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Stress and Emotion Regulation: The Dynamic Fit Model

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Abstract and Keywords

Emotion regulation (ER) can buffer against the negative effects of stress, but little is understood about processes and contextual factors that influence how and under what conditions this stress buffering occurs. We review previous research on ER in relation to stress and psychopathology, and note that a significant gap in prior research is that is has focused almost exclusively on a small number of deliberative ER strategies. We then highlight growing evidence that automatic and habitual forms of ER, characterized by low resource demands and low conscious awareness, have an important influence on the stress response and its link to psychopathology and well-being. We propose the Dynamic Fit Model of Stress and ER, which posits that (1) both deliberative and automatic ER contribute to the link between stress and psychopathology; (2) the fit between stress demands and ER strategy selection can be mapped along the dimensions of automaticity and flexibility; and (3) negative effects of stress on well-being and psychological functioning emerge when there is a poor fit between stress demands and ER. We discuss how the model delineates elements defining a “good fit” or “poor fit” and how the model can be used to articulate an agenda for future research and hypothesis generation.

Keywords: automatic emotion regulation, emotion regulation flexibility, stress buffering, psychopathology, Dynamic Fit Model

No one is a stranger to stress. Whole industries have grown up around the goal of stress reduction, touting the benefits of everything from stress-reducing teas to mindfulness-based stress reduction. Indeed, stress is universally recognized as a factor in psychopathology across the life span (Dohrenwend, 2000), including anxiety disorders (e.g., Pynoos, Steinberg, & Piacentini, 1999), major depressive disorder (e.g., Heim & Nemeroff, 2001; Wurtman, 2005), substance use disorders (e.g., Khantzian, 1985), personality disorders (e.g., McLean & Gallop, 2003; Stiglmayr et al., 2008), and

posttraumatic stress disorder (PTSD; e.g., Ozer, Best, Lipsey, & Weiss, 2003). Thus, understanding factors that buffer against the negative impact of stress is not only of great human interest but also of great interest to psychological science.

Stress involves a complex pattern of psychological and physiological responses. These responses may be to internal or external stimuli and events that are perceived as harmful or threatening. In the face of such challenges, central and peripheral nervous system mechanisms work to maintain allostasis, or relative stability, in the face of stress (Sterling & Eyer, 1988). Allostatic load refers to the finding that adaptation to stress carries with it a biological cost (McEwen & Stellar, 1993), and high levels of allostatic load can contribute to disease (McEwen & Wingfield, 2003), including psychopathology (McEwen, 2000; McEwen & Seeman, 1999).

Important to this concept is the idea that high levels of objective and subjective stress reflect a mismatch between demands (internal or external) and an individual's resources. These resources are multifaceted and include regulatory capacities such as coping (Lazarus, 1966; Lazarus & Folkman, 1984; Lazarus & Lazarus, 1996), social support (e.g., Cohen & Wills, 1985; Cutrona, 1990; Sarason, Sarason, & Pierce, 1990), and executive function (Mendl, 1999; Sprague, Verona, Kalkhoff, & Kilmer, 2011). If there is a mismatch between demands and resources, there is a "poor fit" such that stress exceeds an individual's regulatory threshold and risk for high distress and psychopathology increases.

In this chapter, we focus on emotion regulation (ER) as a key regulatory capacity that can buffer against the negative effects of stress if, we argue, there is a "good fit" between stress demands and ER resources. While there is a large and rich literature on coping and stress (Boekaerts, 1996; Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Dewe, Cox, & Ferguson, 1993; Folkman, 2013; Lazarus, 1966, for reviews), including some forms of coping that overlap with ER (Gross, 1998b; Kashdan, Barrios, Forsyth, & Steger, 2006; Worthington & Scherer, 2004), most of this research focuses on deliberative and explicit strategies that require conscious effort and awareness (Berkman & Lieberman, 2009; Creswell & Lindsay, 2014; Etkin, Egner, & Kalisch, 2011; Garnefski, Kraaij, & Spinhoven, 2001; Goldin, McRae, Ramel, & Gross, 2008; Mauss, Cook, Cheng, & Gross, 2007; Nolen-Hoeksema & Aldao, 2011). Recent evidence, however, suggests that in certain high-stress situations, relatively automatic ER strategies represent a healthy default mode (Sheppes & Gross, 2012; Sheppes, Scheibe, Suri, & Gross, 2011). Conversely, deliberative strategies tend to be newly learned or atypical, represent a much smaller proportion of our regulatory repertoire, and are more effortful and conscious. Such novel, high-resource strategies are likely a poor fit for highly stressful contexts in which we must act quickly and effectively (Sheppes, Catran, & Meiran, 2009; Sheppes & Meiran, 2007, 2008; Sheppes et al., 2014).

The literature on stress and ER has also paid short shrift to a key component of ER that is consistently emphasized but rarely studied: the flexibility of strategy use within and across changing situational contexts (e.g., Cole, Martin, & Dennis, 2004; Gross, 1998b,

1999; Gross & Feldman Barrett, 2011; Lazarus & Folkman, 1984). Instead, researchers have emphasized the unitary use of putatively adaptive or maladaptive ER strategies across different contexts. However, recent research has begun to examine context–person interactions that emphasize the role of flexibility in emotion regulation (Bonanno & Burton, 2013; Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Cheng, 2001; Kashdan & Rottenberg, 2010), suggesting that regulatory flexibility rather than the use of specific ER strategies may best predict psychological functioning (Bonanno & Burton, 2013).

In this chapter, we first review the research literature on stress and ER and note gaps in empirical research on automaticity and flexibility of ER. We then introduce the concept of dynamic fit between stress and ER and describe a novel framework called the Dynamic Fit Model of Stress and ER (see Figure 1), which proposes that the negative effects of stress on well-being and psychological functioning emerge when there is a poor fit between stress demands and ER within the dimensions of automaticity and flexibility. We then use this model to articulate an agenda for future research and hypothesis generation.

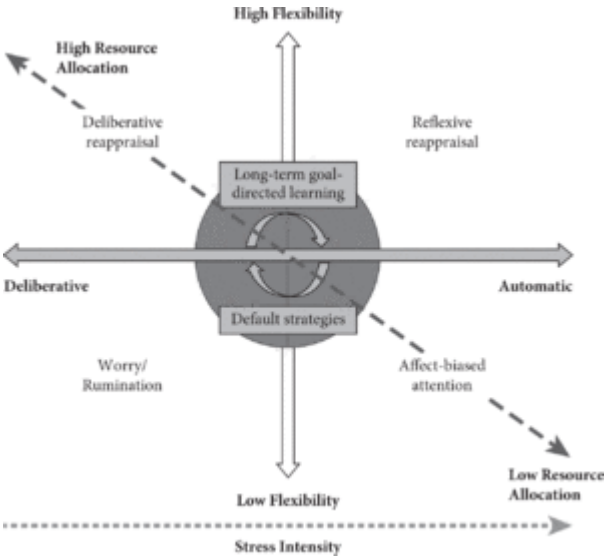

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Figure 1 The Dynamic Fit Model of Stress and Emotion Regulation.

Stress and Emotion Regulation: Empirical Evidence and Gaps

ER refers to intrinsic and extrinsic processes by which people influence the experience, expression, intensity, and time course of their immediate and future emotions to meet context-specific goals (Buhle et al., 2014; Gross, 2002, 2015; Thompson, 1994; Zaki & Williams, 2013). Individuals also differ in the threshold and intensity of emotional reactivity to emotional stimuli, and heightened or blunted reactivity is related to

psychopathology. For example, individuals with depression are less reactive to positive stimuli (Bylsma, Morris, & Rottenberg, 2008 meta-analysis), while anxiety disorders are related to heightened reactivity to threat-relevant stimuli (Carthy, Horesh, Apter, Edge, & Gross, 2010; Goldin, Manber, & Hakimi, 2009; Hare, Tottenham, Galvan, Voss, Glover, & Casey, 2008;). However, maladaptive patterns of ER responses either preceding or following those emotional reactions are both thought to underlie or exacerbate symptoms of psychopathology (e.g., Tomarken & Keener, 1998; Kring & Werner, 2004), and they are also clinically relevant targets for intervention (Carthy et al., 2010). This suggests that while individual difference in emotional reactivity should be considered, ER represents a distinct factor (Cole, Martin, & Dennis, 2004) contributing to the associations between stress and mental health.

Indeed, many studies have demonstrated that ER plays a prominent role in the management of stress. Modulation of unpleasant emotions buffers against the negative influence of stress to reduce symptoms of psychopathology (e.g., Beck, 1979; Sayette, 1993). At the same time, there are bidirectional influences between ER and context (Bonanno & Burton, 2013) suggesting that, while effective ER may buffer the negative effects of stress, stress can also influence the types and flexibility of ER strategies used (Evans & Kim, 2013; Kim et al., 2013). The ability to flexibly modify emotions is a fundamental component of mental health and positive adaptation that, when dysfunctional, corresponds to subjective stress, poor performance, poor health, and mental illness. In this way, ER is a linchpin in the link between stress, risk, and psychopathology.

It is theoretically unassailable and intuitively appealing that ER buffers against stress. The links between stress and ER, however, reflect a complex interplay among biological, social, cognitive, affective, and behavioral factors, and thus significant empirical gaps remain. First, much of the extant research on stress and ER is subsumed under the coping literature. For instance, adaptive coping strategies, including problem-focused and emotion-focused coping, promote resilience following bereavement (e.g., Bonanno & Kaltman, 1999; Stroebe & Schut, 2010). But this coping framework does not address the complexity with respect to the time course of ER. For example, according to several models of ER, including Gross's Process Model (Gross, 1998a, 1998b; Gross & Thompson, 2006) and Campos's view of the temporal characteristics of ER (Campos, Campos, & Barrett, 1989), ER can occur at any point prior to or following behavioral, experiential, and physiological components of emotion generation. For example, according to Gross (1998a), antecedent-focused ER processes, including situation selection and modification, attentional deployment, and cognitive change, occur prior to emotion generation, while response modulation occurs following emotions. Thus, it is unclear whether the antecedent- or response-focused nature of ER or coping influences its stress-buffering impact.

In addition to the coping literature, there is a significant body of research on stress and ER. The use of deliberative emotion regulation (DER) strategies in the face of stress, such as reappraisal, which emphasizes the positive aspects of a negative stimulus or event, is

related to greater resilience and decreased psychopathology (e.g., Garnefski et al., 2001; Nolen-Hoeksema & Aldao, 2011). For example, individuals with greater self-reported resilience tend to use positive emotions to physiologically rebound from negative emotions induced by stress (Garland, Gaylord, & Fredrickson, 2011). In another study, participants instructed to use a positive self-affirmation strategy during a stressful task showed lower cortisol than controls, particularly for those with high reported levels of resources such as self-esteem and optimism (Creswell et al., 2005). Relaxation strategies focused on intentional muscle tension release are related to reduced subjective stress and anxiety (Pawlow & Jones, 2002; Rausch, Gramling, & Auerbach, 2006), and mindfulness meditation is thought to reduce risk for disease and psychopathology by buffering against the negative effects of stress (Creswell & Lindsay, 2014). Finally, successful modulation of negative emotions can buffer against the negative influence of early life stress to reduce symptoms of psychopathology (e.g., Beck, 1979; Sayette, 1993). Cloitre, Miranda, Stovall-McClough, and Han (2005) showed that ER ability plays a key role in the relationship between childhood trauma resulting in PTSD symptoms, and functional impairment in adulthood. In fact, the ability to regulate negative mood was a stronger predictor of adult impairment than PTSD symptom severity (Cloitre et al., 2005).

