconds); similarly, some participants made very few attempts throughout the task, whereas others made over one-hundred attempts ($M = 33.57, SD = 29.83, \text{range} = 0 – 130$). On average, participants made approximately one error every five seconds (errors per second $M = 0.19, SD = 0.09$, range = 0 – 0.45). Consistent with the frustrating design of this task, overall, participants reported moderate interference of emotions on MTPT-C performance ($M = 4.67, SD = 2.49, \text{range} = 1 – 9$ on a scale of 1 – 9).

Overall, scores were similar to those observed in Study 1 and previously published results. However, there were some notable differences, particularly in the Perception of Affect Task. Participants in Study 2 performed notably poorer on the Perception of Affect Task than participants in Study 1 and other published samples (Lane et al., 1996; Rau, 1988). In comparison to Study 1, the size of these disparities were moderate for Task 1, $t(456) = 4.85, p < .001, d = -0.45$, and large for Task 3, $t(485) = 8.52, p < .001, d = -0.85$. 

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Transformations & Verifying Assumptions of Multivariate Analyses

Total scores for the PAT and MTPT-C were first multiplied by -1. This allowed higher scores on all measures to be interpreted as reflecting maladaptive or deficient psychoemotional functioning. Second, all PAT and MTPT-C scores were multiplied by a constant to decrease the relative difference in variance scores across scales. Rescaled scores were then used in place of raw scores in all subsequent analyses. Last, Mahalanobis distances were calculated for each case to identify multivariate outliers for exclusion. Resulting scores ranged from 1.10 to 26.30. Cases with distance scores greater than 18.47 (critical value for a multiple regression with four predictors – emotional schemas, emotion processing, avoidance-based regulation, and emotion-regulation effectiveness) were excluded from subsequent analyses \( n = 2 \). After these exclusions, the resulting sample size was 188. See Table 15 for measure descriptive statistics after these transformations and exclusions.

Table 15: Study 2 Measure Descriptive Statistics

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Skew</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESS-II</td>
<td>3.02</td>
<td>0.72</td>
<td>0.32</td>
<td>-0.38</td>
</tr>
<tr>
<td>PAT Task 1 (Words/Sentences)</td>
<td>-8.69</td>
<td>1.16</td>
<td>1.35</td>
<td>1.98</td>
</tr>
<tr>
<td>PAT Task 3 (Faces/Sentences)</td>
<td>-6.92</td>
<td>1.64</td>
<td>0.60</td>
<td>-0.20</td>
</tr>
<tr>
<td>PAT Total</td>
<td>-7.80</td>
<td>1.24</td>
<td>0.69</td>
<td>-0.06</td>
</tr>
<tr>
<td>CBAS</td>
<td>1.88</td>
<td>0.62</td>
<td>0.72</td>
<td>-0.48</td>
</tr>
<tr>
<td>Emotion Regulation</td>
<td>4.68</td>
<td>2.48</td>
<td>0.08</td>
<td>-0.97</td>
</tr>
<tr>
<td>MTPT-C</td>
<td>-1.65</td>
<td>1.14</td>
<td>-0.15</td>
<td>-1.73</td>
</tr>
</tbody>
</table>

Demographic Correlates

The relation of study variables (i.e., maladaptive emotional schemas, emotion-processing deficits, avoidance-based regulation, emotion-regulation ineffectiveness, and behavioral dysregulation) to collected demographic variables (i.e., gender, age, race, sexual orientation, socioeconomic status) was examined through exploratory correlational and ANOVA analyses.
Unlike Study 1, data in Study 2 suggested no significant associations between study variables and gender or race. Significant associations were, however, noted for age and socioeconomic status. Given these patterns of association, age and socioeconomic status were explored as potential covariates in path analyses.

**Age.** Correlational analyses suggested a statistically significant association between age and reported emotional schemas, such that older participants tended to endorse less maladaptive emotional schemas than younger participants, $r = -.23, p < .01$. A significant inverse association was also observed between age and reported reliance on avoidance-based regulation strategies, $r = -.15, p = .05$. These patterns of association are consistent with previous research suggesting that older adults are generally more effective at emotion regulation. However, they are inconsistent with research suggesting older adults to prefer disengagement-based regulation strategies, such as distraction and withdrawal, over regulation strategies that increase engagement (e.g., reappraisal, interpersonal confrontation, etc.; Birditt et al., 2005; Blanchard-Fields et al., 2004; Noh et al., 2011; Scheibe et al., 2015).

**Socioeconomic Status.** Significant differences were also noted across socioeconomic groups in participants’ reported emotional schemas, $F(3, 182) = 2.85, p = .04$. Post-hoc analyses reflected that participants identifying as “Middle Class” reported significantly less maladaptive emotional schemas than participants identifying as “Lower Middle Class,” $t(93) = 2.77, p = .01, d = -0.60$. No other significant socioeconomic differences in reported emotional schemas were observed. To date, research has not examined emotional schemas across socioeconomic groups; the implications of these results are therefore unclear. Significant differences were also noted across socioeconomic groups in participants’ emotion-processing abilities as defined by PAT Task 1 scores, $F(3, 182) = 4.27, p = .01$, and PAT total scores, $F(3, 182) = 3.32, p = .02$. With
regard to PAT Task 1 (matching emotional themes in sentences with emotion words), post-hoc analyses reflected that participants identifying as “Lower Middle Class” performed significantly poorer than participants identifying as “Working Class,” \( t(104) = 2.12, p = .04, d = -0.41 \), “Middle Class,” \( t(93) = 2.69, p = .01, d = -0.54 \), or “Upper Middle Class,” \( t(45) = 2.51, p = .02, d = -0.86 \). This pattern of relatively poorer performance among participants identifying as “Lower Middle Class” was also observed in PAT Total scores, in which participants identifying as “Lower Middle Class” earned lower PAT Total scores than participants identifying as “Middle Class,” \( t(93) = 2.23, p = .03, d = -0.46 \), or “Upper Middle Class,” \( t(45) = 2.42, p = .02, d = -0.81 \). Participants identifying as “Working Class” also earned lower PAT Total scores than participants identifying as “Upper Middle Class,” \( t(89) = 2.23, p = .03, d = -0.68 \). These association across socioeconomic groups are consistent with research suggesting disparities in neurocognitive functioning across socioeconomic groups (e.g., Hackman & Farah, 2009). However, given the small samples representing each socioeconomic group in Study 2, Study 2, implications of these results are unclear.

**Path Analysis**

As in Study 1, correlations and covariances were first analyzed to understand the overall relation between study variables, LESS-II total score (maladaptive emotional schemas); PAT total score (emotion-processing deficits); CBAS total score (avoidance-based regulation); reported interference of emotions (emotion-regulation ineffectiveness); and MTPT-C time score (behavioral dysregulation). See Table 16 for these analyses. As in Study 1, results suggested significant correlations between maladaptive emotional schemas and (a) avoidant coping style and (b) emotion-regulation ineffectiveness as well as between emotion-regulation ineffectiveness and (a) avoidant coping style and (b) behavioral dysregulation. Unlike Study 1, however,
behavioral dysregulation correlated significantly with emotion-processing deficits, but not maladaptive emotional schemas.

Table 16: Correlations & Covariances between Study 2 Variables

<table>
<thead>
<tr>
<th></th>
<th>LESS-II</th>
<th>PAT</th>
<th>CBAS</th>
<th>EmoDys</th>
<th>MTPT-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maladaptive Emotional Schemas</td>
<td>--</td>
<td>.04</td>
<td>.27</td>
<td>.37</td>
<td>.05</td>
</tr>
<tr>
<td>Emotion-Processing Deficits</td>
<td>.05 (.54)</td>
<td>--</td>
<td>.05</td>
<td>.27</td>
<td>.24</td>
</tr>
<tr>
<td>Avoidant Coping Style</td>
<td>.61 (&lt;.01)</td>
<td>.07 (.34)</td>
<td>--</td>
<td>.32</td>
<td>-.06</td>
</tr>
<tr>
<td>Emotion-Regulation Ineffectiveness</td>
<td>.21 (.01)</td>
<td>.09 (.22)</td>
<td>.21 (&lt;.01)</td>
<td>--</td>
<td>.64</td>
</tr>
<tr>
<td>Behavioral Dysregulation</td>
<td>.06 (.44)</td>
<td>.18 (.02)</td>
<td>-.09 (.26)</td>
<td>.23 (&lt;.01)</td>
<td>--</td>
</tr>
</tbody>
</table>

Correlations and p-values reflected in lower triangle; covariances reflected in upper triangle

Next, the lavaan package for R was used to assess the proposed theoretical model (Figure 5) by conducting a series of recursive path analyses using maximum likelihood estimation. As noted previously, participants’ average number of errors per second on MTPT-C (i.e., MTPT-C skill) were included as a predictor of behavioral dysregulation in path analyses to control for effects of participant skill on MTPT-C. Also, due to their statistically significant association with study variables, socioeconomic status (dummy coded) and age were included as exogenous variables in path analyses, with socioeconomic status predicting LESS-II total scores and PAT total scores (working class used as the reference category) and age predicting LESS-II total scores and CBAS total scores. Analyses first examined the contribution of these demographic variables to model predictions to determine their inclusion as covariates in subsequent analyses. Next, analyses tested Hypotheses 5-8 to further explore the proposed model.