Habitual use of ER strategies deemed relatively maladaptive is related to reduced physical and psychological well-being. In particular, the use of experiential or expressive suppression of emotions in response to stress has been linked to negative health outcomes, including risk for disease (Barger, Bachen, Marsland, & Manuck, 2000; Jamner, Schwartz, & Leigh, 1988), and stress-induced eating is linked to both reduced emotional distress (Adam & Epel, 2007) but also subsequent disordered eating patterns (Heatherton & Baumeister, 1991). This link between problematic ER strategies and poor well-being translates to therapeutic intervention; for example, cognitive-behavioral therapy approaches emphasizing the use of healthy DER strategies like mindfulness, delay of gratification, and reappraisal have shown to bolster resilience to stress (Benight & Cieslak, 2011; Fava & Tomba, 2009; Southwick & Charney, 2012; Troy & Mauss, 2011). In addition, psychopathology is associated with heightened disruptions in the ability to deliberatively regulate emotions (e.g., Aldao, Nolen-Hoeksema, & Schweizer, 2010; Moore, Zoellner, & Mollenholt, 2008, for review). For example, individuals with a history of depression are more likely to spontaneously use suppression strategies, albeit unsuccessfully, in an attempt to decrease unpleasant emotions (Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010), whereas use of reappraisal mitigates the negative impact of stressful life events on depressive symptoms (Troy & Mauss, 2011). This suggests that successful ER is an essential buffer against the detrimental effects of stress and trauma on mental health and illness across the life span.

To complement the behavioral and self-report literature on ER and stress, other researchers aim to identify discrete biobehavioral signatures of ER and show how they predict successful stress buffering and/or contribute to risk for psychopathology. For example, strategies like cognitive reappraisal and mindfulness-based stress reduction techniques bolster prefrontal cortex inhibitory control over subcortical regions involved in the stress response (Creswell & Lindsay, 2014; Etkin et al., 2011; Goldin et al., 2008).

In one study, ventrolateral prefrontal cortex mediation of subcortical regions through the nucleus accumbens was related to greater self-reported ER success in explicitly reducing negative emotions to unpleasant pictures (Wager, Davidson, Hughes, Lindquist, & Ochsner, 2008). Successful ER can also modulate the autonomic nervous system (ANS) by either engaging the sympathetic nervous system (SNS) to help cope with a current stressor, as measured by heart rate variability (HRV), or by initiating parasympathetic nervous system (PSNS) activity to induce calm and return to baseline arousal following a stressor, as measured by respiratory sinus arrhythmia (RSA; Appelhans & Luecken, 2006; Porges, 1995, 2007, for reviews). Moreover, individual differences in resting-state ANS activity are related to successful regulation of the stress response in that those with lower PSNS activity during baseline have greater difficulty down-regulating negative emotions in response to stress (Fabes & Eisenberg, 1997), while greater baseline SNS activity is related to less subjective distress following a stressor (Fabes, Eisenberg, & Eisenbud, 1993).

Despite substantial evidence that ER strategies are linked to stress and psychopathology, a meta-analytic review revealed that some widely studied strategies, such as reappraisal and acceptance, showed only small to medium effect sizes when considering the relationship with psychopathologies, including anxiety and depression (Aldao et al., 2010). This discrepancy may be at least partially due to methodological approaches that focus solely on DER processes. Specifically, in numerous studies of ER, participants are instructed in the use of these strategies and then deliberatively asked to utilize these strategies during emotion viewing or induction procedures. For example, reappraisal is a cognitive ER strategy reflects the ability to reframe or reinterpret the meaning of an event or stimulus to decrease its emotional impact often through the generation of a neutral or positive appraisal of the event (Gross, 1998b, 2002; Gross & Thompson, 2006; Kumar, Gross, & Ahlskog, 2004). Reappraisal has been the topic of hundreds of research studies (e.g., Buhle et al., 2014; Ochsner & Gross, 2008), but assessment methods invoke deliberative regulatory techniques (e.g., asking participants to intentionally and deliberatively monitor and modify their emotional reactions) rather than those that are relatively automatic because they require little awareness and few resources. Because this methodological approach requires a degree of consciousness and effort, investigations of stress and ER predominantly emphasize deliberative, deliberative processes and inherently lack consideration of AER processes. This same bias toward studying deliberative processes is present in the entire ER literature, whereas more automatic emotion regulation (AER) processes have been relatively neglected until recently (e.g., Mauss, Bunge, & Gross, 2007; Todd & Galinsky, 2012).

Stress and Automatic Emotion Regulation

Only recently have theorists recognized that relatively automatic aspects of ER are used on a constant, moment-to-moment basis and therefore are fundamental to our ability to regulate emotions well or poorly and buffer against the effects of stress (Berkman & Lieberman, 2009; Gyurak, Gross, & Etkin, 2011; Mauss et al., 2007; Todd & Galinsky, 2012). Consistent with research on automatic and unconscious processes (cf. Bargh & Gollwitzer, 1994; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001), the idea of unconscious but goal-directed behavior is central to recent theoretical accounts of AER (e.g., Custers & Aarts, 2005; Mauss, et al., 2007; Webb & Sheeran, 2003). This distinction between automatic (nonconscious and implicit) versus deliberative (conscious and deliberative) processes has been discussed using a variety of terms (e.g., Chaiken & Trope, 1999; Devine, 1989; Sloman, 1996; Strack & Deutsch, 2004). For example, the word *automatic* refers to things that are latent and not directly expressed. AER encompasses those aspects of ER that are implicit and latent because they are relatively effortless and automatic (e.g., Mauss, et al., 2007), incidental rather than deliberative (e.g., Berkman & Lieberman, 2009), and reflexive or driven by the object of attention or external information in the environment (Etkin, Egner, Peraza, Kandel, & Hirsch, 2006). In contrast, deliberative aspects of ER are considered relatively controlled, strategic, goal-driven, deliberate, effortful, and intentional.

Existing models fall into two broad categories based on whether emphasis is placed on treating automatic and deliberative as independent ER categories or as opposite ends of a continuous dimension. Here we briefly review definitional issues and several prior models of AER, and we summarize assessment methods and criteria for identifying AER.

Definitions

To formally delineate core components of AER, we draw on the social cognition literature (Bargh, 1989, 1996; Bargh & Ferguson, 2000; Bargh & Gollwitzer, 1994; Bargh et al., 2001; McNally, 1995), which highlights four components of automaticity relevant to ER processes. These components should be thought of as dimensions, ranging from extremely deliberative to extremely automatic, with much room for variation in between. First, in comparison to DER, AER is low in *awareness*, which is the degree to which detection, interpretation, and reactions to a stimulus are amenable to conscious introspection. Importantly, awareness of the processes may be low (e.g., an individual may not know she is shifting attention away from a source of distress), yet awareness of the outcome (e.g., attending to something) is possible. Second, AER is low in *intentionality*, or the driving and instigation of a process by the individual, and thus is difficult to inhibit. Third, and relatedly, AER is lower in *controllability*, or the degree to which the individual person can stop, diminish, or override the target process. Fourth and finally, AER relative to DER is higher in *efficiency*, or the degree to which the process demands attentional resources for its execution.

These dimensions can be further described in terms of stability and in relation to past learning. For example, preconscious automaticity refers to relatively stable processing tendencies that occur when a person merely notices the presence of a stimulus, without goals or intentions (e.g., categorization). Postconscious automaticity refers to a relatively temporary, stimulus-driven aspect of processing that occurs when a person notices the presence of a stimulus and a similar stimulus has recently been consciously attended/ processed (e.g., priming). Finally, goal-dependent automaticity refers to relatively stable responses that have become automatic after intentional, conscious learning has occurred. Goal-dependent automaticity, as described later in the model (Figure 1), may be a particularly important process underlying the expression of an ER strategy as automatic or deliberative, and the transformations between the two.

Models of Automatic Emotion Regulation

According to Mauss and colleagues (2007), AER is on a continuum with DER. AER is characterized by changes in attentional deployment, appraisal, and cognitive engagement that are initiated in pursuit of a goal without conscious awareness, attention, or control of either the process or goal. Thus, AER is defined as “goal-driven change to any aspect of one’s emotions without making a conscious decision to do so” (p. 3). This model encompasses the automatic physiological changes associated with regulating an emotion as well. Mauss and colleagues (2007) make the important point that these automatic processes are different from emotional reactivity because, while reactivity also represents a relatively unconscious process, ER is more malleable in that it can be more readily influenced by contextual factors like sociocultural differences. Like more DER strategies, AER strategies also play an important role in one’s emotional health.

This AER model is consistent with Gross’s Process Model of ER (Gross, 1998a, 1998b), in identifying that AER strategies are either antecedent focused or response focused, and they can be conceptualized as generally adaptive (e.g., action orientation [Koole & Coenen, 2007], coping and resilience [Bonanno, 2005]) and/or maladaptive (e.g., suppression [Egloff, Schmukle, Burns, & Schwerdtfeger, 2006], avoidant attachment style [Mikulincer, Birnbaum, Woddis, & Nachmias, 2000]), each with distinct neural correlates. Response-focused strategies such as cognitive disengagement and behavioral regulation occur after an emotional response. Because these types of strategies rely upon preceding negative emotional cues, they are more likely to result in maladaptive physiological responses and a failure to adequately reduce negative emotional experiences (Aldao & Nolen-Hoeksema, 2010; Garnefski, Teerds, Kraaij, Legerstee, & van den Kommer, 2004; Mathews & MacLeod, 2005; Silk, Steinberg, & Morris, 2003). In contrast, antecedent-focused strategies, such as selective attentional deployment and reappraisal, occur prior to or very early in the emotional response. When these types of automatic strategies fit with situational cues that dictate how attention and subsequent appraisal should be

deployed, they are associated with a greater likelihood of adaptive physiological responses and reduced negative emotions.

Taken together, Mauss and colleagues (2007) note that like deliberative strategies, AER can be both advantageous as well as harmful in regulating negative emotions. This model describes AER in terms of discrete strategies but also places automaticity along a continuum with deliberative processes. There are no specific predictions, however, about potential mobility of strategies along the automatic-deliberative continuum. Furthermore, the adaptiveness of various forms of AER strategies is discussed, but the range of contextual influences on efficacy or efficiency is not fully considered.

Dual-Process Model

According to Gyurak and colleagues (2011), AER and DER are discrete processes with porous boundaries and are thus part of a dual-process system, described as “distinct yet interrelated islands” (p. 401). Both types of ER are posited to contribute to healthy ER capacity. Using the term “implicit ER,” they describe AER as a set of processes that take place automatically without monitoring and in the absence of awareness and effort. In contrast, DER requires effort, monitoring, and awareness. This definitional distinction implies that the person is only able to benefit from situational and/or emotional feedback as a deliberative process is employed. Furthermore, an awareness of one’s ER strategy use (e.g., deliberative reappraisal) that is constantly being updated can be costly and requires a high degree of resources. Therefore, to meet day-to-day needs, deliberative forms of ER cannot be the only form of regulation as they are too resource heavy or “expensive.” For instance, for ER strategies including reappraisal and suppression, recruitment of neurocognitive resources measured via activity of the prefrontal cortex indicate heavy top-down, cognitive demands. The Gyurak and colleagues (2011) model further identifies the existence of cross-over between automatic and deliberative processes and notes this as an important area for future research to explore. For example, the authors suggest that through practice, repetition, and successfully modulating an emotional experience, deliberative processes can become more habitual and implicit. As such, both processes evolve over time and may overlap across situations and depending on the person’s needs. Thus, placement of a particular strategy within each category is not fixed.

To better illustrate AER repertoire, the model identifies five specific examples of nondeliberative processes present throughout the literature that range in their level of automaticity: emotional conflict adaptation, habitual emotion regulation, emotion regulatory goals and values, affect labeling, and error-related regulation. For example, emotional conflict adaptation can be measured using an emotional Stroop task in which reaction times on incongruent (emotional conflict) trials are slower, compared to performance on congruent trials. This behavioral effect is unstructured, effortless, and proceeds without awareness, thus indexing AER.

Extended Model of Emotion Regulation

Todd and Galinsky (2012) build on the dual-process model (Gyurak et al., 2011) by addressing the role of motivation within a changing context in the Extended Model of Emotion Regulation (EMER). This framework singles out affect-biased attention as an understudied form of AER. They define affect-biased attention as an unconscious propensity to attend to one category of salient stimuli over another. They discuss this form of emotion regulation as a preemptive and sensory "tuning filter" that directs attention prior to an emotional experience and continues to guide processing, working at a top-down level subject to the influence of motivational goals. They further argue that this attention filter functions proactively by being repeatedly shaped and updated both over development and within specific emotional events, shaping an individual's emotional experiences.

One of the most widely studied forms of affect-biased attention is threat bias (TB). TB, or selective and exaggerated attention toward threat, is a potential neurocognitive mechanism in anxiety across the life span (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van Ijzendoorn, 2007; Mogg, Mathews, & Eysenck, 1992). As a form of AER, TB functions as an attention filter biased toward negative information, events, and emotions without awareness and requiring little if any conscious effort. TB is thought to promote anxiety by increasing anxious arousal through exaggerated processing of threat, reducing opportunities to disconfirm anxiety-related beliefs. Although TB has been well documented in both clinical and trait-anxious individuals (i.e., Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van Ijzendoorn, 2007), emerging evidence has shown that a significant proportion of anxious adults evidence a bias *away* from threat (Cisler & Koster, 2010; Mansell, Clark, Ehlers, & Chen, 1999) or fail to show a bias using traditional reaction-time-based assays. Innovative new research has delved into these empirical challenges, proposing alternate metrics and methods for assessing TB, including trial-level TB variability (Heeren, Mogoașe, Philippot, & McNally, 2015; Zvielli, Bernstein, & Koster, 2015; Egan & Dennis, 2018), neurophysiological measures of biased attention (Dennis-Tiwary, Denefrio, & Gelber, 2017; Dennis-Tiwary, Egan, Babkirk, & Denefrio, 2016), and eye-tracking methods (Armstrong & Olatunji, 2012). With the hallmark of such recent novel techniques, we are just beginning to understand how mood- and state-related changes in anxiety impact the flexibility of automatic cognitive biases. Thus, TB is a prime candidate for studying the role of AER in anxiety and its potential stress-buffering effects.

The EMER model (Todd & Galinsky, 2012) is further distinguished from other AER models by its rich consideration of development. For example, flexible strategy deployment should gradually develop along with neurocognitive development supporting greater effortful cognitive control. This developmental focus allows for the "evolution" of strategies from relatively reflexive to effortful.

Open Questions About Automatic Emotion Regulation

Several future research questions logically emerge from existing models of AER reviewed earlier (Gyurak et al., 2011; Mauss et al., 2007; Todd & Galinsky, 2012). For example, while it is unclear how strategies dynamically transition from deliberative to automatic over time and vice versa, one likely avenue is habitual use, similar to how procedural tasks are learned and automatized through practice, like driving a car. This process would have implications for therapeutic intervention, such as understanding how cognitive and behavioral strategies for stress management become automatic and more efficient through practice. Further, habitual maladaptive ER could be targeted through interventions that aim to bring those reflexive ER patterns into conscious awareness.

Another topic requiring research attention is how automaticity relates to adaptive or maladaptive ER. For example, repression, a relatively reflexive ER strategy, has been related to both positive and negative mental health outcomes, depending on the context (Bonanno, Znoj, Siddique, & Horowitz, 1999). Frequent use of this strategy has been linked to impaired cognition, reduced social adjustment, and increased physiological reactivity (e.g., Schwartz & Kline, 1995; Weinberger, 1998). However, use of repression following a stressful loss has been associated with greater resilience and reduced psychopathology (Coifman, Bonanno, Ray, & Gross, 2007), suggesting that use of an automatic ER strategy may be adaptive in some contexts and maladaptive in others.

Third, research examining the role of AER in response to both acute and chronic stress is lacking, and the factors contributing to the emergence and trajectories of these automatic processes are not well understood. For instance, AER following relatively acute stress, such as bereavement, is potentially adaptive and promotes resilience (Bonanno, 2005; Bonanno, Keltner, Holen, & Horowitz, 1995). On the other hand, maladaptive or rigid AER may emerge from chronic or severe stress, giving rise to or solidifying automatic patterns of responding that contribute to psychopathologies. Kim and colleagues (2013) found that adults who experienced chronic poverty-related stress throughout childhood showed blunted ventro- and dorsolateral prefrontal cortex activity during a directed ER task. These same prefrontal regions have been implicated in AER processes measured during a startle eye-blink task (Jackson et al., 2003), suggesting that chronic stress may alter patterns of both DER and AER.

In sum, it is crucial for future research to examine both DER and AER in relation to stress. Prior models similarly emphasize the importance of delineating automatic and deliberative processes, often placing them on a single dimension, and specify that effort, awareness, and efficiency are critical factors in distinguishing relatively automatic from deliberative processes. Few models account for contextual effects, developmental change,

or processes through which reflexive strategies can become more amendable to top-down, effortful control or become more or less flexible over time.

Assessment Methods and Individual Differences

Several paradigms have been used in recent research to capture AER and related processes. Berkman and Lieberman (2009) argue that, to infer that AER has occurred, some observable process must be measured that differentiates between an outcome that ensues from regulation versus an outcome that ensues in the absence of regulation efforts. Latency to categorize ER-relevant terms is one such method, with faster reactions times indicating a stronger implicit association. For instance, the ER implicit attitudes test (ER-IAT; Mauss, Evers, Wilhelm, & Gross, 2006) assesses whether individuals subconsciously prefer words describing emotional control (e.g., restrains, stable) or expression (e.g., volatile, boiled) with the assumption that this preference will increase the likelihood of automatic implementation of that strategy. Consistent with this, those with emotional control preferences measured by the ER-IAT reported less negative emotion during a subsequent emotionally provocative task in which emotion control strategies could be enacted.

Other approaches aim to induce the use of AER through experimental manipulation to examine mobility along the automatic-deliberative ER continuum. For example, Mauss and colleagues (2007) showed that priming participants with emotion control words (e.g., “restrains”) was associated with decreased self-reported anger following provocation. Williams, Bargh, Nocera, and Gray (2009) used a similar priming method and found that those primed with reappraisal cue words (e.g., reassessed, carefully analyzed) preceding a stressful task showed decreased heart rate change compared to those who did not receive a reappraisal prime. Importantly, individual differences emerged in the extent to which priming of reappraisal cues enhanced ER during the stressor. Participants who reported using deliberative reappraisal more frequently in everyday life also showed greater AER after exposure to the reappraisal prime. This suggests that those who engage in habitual use of DER strategies may have a broader range of mobility between DER and AER approaches and are thus more able to use either approach to fit the contextual demands (Williams et al., 2009).

Several studies (Eder, 2011; Eder, Rothermund, & Proctor, 2010; Gallo, Keil, McCulloch, Rockstroh, & Gollwitzer, 2009; Parks-Stamm, Oettingen, & Gollwitzer, 2010; Webb, Ononaiye, Sheeran, Reidy, & Lavda, 2010) have demonstrated that ER can be automatized through repeated or elaborated implementation of intentional emotional goals during unpleasant emotional situations. Compared to participants prompted with simple goal intentions (i.e., “do not feel disgusted”), participants who internalized more complex if-then plans, or implemented ER intentions (i.e., “if I see blood, then I will feel

calm and relaxed"), reported decreased negative emotions and reduced neurophysiological responses to fear and disgust stimuli in an independent assessment (Gallo et al., 2009), suggesting automatizing of these strategies.

Automatic Emotion Regulation and Resource Allocation Efficiency

The automatic/deliberative distinction is also important when considering how a range of factors, like cognitive load, may impact the efficacy and efficiency of ER. As noted earlier, the low effort required for AER, compared to DER, translates into fewer resources recruited and greater regulatory efficiency. For instance, when cognitive load is high and extensive attentional resources are required for task completion, effortful, deliberative processes may suffer, whereas automatic processes do not. Consistent with this, AER may differentially influence subjective versus physiological responses to negative emotional experiences, which has implications for the relative efficiency of ER processes. That is, physiological responses to stress can be downregulated without the resources necessary for conscious awareness of these processes, fewer cognitive resources are needed, and thus ER is more efficient. In support of this notion, in one study (Yuan, Ding, Liu, & Yang, 2015), participants were either primed with reappraisal words (AER) or explicitly instructed to use reappraisal (DER group), and then completed a frustrating task. Both AER and DER groups showed decreased heart rate during emotion induction compared to a control group, suggesting that AER may yield physiological benefits in regulatory contexts without the need for allocation of conscious cognitive resources. Subjective ratings of negative emotion, however, were decreased only in the DER group. Thus, while AER may be cognitively efficient, it may have less of an impact on subjective emotional experiences. Importantly, since the relative effectiveness of ER can be assessed as a combination of biological, behavioral, and experiential measures (Webb, Miles, & Sheeran, 2012), an *efficient* strategy is not always an *effective* one. Furthermore, not all AER is necessarily efficient. For instance, McNally (1995) questioned the capacity-free nature of automatic attention in relation to emotion, such as anxiety, arguing that processing of anxiety-relevant information almost immediately interrupts ongoing processes and takes considerable capacity.

Stress and Emotion Regulation Flexibility

The relative advantages of DER and AER may vary depending on the intensity of stress and negative affect, and an individual's ability to flexibly shift strategies when needed. For instance, while reappraisal may be adaptive when unpleasant emotions are relatively low intensity, suppression may be more appropriate for high-intensity emotions (Sheppes et al., 2011). In some contexts, reappraisal could even be considered maladaptive, if the individual uses this strategy to interpret a stimulus or event in an unrealistic or inflexible way (Gross, 2015). In one study (Bonanno et al., 2004), young adults who reported using *both* suppression and enhancement of their emotions following the September 11th terrorist attack in New York City showed fewer long-term negative effects of the traumatic event. Thus, the adaptiveness of ER may be better described in terms of regulatory flexibility (Bonanno & Burton, 2013) and fit between ER strategies and contextual demands.