Demographic Covariates. Including age and socioeconomic status as predictors of LESS-II total scores, PAT total scores and CBAS total scores (in accordance with aforementioned associations), chi-square statistics suggested the model showed good fit to the data, $\chi^2 (19, N = 188) = 21.09, p = .33$. To provide an omnibus test to determine whether the effects of age and socioeconomic status were statistically significant, a chi-square difference test was used to determine whether observed effects were statistically significantly different from zero. After
fixing effects of age and socioeconomic status to zero, chi-square statistics suggested the model was no longer a good fit for the data, $\chi^2(29, N = 188) = 50.57, p = .01$. A chi-square difference test suggested the difference between (a) including age and socioeconomic status as predictors and (b) fixing the effects of these variables to zero was statistically significant, $\chi^2(10) = 50.57, p < .01$. Therefore, age and socioeconomic status were included in all subsequent analyses as covariates. Because demographic covariates are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed in graphical representations of results.

**Hypothesis 5.** A chi-square difference test was first used to determine whether the strength of path coefficients between variables of interest were significantly different from zero. As noted above, results suggested the proposed model was a good fit to the data in Study 2, $\chi^2(19, N = 188) = 21.09, p = .33$. After fixing effects of all variables of interest (LESS-II, PAT, CBAS, Emotion-Regulation Ineffectiveness, MTPT-C) to zero, the model was no longer a good fit to the data, $\chi^2(29, N = 188) = 138.31, p < .01$. A chi-square difference test suggests these models are significantly different, $\chi^2(10) = 117.22, p < .01$, supporting Hypothesis 1 that overall, path coefficients between variables of interest would be positive.

Estimation of individual path coefficients suggested some variability in the strength and direction of association between variables of interest. As in Study 1, emotion-processing deficits showed very little association with other variables of interest. A significant, negative conditional association was also observed between avoidance-based regulation and behavioral dysregulation, $\beta = -0.24, p < .01$, similar to the unhypothesized suppression effect observed in Study 1. Unlike in Study 1, maladaptive emotional schemas and emotion-regulation ineffectiveness showed very weak conditional associations with most other variables of interest. Also unlike Study 1, a
significant, positive conditional association was observed between emotion-processing deficits and behavioral dyresgulation, $\beta = 0.15$, $p = .03$. See Figure 15 for a graphical representation of these results, with significant path coefficients denoted in bold, and Table 17 for a summary of observed path coefficients and residual variances.

Figure 15: Study 2, Proposed Theoretical Model

*Because demographic correlates and MTPT-C errors per second are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed. For details regarding these paths, see Table 17.

Hypothesis 6-8. The proposed theoretical model explained approximately 5% of the variance in emotion-processing deficits, $R^2 = 0.05$, SE = 0.03, 95% CI [-0.01 – 0.10], 38% of the variance in avoidance-based regulation, $R^2 = 0.38$, SE = 0.05, 95% CI [0.27 – 0.49], 6% of the variance in emotion-regulation ineffectiveness, $R^2 = 0.06$, SE = 0.03, 95% CI [0.00 – 0.12], and 12% of the variance in behavioral dysregulation, $R^2 = 0.12$, SE = 0.04, 95% CI [0.04 – 0.20]. This is in partial support of Hypotheses 6-8, which predicted the model would explain 10% of
the variance in emotion-processing deficits and avoidance-based regulation, 15% of the variance in emotion-regulation ineffectiveness, and 25% of the variance in behavioral dysregulation.

Table 17: Study 2 Proposed Theoretical Model Path Coefficients

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unstandardized Coefficient</th>
<th>SE</th>
<th>z-value</th>
<th>p</th>
<th>Standardized Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESS-II → PAT</td>
<td>0.04</td>
<td>0.12</td>
<td>0.33</td>
<td>.74</td>
<td>0.02</td>
</tr>
<tr>
<td>LESS-II → CBAS</td>
<td>0.51</td>
<td>0.05</td>
<td>10.36</td>
<td>&lt; .01</td>
<td>0.61</td>
</tr>
<tr>
<td>LESS-II → EmoDys</td>
<td>0.41</td>
<td>0.30</td>
<td>1.36</td>
<td>.18</td>
<td>0.12</td>
</tr>
<tr>
<td>LESS-II → MTPT-C</td>
<td>0.25</td>
<td>0.14</td>
<td>1.86</td>
<td>.06</td>
<td>0.16</td>
</tr>
<tr>
<td>PAT ↔ CBAS</td>
<td>0.02</td>
<td>0.04</td>
<td>0.46</td>
<td>.65</td>
<td>0.03</td>
</tr>
<tr>
<td>PAT → EmoDys</td>
<td>0.16</td>
<td>0.15</td>
<td>1.09</td>
<td>.27</td>
<td>0.08</td>
</tr>
<tr>
<td>PAT → MTPT-C</td>
<td>0.15</td>
<td>0.07</td>
<td>2.24</td>
<td>.03</td>
<td>0.15</td>
</tr>
<tr>
<td>CBAS → EmoDys</td>
<td>0.54</td>
<td>0.36</td>
<td>1.47</td>
<td>.14</td>
<td>0.13</td>
</tr>
<tr>
<td>CBAS → MTPT-C</td>
<td>-0.46</td>
<td>0.16</td>
<td>-2.80</td>
<td>&lt; .01</td>
<td>-0.24</td>
</tr>
<tr>
<td>EmoDys → MTPT-C</td>
<td>0.10</td>
<td>0.03</td>
<td>3.10</td>
<td>&lt; .01</td>
<td>0.22</td>
</tr>
<tr>
<td>LESS</td>
<td>0.47</td>
<td>0.05</td>
<td>9.70</td>
<td>&lt; .01</td>
<td>0.89</td>
</tr>
<tr>
<td>PAT</td>
<td>1.33</td>
<td>0.14</td>
<td>9.70</td>
<td>&lt; .01</td>
<td>0.96</td>
</tr>
<tr>
<td>CBAS</td>
<td>0.23</td>
<td>0.02</td>
<td>9.70</td>
<td>&lt; .01</td>
<td>0.62</td>
</tr>
<tr>
<td>EmoDys</td>
<td>5.64</td>
<td>0.58</td>
<td>9.70</td>
<td>&lt; .01</td>
<td>0.94</td>
</tr>
<tr>
<td>MTPT-C</td>
<td>1.12</td>
<td>0.12</td>
<td>9.70</td>
<td>&lt; .01</td>
<td>0.88</td>
</tr>
</tbody>
</table>

**Covariates**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unstandardized Coefficient</th>
<th>SE</th>
<th>z-value</th>
<th>p</th>
<th>Standardized Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age → LESS-II</td>
<td>-0.01</td>
<td>&lt;.01</td>
<td>-3.45</td>
<td>&lt;.01</td>
<td>-0.24</td>
</tr>
<tr>
<td>Lower Middle SES → LESS-II</td>
<td>0.21</td>
<td>0.15</td>
<td>1.44</td>
<td>.15</td>
<td>0.11</td>
</tr>
<tr>
<td>Middle SES → LESS-II</td>
<td>-0.23</td>
<td>0.12</td>
<td>-2.01</td>
<td>.05</td>
<td>-0.15</td>
</tr>
<tr>
<td>Upper Middle SES → LESS-II</td>
<td>0.10</td>
<td>0.18</td>
<td>0.57</td>
<td>.57</td>
<td>0.04</td>
</tr>
<tr>
<td>Upper SES → LESS-II</td>
<td>0.76</td>
<td>0.67</td>
<td>1.14</td>
<td>.26</td>
<td>0.08</td>
</tr>
<tr>
<td>Lower Middle SES → PAT</td>
<td>0.20</td>
<td>0.25</td>
<td>0.82</td>
<td>.41</td>
<td>0.06</td>
</tr>
<tr>
<td>Middle SES → PAT</td>
<td>-0.30</td>
<td>0.20</td>
<td>-1.52</td>
<td>.13</td>
<td>-0.12</td>
</tr>
<tr>
<td>Upper Middle SES → PAT</td>
<td>-0.64</td>
<td>0.31</td>
<td>-2.09</td>
<td>.04</td>
<td>-0.16</td>
</tr>
<tr>
<td>Upper SES → PAT</td>
<td>-0.64</td>
<td>1.12</td>
<td>-0.58</td>
<td>.57</td>
<td>-0.04</td>
</tr>
<tr>
<td>Age → CBAS</td>
<td>&lt;.01</td>
<td>&lt;.01</td>
<td>-0.26</td>
<td>.80</td>
<td>-0.02</td>
</tr>
<tr>
<td>Errors Per Second → MTPT-C</td>
<td>-0.16</td>
<td>0.09</td>
<td>-1.75</td>
<td>.08</td>
<td>-0.12</td>
</tr>
</tbody>
</table>

**Analysis of A-Priori Model Variants**

Variants A, B, C, and D of the proposed model (Figures 6, 7, 8, and 9, respectively) were then analyzed in accordance with a-priori hypotheses using the lavaan package for R.

Comparisons across models provided additional information about potential mediating effects.
underlying the observed relations between behavioral dysregulation and other variables of interest.

**Variant A.** Variable A represented the full proposed theoretical model, results of which are discussed above. See Table 17 and Figure 15 for a summary of these results.

**Global & Local Fit.** Variant A had 19 degrees of freedom stemming from demographic covariates and inclusion of the MTPT-C skill covariate. Nevertheless, the theoretically meaningful portion of Variant A was saturated; therefore, statistics of global fit should be interpreted with caution.

Global fit statistics suggested that Variant A was a good fit to the data, \( \chi^2 (19, N = 188) = 21.09, p = .33, \text{CFI} = 0.99, \text{RMSEA} = 0.02, \text{90\% CI} [0.00 – 0.07], \text{SRMR} = 0.04. \) At the local level, correlation residuals (using absolute discrepancy cutoff of 0.10; Kline, 2016) also suggested no appreciable disagreements between data and Variant A. See Table 18 for correlation and standardized residuals for Variant A.

Table 18: Study 2-Variant A, Residuals

<table>
<thead>
<tr>
<th></th>
<th>LESS</th>
<th>PAT</th>
<th>CBAS</th>
<th>EmotionDys</th>
<th>MTPT-C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Correlation Residuals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LESS</td>
<td>-0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBAS</td>
<td>0.00</td>
<td>0.02</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EmotionDys</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>MTPT-C</td>
<td>0.00</td>
<td>0.01</td>
<td>0.00</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Standardized Residuals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LESS</td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>0.00</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBAS</td>
<td>0.00</td>
<td>0.27</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EmotionDys</td>
<td>0.00</td>
<td>0.04</td>
<td>0.02</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>MTPT-C</td>
<td>-0.09</td>
<td>0.14</td>
<td>0.06</td>
<td>0.23</td>
<td>0.08</td>
</tr>
</tbody>
</table>
**Variant B.** Variant B trimmed from the original model the path from maladaptive emotional schemas to behavioral dysregulation, therefore testing whether avoidance-based regulation fully mediated the association between maladaptive emotional schemas and behavioral dysregulation. Figure 16 provides a graphical representation of results, with statistically significant path coefficients denoted in bold.

**Global & Local Fit.** The theoretically meaningful portion of Variant B had one degree of freedom; an additional 19 degrees of freedom stemmed from demographic covariates and inclusion of the MTPT-C skill covariate. Global fit statistics suggested that Variant B was also a good fit to the data, $\chi^2 (20, N = 188) = 24.50, p = .22, \text{CFI} = 0.97, \text{RMSEA} = 0.04, 90\% \text{ CI} [0.00 – 0.08], \text{SRMR} = 0.04$. Examination of local fit statistics also suggested no appreciable disagreements between Variant B and the data at the local level. See Table 19 for further information about local fit statistics.

**Explained Variances & Path Coefficients.** Omitting the path from maladaptive emotional schemas to behavioral dysregulation decreased the proportion of explained variance in behavioral dysregulation to 10%, $R^2 = 0.10, \text{SE} = 0.04, 95\% \text{ CI} [0.02 – 0.18]$. As in Variant A, path coefficients observed in Variant B were predominantly positive. Again, emotion-regulation ineffectiveness showed little association with other variables of interest, $\beta_s = 0.08 – 0.13, ps = .14 – .27$, but a significant, positive association with behavioral dysregulation, $\beta = 0.23, p < .01$. A significant, negative conditional association was also observed between avoidance-based regulation and behavioral dysregulation, though the strength of this association was somewhat weaker than observed in Variant A. See Table 22 for observed path coefficients and residual variances.
Mediation Analysis. Mediation analyses suggested that the indirect effect of maladaptive emotional schemas on behavioral dysregulation through avoidance-based regulation was significant, $\beta = -0.09$, $p = .04$, whereas indirect effects through emotion-regulation ineffectiveness and emotion-processing deficits were not significant ($\beta = 0.03$, $p = .21$ and $\beta = 0.00$, $p = .75$, respectively). Coupled with correlation residuals suggesting good fit at the local level, such findings suggest avoidance-based regulation fully mediated effects of emotional schemas on behavioral dysregulation in this sample.

Figure 16: Study 2, Variant B

*Because demographic correlates and MTPT-C errors per second are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed. For details regarding these paths, see Table 17
Variant C. Variant C trimmed from the original model paths from emotion-processing deficits and avoidance-based regulation to behavioral dysregulation. As such, Variant C tested whether emotion-regulation ineffectiveness fully mediated the association between emotion-processing deficits and behavioral dysregulation and/or the association between avoidance-based regulation and behavioral dysregulation. See Figure 17 for a graphical representation of these results, with statistically significant path coefficients marked in bold.

Global & Local Fit. Variant C had 21 degrees of freedom stemming from omitted paths, demographic covariates, and the MTPT-C skill covariate. Global fit statistics suggested Variant C was a mediocre fit to the data, $\chi^2 (21, N = 188) = 32.95, p = .05, CFI = 0.91, RMSEA = 0.06, 90\% CI [0.00 – 0.08], SRMR = 0.05$. Correspondingly, local fit statistics also suggested two appreciable disagreements between the data and Variant C at the local level. First, Variant C appeared to underestimate the association between behavioral dysregulation and emotion-processing deficits. This underestimation is consistent with the significant, positive association noted between these variables in Variants A and B and suggests that emotion-regulation ineffectiveness did not fully mediate this association. Second, Variant A appeared to
overestimate the association between behavioral dysregulation and avoidance-based regulation. This overestimation is also consistent with Variants A and B, which suggested a significant, negative association between behavioral dysregulation and avoidance-based regulation. This suggests that emotion-regulation ineffectiveness also did not fully mediate this association. See Table 20 for further information about local fit statistics.

**Explained Variances & Path Coefficients.** Omitting paths from emotion-processing deficits and avoidance-based regulation to behavioral dysregulation decreased the proportion of explained variance in behavioral dysregulation to 6%, $R^2 = 0.06$, SE = .03, 95% CI [0.00 – 0.13]. As was observed in Variants A and B, significant, positive conditional associations were noted in Variant C between (a) maladaptive emotional schemas and avoidance-based regulation and between (b) emotion-regulation ineffectiveness and behavioral dysregulation. All other conditional associations were not significant. See Table 22 for observed path coefficients and residual variances.

**Mediation Analyses.** Mediation analyses suggested that the indirect effects of emotion-processing deficits and avoidance-based regulation on behavioral dysregulation through emotion-regulation ineffectiveness were not significant ($\beta = 0.02$, $p = .31$ and $\beta = 0.03$, $p = .19$, respectively). Such findings suggest emotion-regulation ineffectiveness did not significantly mediate these associations.
Figure 17: Study 2, Variant C

*Because demographic correlates and MTPT-C errors per second are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed. For details regarding these paths, see Table 17.

Table 20: Study 2-Variant C Residuals

<table>
<thead>
<tr>
<th></th>
<th>LESS</th>
<th>PAT</th>
<th>CBAS</th>
<th>EmotionDys</th>
<th>MTPT-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation Residuals</td>
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</tr>
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<table>
<thead>
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<tr>
<td>CBAS</td>
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<tr>
<td>EmotionDys</td>
</tr>
<tr>
<td>MTPT-C</td>
</tr>
</tbody>
</table>

*Variant D. Variant D trimmed from the original proposed model those paths that were omitted in Variants B and C (i.e., from maladaptive emotional schemas to behavioral dysregulation; from emotion-processing deficits to behavioral dysregulation; and from
avoidance-based regulation to behavioral dysregulation), thereby providing information about the mediating role of emotion-regulation ineffectiveness in the model. A graphical representation of these results, with significant path coefficients denoted in bold, is shown in Figure 18.

**Global & Local Fit.** Variant D has 22 degrees of freedom stemming from a combination of omitted paths, demographic covariates, and the MTPT-C skill covariate. Global fit statistics suggested that Variant D was a mediocre fit to the data, $\chi^2 (22, N = 188) = 33.04$, $p = .06$, CFI = 0.92, RMSEA = 0.05, 90% CI [0.00 – 0.09], SRMR = 0.05. Local fit statistics similarly suggested two notable discrepancies between the Variant D and the data. Similar to Variant C, Variant D appeared to (a) underestimate the association between behavioral dysregulation and emotion-processing deficits and to (b) overestimate the association between avoidance-based regulation and behavioral dysregulation. These discrepancies are consistent with significant conditional path coefficients observed in Variant A and Variant B. See Table 21 for correlation and standardized residuals.

**Explained Variances & Path Coefficients.** Omitting paths from maladaptive emotional schemas, emotion-processing deficits, and avoidance-based regulation to behavioral dysregulation decreased the proportion of explained variance in behavioral dysregulation to 6%, $R^2 = 0.06$, SE = 0.03, 95% CI [0.00 – 0.13]. As in other model variants, significant, positive conditional associations were noted between (a) maladaptive emotional schemas and behavioral dysregulation and between (b) emotion-regulation ineffectiveness and behavioral dysregulation. See Table 22 for observed path coefficients and residual variances.

**Mediation Analyses.** Mediation analyses suggested that the indirect effects of emotion-processing deficits, avoidance-based regulation, and maladaptive emotional schemas on behavioral dysregulation through emotion-regulation ineffectiveness were not significant ($\beta =$
0.02, \( p = .30, \beta = 0.03, p = .19, \) and \( \beta = 0.03, p = .22, \) respectively). Such findings suggest emotion-regulation ineffectiveness did not significantly mediate these associations.