Although recent research has presented a more nuanced view of reappraisal in ER (Gross, 2015), this strategy is often characterized as a paradigmatic "adaptive" emotion regulation strategy and is pitted against presumably less adaptive strategies such as expressive suppression. This pitting of adaptive against maladaptive strategies creates not only a false dichotomy between "good" and "bad" emotion regulation but also ignores context of the stressor, individual differences, and the likelihood that these strategies function along a continuum rather than as categorically different types of strategies. In their recent proposal on regulatory flexibility, Bonanno and Burton (2013) argue that these assumptions surrounding assignment of adaptiveness to discrete ER strategies represent a *fallacy of uniform efficacy*. Recent research on the context appropriateness of reappraisal and suppression (Gross, 1998a; Sheppes et al., 2011), and short-term versus long-term strategy efficacy (Cummings, Davies, & Simpson, 1994; Davies, Forman, Rasi, & Stevens, 2002; Thompson, Lewis, & Calkins, 2008), are consistent with the critique of assumptions around uniform efficacy of ER strategies. Bonanno and Burton (2013) highlight three components of flexibility: context sensitivity, repertoire, and feedback response. Each of these interrelated components reflects important dimensions of flexibility that can impact the "goodness of fit" between ER strategy use and the changing demands of stressful contexts.

Context Sensitivity

The first step in the sequence of regulatory flexibility is to attend to important aspects of a potentially stressful context and engage in ER that is an appropriate fit for the demands. Bonanno and Burton (2013) describe this as a probabilistic process, as the individual can only make choices with regard to which ER strategy to use based on the features of the context he or she discerns. Individuals vary in their context sensitivity, as some are more able to attune to essential context cues and filter out unneeded information to inform their ER choices. Another important feature of context sensitivity is the ability to judge which aspects of a stressful situation are controllable and which are not, a capacity called discriminative facility (Cheng, 2001, 2003; Chiu, Hong, Mischel, & Shoda, 1995). Cheng and colleagues showed through a series of studies that individuals with greater ability to judge the controllable aspects of stressful scenarios (e.g., airplane turbulence, health management during cancer treatment) during a laboratory task also reported greater flexibility in the use of coping strategies. Context sensitivity also includes the ability to accurately detect emotional cues in the environment and adjust one’s emotional responding in accordance with that context. For example, anger can be an adaptive and appropriate emotion during a protest of injustice (e.g., Lerner, 1997) or maladaptive and damaging in a context of affiliation (e.g., Keltner, Ellsworth, & Edwards, 1993). Taken together, these studies suggest that sensitivity to context is a key aspect of flexibility and determinant of whether ER is adaptive or maladaptive.

Repertoire

Another aspect of regulatory flexibility concerns the breadth of ER repertoire. Individuals differ in the diversity of the ER strategy repertoire at their disposal, the ability to flexibly shift ER approaches over time, and switch between different types of strategies if needed (Gall, Evans, & Bellerose, 2000; Gall, Guirguis-Younger, Charbonneau, & Florack, 2009). This is consistent with a recent study showing that using a greater number of ER strategies is related to lower traumatic stress following a campus mass shooting (Orcutt, Bonanno, Hannan, & Miron, 2014), and more varied use of ER strategies over time is associated with feeling more effective in coping attempts and lower self-reported depression (Cheng, 2001). In addition, greater categorical variability, or the ability to switch among diverse strategy types (e.g., avoidance to reappraisal), is related to better coping with grief following bereavement (Galatzer-Levy, Burton, & Bonanno, 2012; Gupta & Bonanno, 2011) and fewer emotional problems (e.g., Lougheed & Hollenstein, 2012; Southwick, Bonanno, Masten, Panter-Brick, & Yehuda, 2014).

Responsiveness to Feedback

Finally, once an ER strategy has been selected from a repertoire and implemented, one must assess strategy effectiveness and adjust appropriately by maintaining strategy use, shifting to an alternate strategy, or disengaging ER following successful regulation. This responsiveness can be in relation to either external or internal feedback (e.g., Beer, Heerey, Keltner, Scabini, & Knight, 2003; Butler et al., 2003; Füstös, Gramann, Herbert, & Pollatos, 2012). For example, social cues provide feedback on the appropriateness and effectiveness of an ER strategy by allowing us to see how others are both assessing our emotional expressions and managing their emotions to the same situation (Butler et al., 2003). Also, sensitivity to internal cues, like heart rate, has been shown to be related to more successful directed reappraisal or maintenance of emotional responses (Füstös et al., 2012).

This component of regulatory flexibility overlaps somewhat with context sensitivity and repertoire in that one must be sensitive to emotional context to evaluate whether regulatory attempts remain appropriate for the demands, and one must possess a broad repertoire of ER approaches should shifting to a new strategy be necessary. The responsiveness to feedback component, however, highlights that regulatory flexibility is an ongoing process that must be continuously checked, managed, and updated as stress demands fluctuate and regulatory attempts fail or succeed.

Short-Term Versus Long-Term Efficacy

An advantage of considering regulatory flexibility is that it can account for how an ER approach may be adaptive in the moment but maladaptive in the long run. For example, children developing in a stressful environment, such as one with habitual marital discord, may use hypervigilance to monitor their surroundings for signs of conflict, or avoidance to limit the influence of their surroundings on their internal state (Cummings et al., 1994; Davies et al., 2002; Thompson et al., 2008). Although these strategies may protect the child from negative emotions in the moment, they likely also contribute to long-term rigidity in ER patterns (Thompson & Calkins, 1996) and reduced use of a larger repertoire of potentially more adaptive strategies. In other words, an ER strategy can be simultaneously optimal in the moment but also set the stage for vulnerabilities later.

Gaps in the Research on Stress and Emotion Regulation Flexibility

Although the evidence described earlier indicates that healthy ER may be best thought of in terms of flexibility versus rigidity as opposed to discrete adaptive versus maladaptive strategies, several questions remain to drive avenues for future research. For example, relatively little is known about how flexibility and automaticity interact to contribute to ER adaptiveness. One recent study (Myruski et al., 2017) takes a first step in

understanding this relationship, and it illustrates how early, automatic attentional processes relate to emotional flexibility and well-being. Specifically, rapid, automatic appraisal of salient emotional contextual information during an emotional go/no-go task was related to self-reported regulatory flexibility.

In addition, perhaps some aspects of flexibility, such as responsiveness to feedback, must be relatively deliberative, as an individual must consciously and intentionally shift from one strategy to another. In contrast, context sensitivity may be relatively automatic, since it is early, preconscious attentional processes that contribute to detection of important aspects of the emotional context. Furthermore, the elements (e.g., context sensitivity, repertoire) of regulatory flexibility that constitute a good fit between ER approach and stress context should be further explored. Individual differences in flexibility components should also be assessed, as some people may excel at detecting emotional context, but are relatively rigid regarding strategy repertoire, yet little is known about the relative advantages and disadvantages of each aspect of flexibility. In sum, the field is only beginning to explore the relationship between regulatory flexibility, stress, and mental health, and how strengths and weaknesses related to the various components of flexibility can be assessed and targeted for intervention.

Gender, Emotion Regulation, and Stress

A large body of research indicates striking gender differences in emotionality and mental health outcomes (Nolen-Hoeksema, 2012; Tamres, Janicki, & Helgeson, 2002, for reviews) relevant to stress. Studies have shown that, compared to men, women are more aware of their emotions (Ciarrochi, Hynes, & Crittenden, 2005; Joseph & Newman, 2010), show more complexity in conceptualization of emotions (Barrett, Lane, Sechrest, & Schwartz, 2000), and are more analytic of their own emotions (Barrett & Bliss-Moreau, 2009; Gohm, 2003). In addition, the prevalence of depressive and anxiety disorders (Kessler et al., 2007; McLean & Anderson, 2009; Nolen-Hoeksema, 2012) and internalizing symptomology (Kramer, Kreuger, & Hicks, 2008; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999) is greater in women compared to men. On the other hand, men are more likely than women to reach diagnostic criteria for alcohol-related disorders (Keyes, Grant, & Hasin, 2008) and to exhibit externalizing symptomology (Kramer, Kreuger, & Hicks, 2008; Leadbeater, Kuperminc, Blatt, & Hertzog, 1999), suggesting that gender differences in regulatory responses to stress may underlie how different patterns of psychopathology may emerge in men and women (Hyde, Mezulis, & Abramson, 2008; Nolen-Hoeksema, 2012; Zahn-Waxler, Shirtcliff, & Marceau, 2008).

Indeed, several studies have provided evidence for consistent gender differences in ER processes (Nolen-Hoeksema, 2012; Tamres et al., 2002, for reviews). For example, women are more likely to use emotion-focused strategies like rumination, the repetitive focus on negative emotions (Butler & Nolen-Hoeksema, 1994; Nolen-Hoeksema & Aldao, 2011), whereas men are more prone to the use of suppression or avoidance (Tamres et al., 2002, for review), and they are particularly more likely to use alcohol to cope with stress (e.g., Cooper, Frone, Russell, & Mudar, 1995; Cooper, Russell, Skinner, Frone, & Mudar, 1992; Nolen-Hoeksema & Harrell, 2002). Although all these strategies can be maladaptive depending on context and chronicity, rumination has been consistently linked with depression and anxiety, and using alcohol to manage stress contributes to substance use disorders (Luce, Engler, & Crowther, 2007; Sher & Grekin, 2007). Nolen-Hoeksema (2012) showed that these gender differences in patterns of maladaptive strategy use statistically accounted for variance in psychopathology symptoms. However, women also report greater use of problem solving, reappraisal, and social support–seeking strategies compared to men, as well as overall more types of ER strategies (Tamres et al., 2002). When use of these potentially more adaptive strategies is considered, only support seeking appears to decrease the gender gap in depression (Nolen-Hoeksema, 2012). Thus, the links between gender, ER, and psychopathology must be explained by more than just discrete adaptive versus maladaptive strategy use. Instead, gender differences regarding ER in response to stress should be examined in terms of fit between ER and stress context, and through the consideration of dimensions of ER such as flexibility-rigidity and automatic-deliberative. For instance, women’s greater awareness of emotions may act as both a protective factor against stress (Hilt & Nolen-Hoeksema, 2009) or a greater vulnerability to its negative effects (Barrett et al., 2000), depending on the fit

between stress context and strategy use. Specifically, although women report using reappraisal more than men, this strategy could be maladaptive in a context of severe stress such as domestic abuse (Nolen-Hoeksema, 2012). In another study (Nolen-Hoeksema & Aldao, 2011), women reported greater regulatory flexibility compared to men, as indicated by a larger repertoire of ER strategies employed. However, as noted earlier, women are more likely to report ruminating in response to stress compared to men (Tamres et al., 2002; Zlomke & Hahn, 2010), a strategy that inherently suggests a lack of flexibility to disengage and shift strategies. Choices to use this strategy, and difficulties in altering a strategy in response to feedback, may mark regulatory rigidity and serve as a vulnerability factor in the face of stress that exacerbates anxiety and contributes to mental health problems.

Recent research has begun to examine gender differences in automaticity of ER in response to stress. For example, McRae, Ochsner, Mauss, Gabrieli, and Gross (2008) measured brain responses via functional magnetic resonance imaging (fMRI) in men and women during a cognitive reappraisal task. When asked to modulate emotions to unpleasant stimuli, men showed lesser increases in prefrontal activation, but also greater decreases in amygdala activation, in comparison to women. Thus, while emotional responding, as measured by amygdala activity, was reduced, a large degree of deliberative cognitive effort, as measured by prefrontal activity, was not required, suggesting that men are more likely to use AER processes compared to women. If men use AER more frequently, this may account for why women consistently report greater use of ER (Tamres et al., 2002), since widely used methods of ER assessment focus only on deliberative processes.

Finally, there has been a recent theoretical push for researchers to look beyond the traditional gender binary of male/female when examining differences in health-related outcomes (e.g., Bottorff, Oliffe, & Kelly, 2012; Johnson & Repta, 2012). For instance, Lam and McBride-Chang (2007) assessed gender dimensionally as opposed to categorically and showed that individuals low in masculinity but high in femininity reported greater depression, consistent with other findings indicating females are more vulnerable to the negative effects of stress (Barrett & Bliss-Moreau, 2009; Fischer & Manstead, 2000; Kessler et al., 2007; McLean & Anderson, 2009; Nolen-Hoeksema, 2012). However, this study also showed that medium to high levels of masculinity, coupled with high levels of femininity, predicted less depression, indicating that those reporting more androgynous or non-gender-typed characteristics showed less vulnerability to stress. These results indicate that beyond biological sex, individual differences in gender-based personality traits, whether induced biologically or through socialization, may underlie ER processes that represent risks and protective factors against stress. Importantly, this study also showed that greater coping flexibility predicted less depression, regardless of gender, indicating that the ability to be flexible in the face of stress may override or compensate for any potential gender- or personality-based vulnerabilities. These findings highlight the importance of considering dimensionality when it comes not only to psychological

constructs like ER automaticity and flexibility, but also regarding gender itself. In sum, further research is needed to understand gender differences in the relative advantages and disadvantages afforded by automaticity, flexibility, and contextual fit of ER in response to stress.

The Dynamic Fit Model of Stress and Emotion Regulation and Directions for Future Research

Taken together, prior research has supported the idea that ER has powerful stress-buffering effects and supports resilience. There are, however, significant gaps in our understanding of how the fit between ER and stress context impacts the efficacy of stress buffering, how the degree to which a given ER process varies along the automatic-deliberative continuum influences this fit, and how ER flexibility must be considered in order to assess the adaptiveness of a given ER strategy, particularly in response to chronic stress. Here we present the Dynamic Fit Model of Stress and ER, which addresses each of these gaps, delineates what comprises a "good fit" between stress and ER, and drives hypothesis generation regarding how a "poor fit" between stress and ER can have negative implications for psychological well-being and mental health.

The Dynamic Fit Model

The model (see Figure 1) synthesizes clinical, neuroscience, and life span developmental research within a dynamic person-context interactional framework. We describe emotion regulation strategies along two orthogonal dimensions of *automaticity* and *flexibility*. In contrast to discrete views of emotion regulation, we conceptualize ER as varying continually along the automatic-deliberative and flexibility dimensions, both within people and contexts. The model also shows resource allocation varying along the diagonal because automaticity, as detailed earlier, is a function of resources allocated/control required to enact a given strategy. Finally, stress intensity varies along the X-axis, with greater stress intensity as you move to the right, and the center of the model depicts developmental changes or transformations among strategies, discussed in detail next.

Specific strategies can be plotted within each quadrant in this framework. Here, we plot one per quadrant to illustrate how distinct types of strategies can be characterized as varying along the dimensions of automaticity, flexibility, and resource allocation. The positioning of these dimensions and specific strategies further reflect a "good fit" with the degree of stress intensity. For example, reflexive reappraisal is in the top right quadrant, while deliberative reappraisal is in the top left quadrant. The distinction here is that while the empirical study of reappraisal typically involved conscious and controlled use of reappraisal as a strategy, over time reappraisal might become a habitual reaction to high-stress events, such that it becomes highly automatic, flexible, and efficient,

despite the fact that reappraisal is typically considered more “top-down” and therefore conscious and subject to intentional control. Consistent with this view, however, we can also place reappraisal in the top left quadrant when it is used in a more effortful, deliberative, and conscious way in response to low-stress environments. This relative high-resource strategy in the context of low stress carries few costs with it, and thus as posited by the model, represents a good fit with low-stress contexts (see also Sheppes & Gross, 2012).

Turning to the bottom quadrants, these relatively reflexive strategies (rumination and affect-biased attention), while relatively high efficiency (low resource) may be less flexible because they are less amenable to conscious awareness and control. As discussed more later, however, even rumination and worry—typically considered to be forms of distorted cognition that are risk factors in depression, anxiety, and affective disorders—may be adaptive in the context of low and acute stress. In other words, in limited amounts, the relatively automatic use of worry and rumination may require few resources and carry relatively few costs. Indeed, the more flexible the use of these automatic thoughts, the less problematic they are from a psychopathological perspective. Finally, in the bottom right quadrant is affect-biased attention. As a rapid and reflexive evaluative process, such automatic reactions—such as a negativity bias in the context of a high-stress threat—can serve many adaptive functions in terms of triggering an effective fight/flight response, detecting and avoiding danger, and shaping other ER strategy use downstream. If you are caught in a dark alley, and there are shadowy figures lurking, you want an automatic and efficient threat bias to consistently be triggered in order to help you cope with the situation as rapidly and effectively as possible. In the context of an acute, highly stressful context, affect-biased attention may be the optimal, best-fit first responder.

Transformations Among Strategies

The center of the model specifies that long-term goals and learning impact the automaticity of a given ER strategy. That is, with learning and intentionality, strategies can become highly automatic or “default,” which are efficient because they require low resource allocation. Strategies that start as relatively resource intensive, conscious, intentional, and effortful can, over time, with practice or development, become automatic and habitual. By the same token, with learning and cognitive development, it is also developmentally appropriate and adaptive for relatively reflexive forms of ER to become more effortful, focused on higher order or distal goals, amenable to regulatory control, and flexible (Todd & Galinsky, 2012). The transformation between default and intentional strategies can go both ways. In moments of stress and high emotional demands, even AER that began as relatively deliberate (reappraisal) can be become explicit or subject to intentionality because conscious monitoring or a change in strategy is required.

The individual differences and contextual factors that influence the transformations between default and intentional ER strategies are poorly understood. This is a topic ripe for empirical inquiry. For example, there may be distinct mechanisms available for flexibly transforming one type of strategy into another (e.g., from the relatively resource heavy to the relatively automatic). One possibility is that there are dual processes responsible, such as top-down, effortful, conscious attempts combined with more bottom-up, implicit learning. In addition, it is unknown whether transformations are context specific or general. Focusing solely on stress intensity here, we do not, in the model, describe how specific characteristics of a stressful context influence the fit between ER and stress. A large body of research on trauma, stress, and psychopathology suggests that these characteristics of trauma context (e.g., is a situation life-threatening, chronic, perpetrator vs. natural disaster, etc.) moderate the impact of stress (Shalev, 1996). In future iterations of the model, these factors will need to be considered. It will be important to draw on future empirical research to inform how context is modeled.

While controllability of ER is not a dimension in the model presented here, it is relevant to understanding the degree of resource allocation a given strategy may require. From a definitional perspective, relatively automatic strategies involve lower intentionality and therefore are less amenable to intentional control. Control in the realm of ER is typically considered desirable, but in terms of resource allocation, it is costly. However, relatively automatic aspects of ER, like affect-biased attention, may be amenable to control and change as in the case of attention and cognitive bias modification techniques (Hakamata et al., 2010; Salum et al., 2017). The relative merits of ER control and efficiency can only be evaluated in relation to context demands. For example, as detailed more later, if you are fleeing for your life, control is less important than rapid efficiency.

What Counts as a “Good Fit” of Emotion Regulation to Stress?

We argue that a more adaptive fit between ER processes and stress intensity reduces the negative impact of stress and promotes emotional well-being and resilience to adversity. Consistent with findings from Sheppes and colleagues (2011), in low-stress contexts, relatively deliberative strategies, despite being resource intensive, are ideal, as awareness, intentionality, and resources are abundant to assess and manage emotions. In contrast, in high-stress contexts, such as in fight/flight situations, more reflexive AER strategies are ideal, as they can be rapidly deployed and are more efficient, allowing for cognitive and physical resources to be used with optimal flexibility and agility. Furthermore, as stress demands fluctuate over time, the ability to flexibly shift from automatic to DER strategies is paramount.

When fit is poor, especially in the context of chronic stress, this can promote maladaptation over time. For example, rumination has been identified as a key cognitive mechanism in depression (Nolen-Hoeksema, 2012). As depicted in our model, rumination used in low-stress circumstances and more deliberatively (and thus in more controllable ways) is unlikely to promote depression. In our model, we propose that it is only its use in

chronically stressful circumstances and in inflexible and rigid ways that increases depression risk. Few studies, however, have directly examined the context and flexibility of rumination, assuming that it is consistently maladaptive. Another interesting possibility is that poor fit between ER and stress may represent both pre-existing vulnerabilities for development of psychopathology, as well as emergent patterns in response to chronic stresses that, when engrained, contribute to psychopathology. Thus, the relationship between stress and ER is likely bidirectional, with ER processes acting both as a buffer against and a product of stress context.

Conclusion

In this chapter, we argue that the negative effects of stress on well-being and psychological functioning emerge when there is a poor fit between the intensity of stress demands and ER within the dimensions of automaticity, flexibility, and resource allocation. We present the Dynamic Fit Model of Stress and ER to take a first step toward specifying what constitutes poor and good fit, and to use this model to articulate an agenda for future research and hypothesis generation. Because the model is placed within a person-context interactional framework, it generates a host of questions about contextual factors and individual differences in what comprises a good fit between stress and ER. Individual differences relate to a broad range of person-factors, such as race/ethnicity, gender, age, temperament, personality, and biological mechanisms. We hope future research increasingly addresses contextual factors, such as whether stress is acute or chronic, and individual differences that impact the stress-ER link. We applaud research that examines these processes directly in naturalistic, dynamically changing and clinical contexts, including the development of prevention efforts that aim to optimize the stress-buffering effects of ER.

References

Adam, T. C., & Epel, E. S. (2007). Stress, eating and the reward system. *Physiology & Behavior*, *91*(4), 449–458.

Aldao, A., & Nolen-Hoeksema, S. (2010). Specificity of cognitive emotion regulation strategies: A transdiagnostic examination. *Behaviour Research and Therapy*, *48*(10), 974–983.

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, *30*(2), 217–237.

Appelhans, B. M., & Luecken, L. J. (2006). Heart rate variability as an index of regulated emotional responding. *Review of General Psychology*, *10*(3), 229.