Figure 18: Study 2, Variant D

*Because demographic correlates and MTPT-C errors per second are not theoretically central to the proposed model, paths between demographic covariates and model variables are not listed. For details regarding these paths, see Table 17

Table 21: Study 2-Variant D Residuals

<table>
<thead>
<tr>
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<th>CBAS</th>
<th>EmotionDys</th>
<th>MTPT-C</th>
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<td></td>
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</tr>
<tr>
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<td>0.02</td>
<td>0.00</td>
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<table>
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<th>Standardized Residuals</th>
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<td>PAT</td>
</tr>
<tr>
<td>CBAS</td>
</tr>
<tr>
<td>EmotionDys</td>
</tr>
<tr>
<td>MTPT-C</td>
</tr>
</tbody>
</table>
Table 22: Study 2-Variant A, B, C, and D Path Coefficients & Residual Variances

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Variant A Standardized Coefficient</th>
<th>Variant B Standardized Coefficient</th>
<th>Variant C Standardized Coefficient</th>
<th>Variant D Standardized Coefficient</th>
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</thead>
<tbody>
<tr>
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<td>0.02, <em>p</em> = .74</td>
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<td>0.61, <em>p</em> &lt; .01</td>
<td>0.61, <em>p</em> &lt; .01</td>
<td>0.61, <em>p</em> &lt; .01</td>
</tr>
<tr>
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<td>0.12, <em>p</em> = .18</td>
<td>0.12, <em>p</em> = .18</td>
<td>0.12, <em>p</em> = .18</td>
</tr>
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<tr>
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<td>-0.15, <em>p</em> = .04</td>
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<td>0.96, <em>p</em> &lt; .01</td>
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<td>0.96, <em>p</em> &lt; .01</td>
</tr>
<tr>
<td>CBAS</td>
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<td>0.62, <em>p</em> &lt; .01</td>
<td>0.62, <em>p</em> &lt; .01</td>
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</table>

Comparison of A-Priori Model Variants

Comparisons across a-priori model variants provided additional information about potential mediational effects underlying the relations between behavioral dysregulation and maladaptive emotional schemas, emotion-processing deficits, and avoidance-based regulation. See Figure 19 for a graphical representation of these variants. Chi-square difference tests were first used to determine which of these variants best fit the data. Patterns in local fit across variants were then examined to investigate potential mediational effects.

Chi-square statistics suggested that Variants A and B fit the data significantly better than Variants C and D (all *p*s < .05). In terms of global fit, Variants A and B were not significantly different from one another, $\chi^2 (1) = 3.41, p = .06$, and Variants C and D were not significantly different from one another, $\chi^2 (1) = 0.09, p = .76$.

Examination of local fit statistics similarly suggested that omission of paths from (a) avoidance-based regulation to behavioral dysregulation and (b) emotion-processing deficits to
behavioral dysregulation resulted in notable discrepancies with the data in both Variant C and Variant D. Such findings suggest that emotion-regulation ineffectiveness only partially mediated these associations. Omission of the path from maladaptive emotional schemas to behavioral dysregulation, however, did not result in disruptions to local fit statistics, suggesting that avoidance-based regulation fully mediated the relationship between maladaptive emotional schemas and behavioral dysregulation in Study 2.

Figure 19: Study 2 Model Variants
Cumulatively, results suggest that Variant B best reflected the data as they occurred in Study 2. Variant B reflected a combination of partial and full mediational effects between variables of interest, suggesting the effects of behavioral dysregulation likely stem from a combination of maladaptive emotional schemas, avoidance-based regulation, and emotion-regulation ineffectiveness. As in Study 1, Variant B suggested avoidance-based regulation had a negative conditional association with behavioral dysregulation. Unlike Study 1, however, Variant B reflected little associations between emotion-regulation ineffectiveness and other variables of interest, limiting the extent to which mediational effects of this variable could be assessed. Given the strong conditional associations noted in Study 1 and the novel nature of assessing emotion-regulation ineffectiveness in Study 1 (i.e., by asking participants to reflect on the extent to which emotions interfered with task performance), it is likely this lack of association with other variables of interest stemmed from an issue of construct validity rather than an issue of the proposed model.

**Study 2 Discussion**

Results of Study 2 suggested Variant B best fit the data in a predominantly low-income, racially diverse, community sample. Variant B suggested behavioral dysregulation – as it occurred during the Mirror Tracing Persistence Task – to stem from a combination of factors, particularly emotion-regulation ineffectiveness, avoidant coping, and emotion-processing deficits. These results are consistent with previous research suggesting behavioral dysregulation to be broadly associated with psychoemotional disruptions (e.g., Cyders & Smith, 2008; Konrath et al., 2012; Selby et al., 2008). Because various psychoemotional factors, while interrelated, have independent effects on behavioral dysregulation, treatment of dysregulated behavior likely requires a complex, multi-targeted approach. This multi-targeted approach is seen in various
third-wave behavior therapies, including Dialectical Behavior Therapy (Linehan, 1993), Emotion-Focused Therapy (Greenberg, 2004), and Mentalization-Based Treatment (Bateman & Fonagy, 2006).

Because assessment of behavioral dysregulation and emotion-regulation ineffectiveness in Study 2 were task-specific, the extent to which results apply to other instances of behavioral and emotional regulation remain an area for future research. Use of task-specific measures may have contributed to the relatively low proportion of variance of these constructs explained by the model. However, that the model was a good fit to the data even with use of task-specific measures suggests the model may be helpful to explain behavioral dysregulation and emotion-regulation ineffectiveness as they occur in real time.

Replicating findings of Study 1, results of Study 2 suggested avoidant coping to have a negative conditional association with behavioral dysregulation after controlling for emotion-regulation ineffectiveness. This pattern of results provides further evidence to suggest that avoidant coping, while traditionally considered maladaptive, may be effective in reducing behavioral dysregulation so long as it does not interfere with emotion-regulation effectiveness.

Unlike Study 1, results also suggested emotional schemas and emotion-regulation ineffectiveness to have little association with other aspects of psychoemotional functioning in this sample. Without further research, the cause of these non-significant associations is unclear. It is possible, for example, that using mixed modes of measurement (i.e., self-report, behavioral, and performance-based measures) introduced measurement variability, thereby decreasing statistical associations between variables. Alternatively, the single-question approach to assessing emotion-regulation ineffectiveness may have suffered from threats to construct validity. Unlike Study 1, this approach assessed emotion-regulation disruption as it occurred
within the narrow context of a distressing performance-based task. The extent to which responses reflected participants’ trait-level difficulties with emotion-regulation effectiveness (as assessed in Study 1) is therefore questionable. Accordingly, future attempts to replicate and further develop the proposed model may benefit from incorporating both state- and trait-level assessments of emotion-regulation ineffectiveness.

Cumulatively, results of Study 2 suggest a complex interrelationship between psychoemotional factors wherein emotion-processing deficits, avoidant coping, and emotion-regulation ineffectiveness independently contribute to predictions of behavioral dysregulation in this predominantly low-income, racially diverse, community sample. Findings provide a partial replication of results in Study 1 and thereby offer additional support for the proposed model of psychoemotional functioning.
For centuries, research has accumulated on the origins and processes underlying emotional experiences and behavior. Recently, scientists and practitioners have considered the role of emotional schemas as a driving force underlying emotional processes (Bishop et al., 2004; Hayes et al., 2004; Leahy, 2015; Roemer & Orsillo, 2003). Such considerations have been motivated largely by the growing evidence for third-wave behavior therapies, such as Acceptance and Commitment Therapy, Dialectical Behavior Therapy, and Emotion-Focused Therapy. These treatments consistently propose that maladaptive emotional schemas (i.e., beliefs that emotions are invalid, dangerous, unacceptable, etc.) contribute to impairments in emotion processing and overreliance on maladaptive regulation strategies, thereby interfering with goal-directed behavior (Greenberg, 2004; Hayes & Wilson, 1994; Linehan 1993).

Despite these widespread suggestions, empirical support for the role of emotional schemas within the larger context of psychoemotional functioning is limited. The small body of literature examining emotional schemas has been limited by inconsistent operationalization, issues of generalizability, and lack of a central, theoretical model to organize research. Because of these limitations, the contribution of emotional schemas to psychoemotional functioning has remained empirically unclear.

In response to these limitations, the current research introduced and evaluated an integrative model of emotional schemas and psychoemotional functioning through two independent studies. Model fit was evaluated across two studies using slightly different methodologies and very disparate samples. Study 1 utilized a combination of self-report and performance-based measures with a suburban, undergraduate sample, whereas Study 2 utilized self-report, performance-based, and behavioral measures with an urban, community sample.
Each study adopted a cross-sectional design to evaluate the relation of emotional schemas to the nature and quality of psychoemotional functioning.

Cumulatively, findings provided preliminary support for the proposed model of psychoemotional functioning. Four major findings were noted across studies. First, results suggested complex interrelations between psychoemotional factors such that few, if any, full mediational relationships exist between variables. Second, emotional schemas characterizing emotions as invalid, dangerous, unacceptable, and/or intolerable underlay various psychoemotional factors, particularly avoidant coping, emotion-regulation ineffectiveness, and behavioral dysregulation. Third, results highlighted behavioral dysregulation as markedly complex, stemming from a combination of emotion-regulation ineffectiveness, avoidant coping, emotion-processing deficits, and maladaptive emotional schemas. Lastly, results suggested the proposed model did not adequately explain emotion-processing deficits as assessed in the current research. Implications of these findings are detailed below.

**Interrelations between Psychoemotional Factors**

Across two, independent samples, results suggested complex interrelations between assessed psychoemotional factors. In Study 1, no full mediational relationships were noted; similarly, in Study 2, only one full mediational relationship was observed. These results suggest maladaptive emotional schemas, emotion-processing deficits, avoidant coping, emotion-regulation ineffectiveness, and behavioral dysregulation – while interrelated – likely serve unique and semi-independent roles within the context of psychoemotional functioning. Accordingly, investigations into psychoemotional functioning may benefit from a wholistic approach that considers each factor within the context of a larger psychoemotional system.
Though further replication and investigation is needed, the proposed model could serve as a useful tool for organizing psychoemotional research and interventions moving forward. The model may, for example, aid in moving treatments toward more wholistic conceptualizations of psychoemotional functioning. Currently, most third-wave therapies prioritize one or two psychoemotional factors. For example, although Dialectical Behavior Therapy includes training in mindfulness and acceptance, it prioritizes emotion-regulation ineffectiveness and behavioral dysregulation through its focus on development of “DBT Skills” (Linehan, 1993). This focus is particularly evident through the growing popularity of DBT Skills Groups as a standalone treatment for dysregulated behavior (Valentine, Bankoff, Poulin, Reidler, & Pantalone, 2015). Acceptance and Commitment Therapy has a similarly focused approach; the focus on experiential avoidance prioritizes avoidant coping and emotional schemas as treatment targets (Hayes & Wilson, 1994). The proposed model suggests these focused approaches may both (a) have “trickle-down” effects on de-emphasized psychoemotional factors through the complex interrelations between factors and (b) derive less benefit from the independent contributions of de-emphasized factors.

Practitioners treating psychoemotional functioning may also benefit from the proposed model. Although third-wave behavior therapies tend to prioritize one or two aspects of psychoemotional functioning in treatment, they often consider most, if not all, aspects of psychoemotional functioning in conceptualization. The proposed model may aid these conceptualizations by guiding and organizing assessment, highlighting the interrelationships between psychoemotional factors, and encouraging a wholistic approach to understanding the client’s psychoemotional functioning.
Emotional Schemas in Psychoemotional Functioning

The current research also replicates and expands upon previous investigations into emotional schemas. Previous research suggests emotional schemas influence psychoemotional functioning by driving reactions to and management of emotional experiences (Leahy, 2002; Manser et al., 2012; Mitmansgruber et al., 2009). Consistent with this, results suggested maladaptive emotional schemas to be closely associated with an avoidant coping style. Thus, individuals who perceive their emotions to be dangerous, uncontrollable, socially unacceptable, etcetera are likely to adopt strategies that distance themselves from emotional experiences and situations. Avoidant coping often serves a protective function by defending against painful experiences – in this case, emotions. Though protective in the short-term (the person avoids the discomfort of experiencing an emotion perceived as dangerous), avoidant coping restricts opportunity for learning by limiting exposure to experiences that are inconsistent with maladaptive belief systems (e.g., effectively coping with an intense emotion; Delgado et al., 2009).

Changing maladaptive emotional schemas may therefore require interventions that (a) limit avoidant coping and (b) provide exposure to experiences and/or situations in which emotions are experienced as valid, acceptable, controllable, etcetera. Many third-wave therapies structure the therapeutic context in serve of these aims. For example, mindfulness-based approaches and techniques – a cornerstone of many third-wave therapies – encourage full, nonavoidant experiencing of emotion from a stance of nonjudgment and self-validation (Bishop et al., 2004; Kabat-Zinn, 1982; Shapiro et al., 2006). Use of validation strategies within therapeutic interactions may similarly challenge maladaptive emotional schemas by communicating acceptance and validity of psychoemotional experience (Koerner & Linehan,
Because emotional schemas serve a prominent role within the psychoemotional system, these approaches are likely crucial for improving psychoemotional functioning. Further, given growing evidence to suggest emotional schemas as a transdiagnostic treatment target (Norman & Furnes, 2016; Leahy, 2015), ongoing treatment development may consider mindfulness- and validation-based intervention strategies to be critical elements of psychotherapy across a range of clinical presentations.

**Behavioral Dysregulation in Psychoemotional Functioning**

Findings also highlighted behavioral dysregulation – specifically, the inability to persist in goal-directed activity during times of high emotionality – as a complex construct, stemming from a combination of psychoemotional factors. Because behavioral dysregulation was assessed at the trait-level in Study 1 and at the state-level in Study 2, findings suggest these complexities may occur both over time and within a single instance of behavioral dysregulation. Across two independent samples, behavioral dysregulation was most closely associated with emotion-regulation ineffectiveness and avoidant coping. Some evidence suggested behavioral dysregulation to also be associated with emotion-processing deficits and maladaptive emotional schemas, though these associations were not replicated across samples. Implications of these results are discussed below.

**Behavioral Dysregulation & Emotion-Regulation Ineffectiveness**

In the current research, respondents were more likely to engage in goal-inconsistent behaviors when emotion-regulation strategies were ineffective and/or insufficient in managing emotional distress. Study 1 suggested this pattern to occur at the trait level (i.e., participants who reported chronic emotion-regulation ineffectiveness also reported higher engagement in dysregulated behavior), and Study 2 suggested the pattern to also occur at the state level (i.e.,
participants who experienced emotional distress as disruptive were faster to prematurely terminate a distressing task). Behavioral dysregulation may therefore be the result of emotion-regulation burnout, serving to decrease emotional distress when other attempts at emotion regulation are unsuccessful and/or insufficient. These results are consistent with previous research suggesting dysregulated behavior is closely associated with difficulties in emotion regulation (Anestis, Selby, Fink, & Joiner, 2007; Carpenter & Trull, 2013; Edwards & Wupperman, 2017; Selby & Joiner, 2009) and often serves a self-regulatory function (Klonksy, 2011; Wedig & Nock, 2010).

Behavioral Dysregulation & Coping Style

Results also suggested behavioral dysregulation to have a negative conditional association with avoidant coping after controlling for emotion-regulation ineffectiveness. This conditional association was noted in both Study 1 (assessing trait behavioral dysregulation) and Study 2 (assessing state behavioral dysregulation). Results suggest that so long as avoidant coping does not interfere with emotion-regulation effectiveness, it may have an adaptive effect on behavioral dysregulation.

These findings were inconsistent with hypotheses and popular conceptualizations of avoidance as maladaptive (e.g., Fledderus, Bohlmeijer, & Pieterse, 2010). Rather, results suggest avoidance may be adaptive in some contexts. For example, a man struggling with alcohol use may choose to avoid bars or pubs to decrease his chance of relapse. Within this context, if the avoidance does not interfere with other emotion-regulation efforts (e.g., by introducing new emotional distress associated with social exclusion), it is likely to have adaptive effects on drinking behavior. These findings provide further evidence to suggest that optimal psychoemotional functioning prioritizes flexibility in use of emotion-regulation strategies rather
than individual strategies that are inherently adaptive. Accordingly, future research may consider moving away from classifying regulation strategies as “adaptive” or “maladaptive” and instead focus on identifying patterns of fit between strategies and psychoemotional experience, situational demands, and personal goals.

Behavioral Dysregulation, Emotion Processing, & Emotional Schemas

Results suggested that behavioral dysregulation may also be associated with emotion-processing deficits and maladaptive emotional schemas. However, these associations were not consistent across studies and measures. If replicated through future research, these findings imply that effective interventions for behavioral dysregulation may require a multi-targeted approach focused on a combination of emotion regulation, avoidance, emotion processing, and emotional schemas.

This multi-targeted approach is consistent with various third-wave behavior therapies. Though third-wave therapies tend to prioritize one or two aspects of psychoemotional functioning, they commonly address other aspects through secondary interventions. For example, although Dialectical Behavior Therapy prioritizes emotion regulation through skills instruction, it also targets emotional schemas through validation and emotion processing through mindfulness (Linehan, 1993).

Emotion-Processing Deficits & Psychoemotional Functioning

In both samples, the proposed model of psychoemotional functioning was unable to replicate previously demonstrated associations between emotion-processing deficits and other psychoemotional factors. Various factors may have contributed to this model failure. First, sample characteristics may have yielded low variability in emotion-processing scores and an underrepresentation of emotion-processing deficits in the data. Consistent with this, no
statistically significant associations were noted between emotion-processing deficits and other psychoemotional factors in Study 1, which utilized a relatively homogenous, high functioning sample. Conversely, statistically significant associations were observed between emotion-processing deficits and behavioral dysregulation in Study 2, which utilized a more diverse community sample. To avoid this limitation, future research should employ heterogeneous samples to ensure adequate variability in emotion-processing abilities across participants.

The lack of statistically significant association between emotion-processing deficits and other psychoemotional factors may have also stemmed from issues of construct validity. The Perception of Affect Task (PAT; Rau, 1988) is a performance-based measure of processing emotional information in sentences, words, and facial expressions. It can therefore be broadly conceptualized as assessing participants’ emotion-situation knowledge, emotion labeling, and facial-processing ability. The PAT does not assess other forms of emotion processing, such as recognition and understanding of emotional experiences in the self. It is therefore possible that the PAT was too narrow in scope to detect associations with other assessed psychoemotional factors. Given the large literature establishing emotion processing as playing a fundamental role in psychoemotional experience and functioning (e.g., Izard, 2010; Kret & Ploeger, 2015; Panksepp, 2006; Whelton, 2004), future investigations may consider whether alternative measures of emotion processing are more adequately explained by the model.