Armstrong, T., & Olatunji, B. O. (2012). Eye tracking of attention in the affective disorders: A meta-analytic review and synthesis. *Clinical Psychology Review*, *32*(8), 704–723.

Bar-Haim, Y., Lamy, D., Pergamin, L., Bakermans-Kranenburg, M. J., & Van Ijzendoorn, M. H. (2007). *Threat-related attentional bias in anxious and nonanxious individuals: A meta-analytic study*. *Psychological Bulletin*, *133*(1), 1–24.

Barger, S. D., Bachen, E. A., Marsland, A. L., & Manuck, S. B. (2000). Repressive coping and blood measures of disease risk: Lipids and endocrine and immunological responses to a laboratory stressor. *Journal of Applied Social Psychology*, *30*(8), 1619–1638.

Bargh, J. A. (1989). Conditional automaticity: Varieties of automatic influence in social perception and cognition. *Unintended Thought*, *3*, 51–69.

Bargh, J. A. (1996). Automaticity in social psychology. In E.T. Higgins & A.W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 169–183). New York, NY, US: Guilford Press.

Bargh, J. A., & Ferguson, M. J. (2000). Beyond behaviorism: On the automaticity of higher mental processes. *Psychological Bulletin*, *126*(6), 925.

Bargh, J. A., & Gollwitzer, P. M. (1994). Environmental control of goal-directed action: Automatic and strategic contingencies between situations and behavior. In W.D. Spaulding (Ed.), *Nebraska symposium on motivation, Vol. 41. Integrative views of motivation, cognitive, and emotion* (pp. 71–124). Lincoln, NE, US: University of Nebraska Press.

Bargh, J. A., Gollwitzer, P. M., Lee-Chai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. *Journal of Personality and Social Psychology*, *81*(6), 1014.

Barrett, L. F., & Bliss-Moreau, E. (2009). She's emotional. He's having a bad day: Attributional explanations for emotion stereotypes. *Emotion*, *9*(5), 649.

Barrett, L. F., Lane, R. D., Sechrest, L., & Schwartz, G. E. (2000). Sex differences in emotional awareness. *Personality and Social Psychology Bulletin*, *26*(9), 1027–1035.

Beck, A. T. (1979). *Cognitive therapy and the emotional disorders*. New York, NY: Penguin.

Beer, J. S., Heerey, E. A., Keltner, D., Scabini, D., & Knight, R. T. (2003). The regulatory function of self-conscious emotion: Insights from patients with orbitofrontal damage. *Journal of Personality and Social Psychology*, *85*(4), 594.

Benight, C. C., & Cieslak, R. (2011). Cognitive factors and resilience: How self-efficacy contributes to coping with adversities. In Steven M. Southwick, Brett T. Litz, Dennis

Charney, & Matthew J. Friedman (Eds.), *Resilience and mental health: Challenges across the lifespan* (pp. 45–55). Cambridge, UK: Cambridge University Press.

Berkman, E. T., & Lieberman, M. D. (2009). Using neuroscience to broaden emotion regulation: Theoretical and methodological considerations. *Social and Personality Psychology Compass*, *3*(4), 475–493.

Boekaerts, M. (1996). Coping with stress in childhood and adolescence. In M. Zeidner & N.S. Endler (Eds.), *Handbook of coping: Theory, research, applications* (pp. 452–484). Oxford, England: John Wiley & Sons.

Bonanno, G. A. (2005). Resilience in the face of potential trauma. *Current Directions in Psychological Science*, *14*(3), 135–138.

Bonanno, G. A., & Burton, C. L. (2013). Regulatory flexibility: An individual differences perspective on coping and emotion regulation. *Perspectives on Psychological Science*, *8*(6), 591–612.

Bonanno, G. A., & Kaltman, S. (1999). Toward an integrative perspective on bereavement. *Psychological Bulletin*, *125*(6), 760.

Bonanno, G. A., Keltner, D., Holen, A., & Horowitz, M. J. (1995). When avoiding unpleasant emotions might not be such a bad thing: Verbal-autonomic response dissociation and midlife conjugal bereavement. *Journal of Personality and Social Psychology*, *69*(5), 975.

Bonanno, G. A., Papa, A., Lalande, K., Westphal, M., & Coifman, K. (2004). The importance of being flexible: The ability to both enhance and suppress emotional expression predicts long-term adjustment. *Psychological Science*, *15*(7), 482–487.

Bonanno, G. A., Znoj, H., Siddique, H. I., & Horowitz, M. J. (1999). Verbal-autonomic dissociation and adaptation to midlife conjugal loss: A follow-up at 25 months. *Cognitive Therapy and Research*, *23*(6), 605–624.

Bottorff, J. L., Oliffe, J. L., & Kelly, M. (2012). *The gender (s) in the room*. Thousand Oaks, CA: Sage.

Buhle, J. T., Silvers, J. A., Wager, T. D., Lopez, R., Onyemekwu, C., Kober, H., … Ochsner, K. N. (2014). Cognitive reappraisal of emotion: A meta-analysis of human neuroimaging studies. *Cerebral Cortex*, *24*(11), 2981–2990.

Butler, E. A., Egloff, B., Wlhelm, F. H., Smith, N. C., Erickson, E. A., & Gross, J. J. (2003). The social consequences of expressive suppression. *Emotion*, *3*(1), 48.

Butler, L. D., & Nolen-Hoeksema, S. (1994). Gender differences in responses to depressed mood in a college sample. *Sex Roles*, *30*(5), 331–346.

Bylsma, L. M., Morris, B. H., & Rottenberg, J. (2008). A meta-analysis of emotional reactivity in major depressive disorder. *Clinical Psychology Review*, *28*(4), 676–691.

Campos, J. J., Campos, R. G., & Barrett, K. C. (1989). Emergent themes in the study of emotional development and emotion regulation. *Developmental Psychology*, *25*(3), 394–402.

Carthy, T., Horesh, N., Apter, A., Edge, M. D., & Gross, J. J. (2010). Emotional reactivity and cognitive regulation in anxious children. *Behaviour Research and Therapy*, *48*(5), 384–393.

Chaiken, S., & Trope, Y. (1999). *Dual-process theories in social psychology*. New York, NY: Guilford Press.

Cheng, C. (2001). Assessing coping flexibility in real-life and laboratory settings: A multimethod approach. *Journal of Personality and Social Psychology*, *80*(5), 814.

Cheng, C. (2003). Discriminative facility: Cognitive mechanisms of coping. In R. Roth, L.F. Lowenstein, & D.R. Trent (Eds.), *Catching the future: Women and men in global psychology* (pp. 81–89). Lengerich, Germany: Pabst Science Publishers.

Chiu, C.-Y., Hong, Y.-Y., Mischel, W., & Shoda, Y. (1995). Discriminative facility in social competence: Conditional versus dispositional encoding and monitoring-blunting of information. *Social Cognition*, *13*(1), 49–70.

Ciarrochi, J., Hynes, K., & Crittenden, N. (2005). Can men do better if they try harder: Sex and motivational effects on emotional awareness. *Cognition & Emotion*, *19*(1), 133–141.

Cisler, J. M., & Koster, E. H. (2010). Mechanisms of attentional biases towards threat in anxiety disorders: An integrative review. *Clinical Psychology Review*, *30*(2), 203–216.

Cloitre, M., Miranda, R., Stovall-McClough, K. C., & Han, H. (2005). Beyond PTSD: Emotion regulation and interpersonal problems as predictors of functional impairment in survivors of childhood abuse. *Behavior Therapy*, *36*(2), 119–124.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, *98*(2), 310.

Coifman, K. G., Bonanno, G. A., Ray, R. D., & Gross, J. J. (2007). Does repressive coping promote resilience? Affective-autonomic response discrepancy during bereavement. *Journal of Personality and Social Psychology*, *92*(4), 745.

Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development*, *75*(2), 317–333.

Compas, B. E., Connor-Smith, J. K., Saltzman, H., Thomsen, A. H., & Wadsworth, M. E. (2001). Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychological Bulletin*, *127*(1), 87.

Cooper, M. L., Frone, M. R., Russell, M., & Mudar, P. (1995). Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality and Social Psychology*, *69*(5), 990.

Cooper, M. L., Russell, M., Skinner, J. B., Frone, M. R., & Mudar, P. (1992). Stress and alcohol use: Moderating effects of gender, coping, and alcohol expectancies. *Journal of Abnormal Psychology*, *101*(1), 139.

Creswell, J. D., & Lindsay, E. K. (2014). How does mindfulness training affect health? A mindfulness stress buffering account. *Current Directions in Psychological Science*, *23*(6), 401–407.

Creswell, J. D., Welch, W. T., Taylor, S. E., Sherman, D. K., Gruenewald, T. L., & Mann, T. (2005). Affirmation of personal values buffers neuroendocrine and psychological stress responses. *Psychological Science*, *16*(11), 846–851.

Cummings, E. M., Davies, P. T., & Simpson, K. S. (1994). Marital conflict, gender, and children's appraisals and coping efficacy as mediators of child adjustment. *Journal of Family Psychology*, *8*(2), 141.

Custers, R., & Aarts, H. (2005). Positive affect as implicit motivator: On the nonconscious operation of behavioral goals. *Journal of Personality and Social Psychology*, *89*(2), 129.

Cutrona, C. E. (1990). Stress and social support—In search of optimal matching. *Journal of Social and Clinical Psychology*, *9*(1), 3–14.

Davies, P. T., Forman, E. M., Rasi, J. A., & Stevens, K. I. (2002). Assessing children's emotional security in the interparental relationship: The security in the interparental subsystem scales. *Child Development*, *73*(2), 544–562.

Dennis-Tiwary, T. A., Denefrio, S., & Gelber, S. (2017). Salutary effects of an attention bias modification mobile application on biobehavioral measures of stress and anxiety during pregnancy. *Biological Psychology*, *127*, 148–156.

Dennis-Tiwary, T. A., Egan, L. J., Babkirk, S., & Denefrio, S. (2016). For whom the bell tolls: Neurocognitive individual differences in the acute stress-reduction effects of an attention bias modification game for anxiety. *Behaviour Research and Therapy*, *77*, 105–117.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, *56*(1), 5.

Dewe, P., Cox, T., & Ferguson, E. (1993). Individual strategies for coping with stress at work: A review. *Work & Stress*, *7*(1), 5–15.

Dohrenwend, B. P. (2000). The role of adversity and stress in psychopathology: Some evidence and its implications for theory and research. *Journal of Health and Social Behavior*, *41*(1), 1–19.

Eder, A. B. (2011). Control of impulsive emotional behaviour through implementation intentions. *Cognition and Emotion*, *25*(3), 478–489.

Eder, A. B., Rothermund, K., & Proctor, R. W. (2010). The prepared emotional reflex: Intentional preparation of automatic approach and avoidance tendencies as a means to regulate emotional responding. *Emotion*, *10*(4), 593.

Egan, L. J., & Dennis-Tiwary, T. A. (2018). Dynamic measures of anxiety-related threat bias: Links to stress reactivity. *Motivation and Emotion*, 1–9.

Egloff, B., Schmukle, S. C., Burns, L. R., & Schwerdtfeger, A. (2006). Spontaneous emotion regulation during evaluated speaking tasks: Associations with negative affect, anxiety expression, memory, and physiological responding. *Emotion*, *6*(3), 356–366.

Ehring, T., Tuschen-Caffier, B., Schnülle, J., Fischer, S., & Gross, J. J. (2010). Emotion regulation and vulnerability to depression: Spontaneous versus instructed use of emotion suppression and reappraisal. *Emotion*, *10*(4), 563.

Etkin, A., Egner, T., & Kalisch, R. (2011). Emotional processing in anterior cingulate and medial prefrontal cortex. *Trends in Cognitive Sciences*, *15*(2), 85–93.

Etkin, A., Egner, T., Peraza, D. M., Kandel, E. R., & Hirsch, J. (2006). Resolving emotional conflict: A role for the rostral anterior cingulate cortex in modulating activity in the amygdala. *Neuron*, *51*(6), 871–882.

Evans, G. W., & Kim, P. (2013). Childhood poverty, chronic stress, self-regulation, and coping. *Child Development Perspectives*, *7*(1), 43–48.

Fabes, R. A., & Eisenberg, N. (1997). Regulatory control and adults' stress-related responses to daily life events. *Journal of Personality and Social Psychology*, *73*, 1107–1117.

Fabes, R. A., Eisenberg, N., & Eisenbud, L. (1993). Behavioral and physiological correlates of children's reactions to others in distress. *Developmental Psychology*, *29*(4), 655.

Fava, G. A., & Tomba, E. (2009). Increasing psychological well-being and resilience by psychotherapeutic methods. *Journal of Personality*, *77*(6), 1903–1934.

Fischer, A. H., & Manstead, A. S. (2000). The relation between gender and emotions in different cultures. *Gender and Emotion: Social Psychological Perspectives*, *1*, 71–94.

Folkman, S. (2013). Stress: Appraisal and coping. In *Encyclopedia of behavioral medicine* (pp. 1913–1915). New York, NY: Springer.

Füstös, J., Gramann, K., Herbert, B. M., & Pollatos, O. (2012). On the embodiment of emotion regulation: Interoceptive awareness facilitates reappraisal. *Social Cognitive and Affective Neuroscience*, *8*(8), 911–917.

Galatzer-Levy, I. R., Burton, C. L., & Bonanno, G. A. (2012). Coping flexibility, potentially traumatic life events, and resilience: A prospective study of college student adjustment. *Journal of Social and Clinical Psychology*, *31*(6), 542–567.

Gall, T. L., Evans, D. R., & Bellerose, S. (2000). Transition to first-year university: Patterns of change in adjustment across life domains and time. *Journal of Social and Clinical Psychology*, *19*(4), 544–567.

Gall, T. L., Guirguis-Younger, M., Charbonneau, C., & Florack, P. (2009). The trajectory of religious coping across time in response to the diagnosis of breast cancer. *Psycho-Oncology*, *18*(11), 1165–1178.

Gallo, I. S., Keil, A., McCulloch, K. C., Rockstroh, B., & Gollwitzer, P. M. (2009). Strategic automation of emotion regulation. *Journal of Personality and Social Psychology*, *96*(1), 11.

Garland, E. L., Gaylord, S. A., & Fredrickson, B. L. (2011). Positive reappraisal mediates the stress-reductive effects of mindfulness: An upward spiral process. *Mindfulness*, *2*(1), 59–67.

Garnefski, N., Kraaij, V., & Spinhoven, P. (2001). Negative life events, cognitive emotion regulation and emotional problems. *Personality and Individual Differences*, *30*(8), 1311–1327.

Garnefski, N., Teerds, J., Kraaij, V., Legerstee, J., & van den Kommer, T. (2004). Cognitive emotion regulation strategies and depressive symptoms: Differences between males and females. *Personality and Individual Differences*, *36*(2), 267–276.

Gohm, C. L. (2003). Mood regulation and emotional intelligence: Individual differences. *Journal of Personality and Social Psychology*, *84*(3), 594.

Goldin, P. R., Manber, T., Hakimi, S., Canli, T., & Gross, J. J. (2009). Neural bases of social anxiety disorder: Emotional reactivity and cognitive regulation during social and physical threat. *Archives of General Psychiatry*, *66*(2), 170–180.

Goldin, P. R., McRae, K., Ramel, W., & Gross, J. J. (2008). The neural bases of emotion regulation: Reappraisal and suppression of negative emotion. *Biological Psychiatry*, *63*(6), 577–586.

Gross, J. J. (1998a). Antecedent-and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, *74*(1), 224.

Gross, J. J. (1998b). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, *2*(3), 271.

Gross, J. J. (1999). Emotion regulation: Past, present, future. *Cognition & Emotion*, *13*(5), 551–573.

Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*, *39*(3), 281–291.

Gross, J. J. (2015). Emotion regulation: Current status and future prospects. *Psychological Inquiry*, *26*(1), 1–26.

Gross, J. J., & Feldman Barrett, L. (2011). Emotion generation and emotion regulation: One or two depends on your point of view. *Emotion Review*, *3*(1), 8–16.

Gross, J. J., & Thompson, R. A. (2006). Emotion regulation: Conceptual foundations. In J.J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3–26). New York, NY: The Guilford Press.

Gupta, S., & Bonanno, G. A. (2011). Complicated grief and deficits in emotional expressive flexibility. *Journal of Abnormal Psychology*, *120*(3), 635.

Gyurak, A., Gross, J. J., & Etkin, A. (2011). Explicit and implicit emotion regulation: A dual-process framework. *Cognition and Emotion*, *25*(3), 400–412.

Hare, T. A., Tottenham, N., Galvan, A., Voss, H. U., Glover, G. H., & Casey, B. J. (2008). Biological substrates of emotional reactivity and regulation in adolescence during an emotional go-nogo task. *Biological Psychiatry*, *63*(10), 927–934.

Hakamata, Y., Lissek, S., Bar-Haim, Y., Britton, J. C., Fox, N. A., Leibenluft, E., … Pine, D. S. (2010). Attention bias modification treatment: A meta-analysis toward the establishment of novel treatment for anxiety. *Biological Psychiatry*, *68*(11), 982–990.

Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin*, *110*(1), 86.

Heeren, A., Mogoaşe, C., Philippot, P., & McNally, R. J. (2015). Attention bias modification for social anxiety: A systematic review and meta-analysis. *Clinical Psychology Review*, *40*, 76–90.

Heim, C., & Nemeroff, C. B. (2001). The role of childhood trauma in the neurobiology of mood and anxiety disorders: Preclinical and clinical studies. *Biological Psychiatry*, *49*(12), 1023–1039.

Hilt, L., & Nolen-Hoeksema, S. (2009). The emergence of gender differences in depression in adolescence. In S. Nolen- Hoeksema & L. M. Hilt (Eds.), *Handbook of Depression in Adolescents*, (pp. 111–135). New York, NY: Routledge.

Hyde, J. S., Mezulis, A. H., & Abramson, L. Y. (2008). The ABCs of depression: Integrating affective, biological, and cognitive models to explain the emergence of the gender difference in depression. *Psychological Review*, *115*(2), 291.

Jackson, D. C., Mueller, C. J., Dolski, I., Dalton, K. M., Nitschke, J. B., Urry, H. L., … Davidson, R. J. (2003). Now you feel it, now you don't: Frontal brain electrical asymmetry and individual differences in emotion regulation. *Psychological Science*, *14*(6), 612–617.

Jamner, L., Schwartz, G., & Leigh, H. (1988). Repressive coping predicts monocyte, eosinophile and serum glucose levels: Support for the opioid-peptide hypothesis. *Psychosomatic Medicine*, *50*, 567–577.

Johnson, J. L., & Repta, R. (2012). Sex and gender: Beyond binaries. In Oliffe, J.L., Greaves, L. (Eds.), *Designing and conducting gender, sex, and health research* (pp. 17–37). Thousand Oaks, CA: Sage.

Joseph, D. L., & Newman, D. A. (2010). *Emotional intelligence: An integrative meta-analysis and cascading model*, Washington, DC: American Psychological Association.

Kashdan, T. B., Barrios, V., Forsyth, J. P., & Steger, M. F. (2006). Experiential avoidance as a generalized psychological vulnerability: Comparisons with coping and emotion regulation strategies. *Behaviour Research and Therapy*, *44*(9), 1301–1320.

Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review*, *30*(7), 865–878.

Keltner, D., Ellsworth, P. C., & Edwards, K. (1993). Beyond simple pessimism: Effects of sadness and anger on social perception. *Journal of Personality and Social Psychology*, *64*(5), 740.

Kessler, R. C., Amminger, G. P., Aguilar-Gaxiola, S., Alonso, J., Lee, S., & Ustun, T. B. (2007). Age of onset of mental disorders: A review of recent literature. *Current Opinion in Psychiatry*, *20*(4), 359.

Keyes, K. M., Grant, B. F., & Hasin, D. S. (2008). Evidence for a closing gender gap in alcohol use, abuse, and dependence in the United States population. *Drug and Alcohol Dependence*, *93*(1), 21–29.

Khantzian, E. (1985). Psychotherapeutic interventions with substance abusers—The clinical context. *Journal of Substance Abuse Treatment*, *2*(2), 83–88.

Kim, P., Evans, G. W., Angstadt, M., Ho, S. S., Sripada, C. S., Swain, J. E., … Phan, K. L. (2013). Effects of childhood poverty and chronic stress on emotion regulatory brain

function in adulthood. *Proceedings of the National Academy of Sciences*, *110*(46), 18442–18447.

Koole, S. L., & Coenen, L. H. (2007). Implicit self and affect regulation: Effects of action orientation and subliminal self priming in an affective priming task. *Self and Identity*, *6*(2–3), 118–136.

Kramer, M. D., Krueger, R. F., & Hicks, B. M. (2008). The role of internalizing and externalizing liability factors in accounting for gender differences in the prevalence of common psychopathological syndromes. *Psychological Medicine*, *38*(1), 51–61.

Kring, A. M., & Werner, K. H. (2004). Emotion regulation and psychopathology. In P. Philippot & R. S. Feldman (Eds.), *The Regulation of Emotion* (pp. 359–385). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Kumar, N., Gross, J. B., & Ahlskog, J. E. (2004). Copper deficiency myelopathy produces a clinical picture like subacute combined degeneration. *Neurology*, *63*(1), 33–39.

Lam, C. B., & McBride-Chang, C. A. (2007). Resilience in young adulthood: The moderating influences of gender-related personality traits and coping flexibility. *Sex Roles*, *56*(3–4), 159–172.

Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.

Lazarus, R. S., & Folkman, S. (1984). Coping and adaptation. In W. D. Gentry (Ed.), *The handbook of behavioral medicine* (pp. 282–325). New York: Guilford.

Lazarus, R. S., & Lazarus, B. N. (1996). *Passion and reason: Making sense of our emotions*: New York, NY: Oxford University Press.

Lerner, M. J. (1997). What does the belief in a just world protect us from: The dread of death or the fear of understanding suffering? *Psychological Inquiry*, *8*(1), 29–32.