**Sociodemographic Considerations**

Results suggest the proposed integrative model of psychoemotional functioning showed strong global fit across two very disparate samples. The first sample included predominantly Caucasian, middle-class, undergraduate students in the Southeastern United States, whereas the second sample included predominantly racially and ethnically diverse, lower-socioeconomic
status, community members from the greater New York City area. Though preliminary, generalization of the model across these two samples suggests the model may be valid across sociodemographic and geographic contexts.

In both studies, results also suggested psychoemotional functioning was significantly associated with sociodemographic characteristics. Failure to consider these sociodemographic correlates drastically decreased fit of the model, suggesting sociodemographic considerations are likely necessary for adequate understanding of psychoemotional functioning. These associations were most notable for the Leahy Emotional Schema Scale-II (LESS-II). The LESS-II demonstrated significant associations with race in Study 1 and with age and socioeconomic status in Study 2. Associations suggested the LESS-II may disproportionately favor middle-aged, middle-class, White respondents. Various explanations may account for these results. First, the LESS-II may assess endorsement of emotional schemas deemed “maladaptive” by the majority culture. As discussed previously, emotional schemas vary across cultures and historical periods (see Development of Emotional Schemas, p. 32); therefore, definitions of schema adaptiveness likely also vary across culture and time. Though further research is necessary, it is possible the LESS-II relies on the majority culture to define maladaptiveness of emotional schemas. Second, members of minority groups (e.g., people who are younger, from lower socioeconomic backgrounds, and/or from racial and ethnic minority cultures) may be more likely to adopt maladaptive emotional schemas. Research suggests members of racial and ethnic minorities may adopt emotional schemas traditionally considered maladaptive to protect against discrimination by the majority culture (e.g., an African American man adopting schemas that view emotional expression as dangerous to protect against accusations of aggression; Hughes et al., 2006).
Though further research is necessary, sociodemographic discrepancies on the LESS-II may reflect such adoptions.

Significant sociodemographic discrepancies were also noted for the Perception of Affect Task (PAT) across studies. Participant scores on the PAT were significantly associated with gender and race in Study 1 and with sociodeconomic status in Study 2 such that White women from middle-class backgrounds tended to earn higher scores than participants with other sociodemographic backgrounds. These associations may be explained, at least in part, by previous research on emotion processing. First, regarding racial differences, research suggests a same-race bias in facial processing such that people are most accurate at judging facial expressions when judging faces of their own race (Elfenbein & Ambady, 2002). Because the PAT relies on Ekman faces for assessing facial-processing ability, Caucasian faces are overrepresented in the assessment. Accordingly, the assessment may have underestimated facial-processing ability for racial minority participants, contributing to lower scores on the PAT. Regarding gender differences, extensive research suggests a slight superiority of women over men in emotion processing (Kirkland et al., 2013; Thompson & Voyer, 2014). Observed differences in PAT scores likely reflect these long-established gender differences. Third, regarding socioeconomic differences, some research suggests that environmental factors may contribute to lower neurocognitive functioning among members of lower socioeconomic status in comparison to members of higher socioeconomic status (Hackman & Farah, 2009). Though further research is necessary, observed differences in PAT scores may reflect these neurocognitive differences.

Results highlight the importance of conceptualizing and assessing psychoemotional functioning within the context of sociodemographic correlates. Many currently available
assessments of psychoemotional functioning are developed, normed, and validated using members of the majority culture (i.e., people who are well-educated, predominantly Caucasian, middle-class, and native-born). It is therefore possible that these measures underestimate the psychoemotional functioning of underrepresented groups.

**Methodological Considerations**

The current research comprised of two, cross-sectional studies with adult samples to evaluate the proposed model of psychoemotional functioning. Despite various similarities across the two studies, there were also notable differences. These differences may have contributed, at least in part, to differences in results across Study 1 and Study 2.

First, participants in Study 1 were sampled from a college population, whereas participants in Study 2 were recruited from the community. To date, theories of psychoemotional functioning have been built largely on research with college samples. For example, measures of psychoemotional functioning are routinely developed and validated using college samples (e.g., Gross & John, 2003; Ottenbreit & Dobson, 2004; Whiteside & Lynam, 2001, but see Leahy, 2002). These measures are then used in research with college samples to make contributions to theory development (e.g., Salsman & Linehan, 2012). It is therefore plausible that resulting theories of psychoemotional functioning are most accurate in college samples. Consistent with this, the proposed model of psychoemotional functioning – informed by previous research and assessed using measures largely developed in college samples – showed stronger global and local fit statistics in the college sample (Study 1) than the community sample (Study 2).

Second, Studies 1 and 2 used slightly different modes of assessing psychoemotional functioning. The studies used the same measures of emotional schemas (Leahy Emotional Schema Scale-II), emotion processing (Perception of Affect Task), and avoidant coping style
(Cognitive-Behavioral Avoidance Scale). Correspondingly, observed associations between these variables were consistent across studies. However, Study 1 and Study 2 used different measures of emotion regulation (i.e., Negative Mood Regulation Scale versus self-reported interference of emotions on task performance, respectively) and behavioral dysregulation (i.e., UPPS-P Impulsive Behavior Scale versus Mirror Tracing Persistence Task, respectively), with Study 1 relying on self-report measures and Study 2 adopting a mixture of modes of assessment. These differences in assessment likely contributed to higher shared method-variance in Study 1 as compared to Study 2, thereby inflating Study 1 estimates of association between variables. Consistent with this, emotion regulation and behavioral dysregulation showed stronger overall associations with other variables in Study 1 than in Study 2.

Because the current research is largely preliminary, future research is necessary to determine how methodological differences might impact the proposed model of psychoemotional functioning. Research should investigate generalizability of the model across samples, modes of assessment, and contexts to determine under which circumstances the model is most (and least) applicable.

Limitations

The current research should be understood within the context of a few methodological limitations. First, both Study 1 and Study 2 utilized cross-sectional designs. Therefore, results cannot be used to make unequivocal conclusions about causality and directionality of observed relationships. Most research on psychoemotional functioning has similarly relied on cross-sectional designs, because psychoemotional factors are presumed to exist as characterological traits that are unresponsive to experimental manipulation (indeed, even weeks of therapy may not be successful in changing psychoemotional factors). Consistent with this presumption, pilot
research associated with the current study suggested participants’ endorsement of emotional schemas were unresponsive to attempts at experimental manipulation (see Appendix G). Some research, however, has effectively manipulated participants’ general approach toward emotion regulation within the context of an individual task (e.g., acceptance versus suppression; Feldner et al., 2003; Feldner et al., 2006). Integration of such experimental methods through future research may aid in clarifying issues of causality and directionality suggested by the proposed model of psychoemotional functioning.

Second, the current research relied heavily on use of self-report measures of psychoemotional functioning. Previous research has demonstrated various limitations to self-report methods, including biased response patterns stemming from research demand characteristics, self-presentation, and respondent insight (Paulhus & Vazire, 2005). These biases may have been particularly strong in Study 1, in which four out of five constructs were assessed using self-report methods. Consistent with this, observed associations were strongest between factors assessed via self-report, whereas comparatively weaker associations were noted among factors assessed using behavioral or performance-based measures. Future research is therefore necessary to determine the extent to which the proposed model can be used to explain or predict behavioral outcomes, such as engagement in dysregulated behavior, use of emotion-regulation strategies across situations, or psychotherapy response.

Third, the research may have included overly narrow operationalizations of study variables. For example, although the Perception of Affect Task assesses various aspects of emotion processing (i.e., emotion vocabulary, facial processing, and emotion-situation knowledge), it is not a comprehensive assessment of emotion processing. There are various aspects of emotion processing that the Perception of Affect Task does not assess – particularly
ability to process emotional information in the self (e.g., emotion differentiation, affect labeling, alexithymia, etc.). The extent to which these unassessed aspects of emotion processing may be better explained by the model therefore remains a question for further research. Relatedly, the MTPT-C, used in Study 2, assesses propensity toward behavioral dysregulation by measuring participant behavior within the narrow context of an idiosyncratic stressor (i.e., a mirror tracing task; Strong et al., 2003). Although the MTPT-C has demonstrated strong convergent validity with other behavioral measures (McHugh et al., 2011), some research suggests behavioral dysregulation is more likely to occur in the context of personally relevant distress than in situations of idiosyncratic stress (e.g., rejection by a loved one versus rejection by a stranger; Ebner-Priemer et al., 2015; Rosenthal et al., 2016). It is therefore possible that scores on the MTPT-C are biased by the extent to which participants appraise the tracing task as personally relevant. Future research may prioritize ecological validity to determine the extent to which the proposed model of psychoemotional functioning holds in more personally relevant contexts.

**Future Directions**

The current research proposes a theoretical model of psychoemotional functioning to organize and guide ongoing research into emotional experience and behavior. Though results provide preliminary evidence to support the proposed model as a viable tool, ongoing research is needed to further investigate and develop the model to account for growing research findings. Specifically, future research should investigate the following: (a) generalization of the model across populations, situations, and cultures; (b) replication of the model using different research designs (e.g., experimental, longitudinal, etc.) and modes of measurement (e.g., behavioral, ecological momentary assessment, etc.); (c) ability of the model to predict behaviorally and clinically-relevant outcomes in psychoemotional functioning; and (d) clarification of the role of
emotion processing within the context of psychoemotional functioning. As ongoing research aids
development and modification of the proposed model, research may also investigate the utility of
the model within a clinical context. Specifically, research may investigate the utility of the
proposed model as a tool for organizing psychoemotional assessment, predicting treatment
outcomes, and/or guiding intervention.

Conclusions

Centuries of research have contributed to current understandings of emotion, emotional
experience, and emotional behavior. Nevertheless, notable gaps in knowledge about
psychoemotional functioning persist. With the rising popularity of third-wave behavior therapies,
empirical research has begun to consider how underlying emotional belief systems may organize
an individual’s emotional experience and behavior (e.g., Bishop et al., 2004; Hayes et al., 2004;
Leahy, 2015; Roemer & Orsillo, 2003).

The current research proposes an integrative model of psychoemotional functioning.
Results suggest this model to be a potentially valuable tool for organizing and guiding research
in this area. Findings suggest four key conclusions. First, psychoemotional functioning appears
to stem from complex interrelations between maladaptive emotional schemas, emotion-
processing deficits, avoidant coping, emotion-regulation ineffectiveness, and behavioral
dysregulation. Second, emotional schemas play a key role in guiding psychoemotional
experience and functioning. Third, behavioral dysregulation is a complex construct, which may
stem primarily from difficulties with emotion regulation. Last, the proposed model failed to
highlight the role of emotion-processing deficits within the context of psychoemotional
functioning. The current research also highlighted the importance of conceptualizing and
assessing psychoemotional functioning within the context of sociodemographic and cultural
considerations. Ongoing research is needed to replicate and continue development of the proposed model of psychoemotional functioning. Nevertheless, results preliminarily suggest the model’s potential viability as a clinically relevant tool to guide and organize assessment, conceptualization, treatment development, and treatment outcomes.
We are interested in how you deal with your feelings or emotions—for example, how you deal with feelings of anger, sadness, anxiety, or sexual feelings. We all differ in how we deal with these feelings—so there are no right or wrong answers. Please read each sentence carefully and answer each sentence—using the scale below—as to how you deal with your feelings during the past month. Put the number of your response next to the sentence.

Scale:
1=very untrue of me 3=slightly untrue of me 5=somewhat true of me
2=somewhat untrue of me 4=slightly true of me 6=very true of me

1. ____ I often think that I respond with feelings that others would not have.
2. ____ Some feelings are wrong to have.
3. ____ There are things about myself that I just don’t understand.
4. ____ I believe that it is important to let myself cry in order to get my feelings “out”.
5. ____ If I let myself have some of these feelings, I fear I will lose control.
6. ____ Others understand and accept my feelings.
7. ____ My feelings don’t make sense to me.
8. ____ If other people changed, I would feel a lot better.
9. ____ I sometimes fear that if I allowed myself to have a strong feeling, it would not go away.
10. ____ I feel ashamed of my feelings.
11. ____ Things that bother other people don’t bother me.
12. ____ No one really cares about my feelings.
13. ____ It is important for me to be reasonable and practical rather than sensitive and open to my feelings.
14. ____ When I feel down, I try to think of the more important things in life---what I value.
15. ____ I feel that I can express my feelings openly.
16. ____ I often say to myself, “What’s wrong with me?”
17. ____ I worry that I won’t be able to control my feelings.
18. ____ You have to guard against having certain feelings.
19. ____ Strong feelings only last a short period of time.
20. ____ I often feel “numb” emotionally---like I have no feelings.
21. ____ Other people cause me to have unpleasant feelings.
22. ____ When I feel down, I sit by myself and think a lot about how bad I feel.
23. ____ I like being absolutely definite about the way I feel about someone else.
24. ____ I accept my feelings.
25. ____ I think that I have the same feelings that other people have.
26. ____ There are higher values that I aspire to.
27. ____ I think it is important to be rational and logical in almost everything.
28. ____ I like being absolutely definite about the way I feel about myself.
APPENDIX B: PERCEPTION OF AFFECT TASK
Emotion Words

Happiness  Sadness  Fear  Anger  Disgust  Surprise  Neutral

Emotion Sentences

1. When the calves’ brains dinner is mistakenly brought to the table, one customer seated there quickly turns his head away.

2. Being sure that his player did nothing wrong, a coach demands an explanation from the referee about the penalty call.

3. A young girl wishes she was like her girlfriends and had a date for the high school dance.

4. Just as the young boy walks into the room, the lights flick on and family members appear with packages in their hands.

5. When one of the youngsters picks up a slimy snail, one girl looks at the others and covers her eyes.

6. Passengers listen carefully as a stewardess tells them that the airplane must make an emergency landing.

7. A man walks from the kitchen to the family room and turns on the radio.

8. An individual running for governor demands to know who in her office is responsible for leaking the negative ‘confidential’ information about her to the press.

9. A woman falls asleep while reading the newspaper.

10. Villagers listen to the bombs move closer and closer.

11. As a couple eating lunch in the park cannot avoid the stench of two derelicts close by, they hastily move to another bench.

12. Expecting that a particular car would be far beyond her price range, a car buyer, upon hearing the dollar figure, asks that the salesman repeat the low figure one more time.

13. Several long-standing friends joke about the past.

14. An older man looks at a picture of his recently departed wife.

15. A parent tugs at her child after he swears at her.

16. A grandfather returns to his room after he is told that his grandson will not be able to visit him after all.

17. Both teenagers clap to the beat as their favorite song plays on.

18. A young girl, who has come to believe that her dog is just plain stupid and will never learn how to retrieve, is totally speechless when he actually does return the ball to her.

19. A child becomes fidgety when a doctor approaches him with a big needle.

20. Several relatives gather at a funeral.
21. Tired and hungry, and noting the fine smell of chicken coming from the kitchen, a husband kisses his wife as soon as he sees her.

22. Several young girls play with a cute three week old puppy.

23. A young actor, sensing that his acting for the audition was totally lackluster, can hardly believe it when the director gives him the lead role.

24. A mother says good-by to her daughter who is going off to college.

25. Even the thought of seeing the cats' mutilated bodies brings a queer feeling to the newswoman's stomach.

26. Having finished his lunch, a carpenter continues loading the lumber into his truck.

27. After her third request for her class's attention, the teacher states that several students will have to remain after school.

28. Immediately upon hearing the loud barks, the child grabs her mother and holds her tight.

29. After a great deal of hard work in practice, a young batter hits his first home run.

30. When he notices that several youngsters are pocketing expensive merchandise, the store owner quickly makes his way toward them.

31. Having applied for hundreds of jobs over many months and having received just as many negative responses, the applicant is momentarily stunned when he is in fact offered a job.

32. While speaking on the phone to a business partner, an individual bends down to tie his shoelaces.

33. While most of the boy scouts walk right to the edge of the cliff, two scouts refuse to even approach the edge.

34. As the government inspector has difficulty breathing while he inspects the filthy prison cells, he cuts the inspection short.

35. The seamstress quickly and accurately measures and cuts the material to be used for the dress she is mending.
Different people use different strategies to deal with situations and problems in their lives. Below are a number of strategies that people may use to deal with situations and problems. A number of the items below refer to dealing with situations at work or school. If you are not currently working or attending school, answer these items instead using your daily duties and activities. Please read each statement carefully and indicate how true, in general, each statement is for you using the following key:

1=not at all true for me  
2=somewhat true for me  
3=moderately true for me  
4=very much true for me  
5=extremely true for me

1. ____ I avoid attending social activities.
2. ____ When uncertain about my future, I fail to sit down and think about what I really want.
3. ____ I would like to achieve things at work/school, but I have to accept my limits.
4. ____ I fail to do what is needed to follow through with achievement goals I have set for myself.
5. ____ In order to avoid feelings of disappointment, I just try not to get too serious about work/school.
6. ____ Rather than try new activities, I tend to stick with the things I know.
7. ____ I choose to turn down opportunities to further my education/career.
8. ____ I do not answer the phone in case people are calling with social invitations.
9. ____ I quit activities that challenge me too much.
10. ____ I try not to think about problems in my personal relationships.
11. ____ I think to myself that I will not be able to complete really challenging tasks.
12. ____ While I know I should make decisions about my personal relationships, I just let things go on as they are.
13. ____ I avoid trying new activities that hold the potential for failure.
14. ____ I do not go out to events when I know there will be a lot of people I do not know.
15. ____ Instead of thinking about problems in my social life, I tell myself that I prefer to be alone.
16. ____ I fail to discuss/address tension that builds in a friendship.
17. ____ I find that I often want to leave social gatherings.
18. ____ I do not try to think about ways to improve my work/school performance.
19. ____ I try not to think about my future and what I will do with my life.
20. ____ I just wait out tension in my relationships hoping that it will go away.
21. ____ I tend to make up excuses to get out of social activities.
22. ____ There is nothing I can do to improve problems in my relationships.
23. ____ I turn down opportunities to socialize with the opposite sex.
24. ____ I tend to remain to myself during social gatherings or activities.
25. ____ I avoid making decisions about my future.
26. ____ When I experience confusion in my relationships, I do not try to figure things out.
27. ____ While I know that I have to make some important decisions about school/work, I just do not get down to it.
28. ____ Rather than getting out and doing things, I just sit at home and watch TV.
29. ____ I distract myself when I start to think about my work/school performance.
30. ____ I do not bother thinking about how to solve problems in my family – it is useless.
31. ____ I find myself avoiding tasks and assignments that are really important.
APPENDIX D: GENERALIZED EXPECTANCY FOR NEGATIVE MOOD REGULATION
Please read each statement carefully. Indicate your level of agreement or disagreement with each statement using the following key:

1=strong disagreement  3=neither disagreement nor agreement  5=strong agreement
2=disagreement        4=agreement

1. ____ When I’m upset, I believe that I can usually find a way to cheer myself up.
2. ____ When I’m upset, I believe that I can do something to feel better.
3. ____ When I’m upset, I believe that walling in it is all I can do.
4. ____ When I’m upset, I believe that I’ll feel okay if I think about more pleasant times.
5. ____ When I’m upset, I believe that being with other people will be a drag.
6. ____ When I’m upset, I believe that I can feel better by treating myself to something I like.
7. ____ When I’m upset, I believe that I’ll feel better when I understand why I feel bad.
8. ____ When I’m upset, I believe that I won’t be able to get myself to do anything about it.
9. ____ When I’m upset, I believe that I won’t feel much better by trying to find some good in the situation.
10. ____ When I’m upset, I believe that it won’t be long before I can calm myself down.
11. ____ When I’m upset, I believe that it will be hard to find someone who really understands.
12. ____ When I’m upset, I believe that telling myself it will pass will help me calm down.
13. ____ When I’m upset, I believe that doing something nice for someone else will cheer me up.
14. ____ When I’m upset, I believe that I’ll end up feeling really depressed.
15. ____ When I’m upset, I believe that planning how I’ll deal with things will help.
16. ____ When I’m upset, I believe that I can forget about what’s upsetting me pretty easily.
17. ____ When I’m upset, I believe that catching up with my work will calm me down.
18. ____ When I’m upset, I believe that the advice friends give me won’t help me feel better.
19. ____ When I’m upset, I believe that I won’t be able to enjoy the things I usually enjoy.
20. ____ When I’m upset, I believe that I can find a way to relax.
21. ____ When I’m upset, I believe that trying to work the problem out in my head will only make it seem worse.
22. ____ When I’m upset, I believe that seeing a moving won’t help me feel better.
23. ____ When I’m upset, I believe that going out to dinner with friends will help.
24. ____ When I’m upset, I believe that I’ll be upset for a long time.
25. ____ When I’m upset, I believe that I won’t be able to put it out of my mind.
26. ____ When I’m upset, I believe that I can feel better by doing something creative.
27. ____ When I’m upset, I believe that I’ll start to feel really down about myself.
28. ____ When I’m upset, I believe that thinking that things will eventually be better won’t help me feel any better.
29. ____ When I’m upset, I believe that I can find some humor in the situation and feel better.
30. ____ When I’m upset, I believe that if I’m with a group of people, I’ll feel “alone in a crowd.”
APPENDIX E: UPPS-P IMPULSIVE BEHAVIOR SCALE - NEGATIVE URGENCY

SUBSCALE
Below are a number of statements that describe ways in which people act and think. For each statement, please indicate how much you agree or disagree with the statement using the following key:

1 = agree strongly
2 = agree some
3 = disagree some
4 = disagree strongly

1. ____ I have trouble controlling my impulses.
2. ____ I have trouble resisting my cravings (for food, cigarettes, etc.).
3. ____ I often get involved in things I later wish I could get out of.
4. ____ When I feel bad, I will often do things I later regret in order to make myself feel better now.
5. ____ Sometimes when I feel bad, I can’t seem to stop what I am doing even though it is making me feel worse.
6. ____ When I am upset I often act without thinking.
7. ____ When I feel rejected, I will often say things that I later regret.
8. ____ It is hard for me to resist acting on my feelings.
9. ____ I often make matters worse because I act without thinking when I am upset.
10. ____ In the heat of an argument, I will often say things that I later regret.
11. ____ I always keep my feelings under control.
12. ____ Sometimes I do impulsive things that I later regret.
APPENDIX F: EMOTION-REGULATION CHOICE TASK
I initially planned to assess participants’ preference for avoidance-based regulation in Study 2 using the emotion-regulation choice task (ERCT; Sheppes, Scheibe, Suri, & Gross, 2011). The ERCT assesses emotion-regulation strategy preferences in response to emotionally provocative images. For each trial, participants are presented with an emotionally charged image from the International Affective Picture system (Lang, Bradley, & Cuthbert, 2008) for 500ms. They then choose between two emotion-regulation strategies (e.g., distraction or reappraisal) based on expectations of each strategy’s effectiveness in minimizing negative emotional reactions. Participants are instructed to engage in the chosen strategy while viewing the image again for 5,000ms. Last, participants report the intensity of their emotional reaction using a 9-point Likert scale and briefly describe their application of the chosen strategy before advancing to the next trial. For the purposes of Study 2, I originally planned to include 20 data-collection trials and to compare the following emotion-regulation strategies: avoidance through distraction, avoidance through suppression, reappraisal, and acceptance.

To accommodate the ERCT being delivered in a group format, I included 20 practice trials prior to the data-collection trials described above. The practice trials were intended to provide participants with information about each of the emotion-regulation strategies included in the task (i.e., distraction, suppression, reappraisal, and acceptance) and to provide participants corrective feedback about their application of these strategies. Practice trials mirrored data collection trials with the addition of a corrective feedback portion. After viewing the image for 500ms and choosing an emotion-regulation strategy, participants were presented with four descriptions of possible strategy applications (i.e., one for each of distraction, suppression, reappraisal, and acceptance). Participants were asked to choose the description that best aligned with their chosen emotion-regulation strategy. If the participant chose incorrectly, they were
provided corrective feedback about the description they chose and asked to try again. When the participant chose correctly, they continued in the trial by viewing the image again for 1,500ms and answering questions about their emotional reaction and application of the chosen strategy.

A total of 24 participants completed the ERCT (resulting in 480 completed practice trials and 480 data-collection trials) before it was removed from the study protocol. Data from these participants suggested the practice trials were insufficient in providing participants adequate knowledge to complete the data collection trials effectively. Of the 480 data-collection trials completed by participants, only 45% of trials had identified strategies that matched participants’ descriptions of strategy application. Many participants also commented on the distressing and dysregulating nature of the ERCT task, and two participants became too behaviorally dysregulated by the task to continue in the study. Inclusion of the ERCT task also extended participants’ study-completion time considerably, raising question of the appropriateness of compensation rate provided to participants. For these reasons, the ERCT was removed from the study protocol, and preference for avoidance-based regulation strategies was instead assessed using the Cognitive-Behavioral Avoidance Scale.
APPENDIX G: PILOT TESTING
Study 2 was originally designed as an experimental study, which included manipulation of participants’ beliefs about emotion prior to assessment of psychoemotional functioning. The purpose of such a manipulation was to inform causal inferences about the effects of emotional schemas on psychoemotional functioning. Nevertheless, after two cycles of pilot testing, an effective manipulation of participants’ beliefs about emotion could not be developed. The study design was therefore changed from an experimental design to a cross-sectional design. Details about pilot testing methods and results are included below.

In the first round of pilot research, participants (a) completed a self-report measure of endorsement of maladaptive emotional schemas (i.e., half of the LESS-II; Leahy, 2012b), (b) read a descriptive, psychoeducational essay about emotions, (c) completed a series of brief distractor tasks, and (d) completed a self-report measure of endorsement of maladaptive emotional schemas (i.e., second half of the LESS-II; Leahy, 2012b). The content of essays was manipulated, such that half of participants read an essay portraying emotion positively (e.g., as informative, helpful, inherently valid, etc.) and the other half of participants read an essay portraying emotion negatively (e.g., as dangerous, harmful, etc.). This round of pilot research was completed with 32 participants. For each participant, the difference between endorsement of schemas before and after reading the essay was calculated. Results suggested no significant differences in participant change scores across essay conditions, $t(30) = 1.69, p = .10$. Further, though results were not significant, participants in the “portraying emotions positively” condition showed increased endorsement of maladaptive emotional schemas after reading the essay, and participants in the “portraying emotions negatively” condition showed reduced endorsement of maladaptive emotional schemas after reading the essay.
Based on feedback from participants in the first round of pilot research, descriptive essays were altered slightly in the second round of pilot testing. Additional self-report measures were also included prior to and following the essays to minimize study demand characteristics. All other methods remained the same. The second round of pilot research was completed with 32 participants. Again, results suggested no significant differences in participant change scores across essay conditions, $t(30) = 0.32, p = .75$.

Results of the aforementioned pilot research suggested that participant endorsement of maladaptive emotional schemas was not successfully manipulated through the presentation of brief, psychoeducational material. Such findings may suggest that emotional schemas are ensuring stable traits that are resistant to brief manipulation. Because an effective manipulation could not be determined, Study 2 instead adopted a cross-sectional study design.
REFERENCES


Gasper, K., & Clore, G. L. (2000). Do you have to pay attention to your feelings to be influenced by them? *Personality and Social Psychology Bulletin, 26*(6), 698-711.


Society of Clinical Psychology (2016). *Psychological Treatments*. Available at: https://www.div12.org/treatments/