Leadbeater, B. J., Kuperminc, G. P., Blatt, S. J., & Hertzog, C. (1999). A multivariate model of gender differences in adolescents' internalizing and externalizing problems. *Developmental Psychology*, *35*(5), 1268–1282.

Lougheed, J. P., & Hollenstein, T. (2012). A limited repertoire of emotion regulation strategies is associated with internalizing problems in adolescence. *Social Development*, *21*(4), 704–721.

Luce, K. H., Engler, P. A., & Crowther, J. H. (2007). Eating disorders and alcohol use: Group differences in consumption rates and drinking motives. *Eating Behaviors*, *8*(2), 177–184.

Mansell, W., Clark, D. M., Ehlers, A., & Chen, Y.-P. (1999). Social anxiety and attention away from emotional faces. *Cognition & Emotion*, *13*(6), 673–690.

Mathews, A., & MacLeod, C. (2005). Cognitive vulnerability to emotional disorders. *Annual Review of Clinical Psychology*, *1*, 167–195.

Mauss, I. B., Bunge, S. A., & Gross, J. J. (2007). Automatic emotion regulation. *Social and Personality Psychology Compass*, *1*(1), 146–167.

Mauss, I. B., Cook, C. L., Cheng, J. Y., & Gross, J. J. (2007). Individual differences in cognitive reappraisal: Experiential and physiological responses to an anger provocation. *International Journal of Psychophysiology*, *66*(2), 116–124.

Mauss, I. B., Evers, C., Wilhelm, F. H., & Gross, J. J. (2006). How to bite your tongue without blowing your top: Implicit evaluation of emotion regulation predicts affective responding to anger provocation. *Personality and Social Psychology Bulletin*, *32*(5), 589–602.

McEwen, B. S. (2000). Allostasis and allostatic load: Implications for neuropsychopharmacology. *Neuropsychopharmacology*, *22*(2), 108–124.

McEwen, B. S., & Seeman, T. (1999). Protective and damaging effects of mediators of stress: Elaborating and testing the concepts of allostasis and allostatic load. *Annals of the New York Academy of Sciences*, *896*(1), 30–47.

McEwen, B. S., & Stellar, E. (1993). Stress and the individual: Mechanisms leading to disease. *Archives of Internal Medicine*, *153*(18), 2093–2101.

McEwen, B. S., & Wingfield, J. C. (2003). The concept of allostasis in biology and biomedicine. *Hormones and Behavior*, *43*(1), 2–15.

McLean, C. P., & Anderson, E. R. (2009). Brave men and timid women? A review of the gender differences in fear and anxiety. *Clinical Psychology Review*, *29*(6), 496–505.

McLean, L. M., & Gallop, R. (2003). Implications of childhood sexual abuse for adult borderline personality disorder and complex posttraumatic stress disorder. *American Journal of Psychiatry*, *160*(2), 369–371. doi:10.1176/appi.ajp.160.2.369

McNally, R. J. (1995). Automaticity and the anxiety disorders. *Behaviour Research and Therapy*, *33*(7), 747–754.

McRae, K., Ochsner, K. N., Mauss, I. B., Gabrieli, J. J., & Gross, J. J. (2008). Gender differences in emotion regulation: An fMRI study of cognitive reappraisal. *Group Processes & Intergroup Relations*, *11*(2), 143–162.

Mendl, M. (1999). Performing under pressure: Stress and cognitive function. *Applied Animal Behaviour Science*, *65*(3), 221–244.

Mikulincer, M., Birnbaum, G., Woddis, D., & Nachmias, O. (2000). Stress and accessibility of proximity-related thoughts: Exploring the normative and intraindividual components of attachment theory. *Journal of Personality and Social Psychology*, *78*(3), 509.

Mogg, K., Mathews, A., & Eysenck, M. (1992). Attentional bias to threat in clinical anxiety states. *Cognition & Emotion*, *6*(2), 149–159.

Moore, S. A., Zoellner, L. A., & Mollenholt, N. (2008). Are expressive suppression and cognitive reappraisal associated with stress-related symptoms? *Behaviour Research and Therapy*, *46*(9), 993–1000.

Myruski, S., Bonanno, G. A., Gulyayeva, O., Egan, L. J., & Dennis-Tiwary, T. A. (2017). Neurocognitive assessment of emotional context sensitivity. *Cognitive, Affective, & Behavioral Neuroscience*, *17*(5), 1058–1071.

Nolen-Hoeksema, S. (2012). Emotion regulation and psychopathology: The role of gender. *Annual Review of Clinical Psychology*, *8*, 161–187.

Nolen-Hoeksema, S., & Aldao, A. (2011). Gender and age differences in emotion regulation strategies and their relationship to depressive symptoms. *Personality and Individual Differences*, *51*(6), 704–708.

Nolen-Hoeksema, S., & Harrell, Z. A. (2002). Rumination, depression, and alcohol use: Tests of gender differences. *Journal of Cognitive Psychotherapy*, *16*(4), 391–403.

Ochsner, K. N., & Gross, J. J. (2008). Cognitive emotion regulation: Insights from social cognitive and affective neuroscience. *Current Directions in Psychological Science*, *17*(2), 153–158.

Orcutt, H. K., Bonanno, G. A., Hannan, S. M., & Miron, L. R. (2014). Prospective trajectories of posttraumatic stress in college women following a campus mass shooting. *Journal of Traumatic Stress*, *27*(3), 249–256.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin*, *129*(1), 52.

Parks-Stamm, E. J., Oettingen, G., & Gollwitzer, P. M. (2010). Making sense of one's actions in an explanatory vacuum: The interpretation of nonconscious goal striving. *Journal of Experimental Social Psychology*, *46*(3), 531–542.

Pawlow, L. A., & Jones, G. E. (2002). The impact of abbreviated progressive muscle relaxation on salivary cortisol. *Biological Psychology*, *60*(1), 1–16.

Porges, S. W. (1995). Cardiac vagal tone: A physiological index of stress. *Neuroscience & Biobehavioral Reviews*, *19*(2), 225–233.

Porges, S. W. (2007). The polyvagal perspective. *Biological Psychology*, *74*(2), 116–143.

Pynoos, R. S., Steinberg, A. M., & Piacentini, J. C. (1999). A developmental psychopathology model of childhood traumatic stress and intersection with anxiety disorders. *Biological Psychiatry*, *46*(11), 1542–1554.

Rausch, S. M., Gramling, S. E., & Auerbach, S. M. (2006). Effects of a single session of large-group meditation and progressive muscle relaxation training on stress reduction, reactivity, and recovery. *International Journal of Stress Management*, *13*(3), 273.

Salum, G. A., Mogg, K., Bradley, B. P., Stringaris, A., Gadelha, A., Pan, P. M., … Pine, D. S. (2017). Association between irritability and bias in attention orienting to threat in children and adolescents. *Journal of Child Psychology and Psychiatry*, *58*(5), 595–602.

Sarason, B. R., Sarason, I. G., & Pierce, G. R. (1990). *Social support: An interactional view*. Hoboken, NJ: John Wiley & Sons.

Sayette, M. A. (1993). An appraisal-disruption model of alcohol's effects on stress responses in social drinkers. *Psychological Bulletin*, *114*(3), 459.

Schwartz, G. E., & Kline, J. P. (1995). Repression, emotional disclosure, and health: Theoretical, empirical, and clinical considerations. In J. W. Pennebaker (Ed.), *Emotion, disclosure, & health* (pp. 177–193). Washington, DC, US: American Psychological Association.

Shalev, A. Y. (1996). Stress versus traumatic stress: From acute homeostatic reactions to chronic psychopathology. In B. A. van der Kolk, A. C. McFarlane, & L. Weisaeth (Eds.), *Traumatic stress: The effects of overwhelming experience on mind, body, and society* (pp. 77–101). New York, NY, US: Guilford Press.

Sheppes, G., Catran, E., & Meiran, N. (2009). Reappraisal (but not distraction) is going to make you sweat: Physiological evidence for self-control effort. *International Journal of Psychophysiology*, *71*(2), 91–96.

Sheppes, G., & Gross, J. J. (2012). Emotion regulation effectiveness: What works when. *Handbook of Psychology*, 391–406.

Sheppes, G., & Meiran, N. (2007). Better late than never? On the dynamics of online regulation of sadness using distraction and cognitive reappraisal. *Personality and Social Psychology Bulletin*, *33*(11), 1518–1532.

Sheppes, G., & Meiran, N. (2008). Divergent cognitive costs for online forms of reappraisal and distraction. *Emotion*, *8*(6), 870.

Sheppes, G., Scheibe, S., Suri, G., & Gross, J. J. (2011). Emotion-regulation choice. *Psychological Science*, *22*(11), 1391–1396.

Sheppes, G., Scheibe, S., Suri, G., Radu, P., Blechert, J., & Gross, J. J. (2014). Emotion regulation choice: A conceptual framework and supporting evidence. *Journal of Experimental Psychology: General*, *143*(1), 163.

Sher, K. J., & Grekin, E. R. (2007). Alcohol and affect regulation. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 560–580). New York, NY, US: Guilford Press.

Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behavior. *Child Development*, *74*(6), 1869–1880.

Sloman, S. A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin*, *119*(1), 3.

Southwick, S. M., Bonanno, G. A., Masten, A. S., Panter-Brick, C., & Yehuda, R. (2014). Resilience definitions, theory, and challenges: Interdisciplinary perspectives. *European Journal of Psychotraumatology*, *5*(1), 25338.

Southwick, S. M., & Charney, D. S. (2012). The science of resilience: Implications for the prevention and treatment of depression. *Science*, *338*(6103), 79–82.

Sprague, J., Verona, E., Kalkhoff, W., & Kilmer, A. (2011). Moderators and mediators of the stress-aggression relationship: Executive function and state anger. *Emotion*, *11*(1), 61.

Sterling, P., & Eyer, J. (1988). Allostasis: A new paradigm to explain arousal pathology. In K. Fisher and J. Reason (Eds.), *Handbook of life stress, cognition and health* (pp. 629–649). New York, NY: Wiley.

Stiglmayr, C., Ebner-Priemer, U., Bretz, J., Behm, R., Mohse, M., Lammers, C. H., … Kleindienst, N. (2008). Dissociative symptoms are positively related to stress in borderline personality disorder. *Acta Psychiatrica Scandinavica*, *117*(2), 139–147.

Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, *8*(3), 220–247.

Stroebe, M., & Schut, H. (2010). The dual process model of coping with bereavement: A decade on. *OMEGA-Journal of Death and Dying*, *61*(4), 273–289.

Tamres, L. K., Janicki, D., & Helgeson, V. S. (2002). Sex differences in coping behavior: A meta-analytic review and an examination of relative coping. *Personality and Social Psychology Review*, *6*(1), 2–30.

Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development*, *59*(2–3), 25–52.

Thompson, R. A., & Calkins, S. D. (1996). The double-edged sword: Emotional regulation for children at risk. *Development and Psychopathology*, *8*(1), 163–182.

Thompson, R. A., Lewis, M. D., & Calkins, S. D. (2008). Reassessing emotion regulation. *Child Development Perspectives*, *2*(3), 124–131.

Todd, A. R., & Galinsky, A. D. (2012). The reciprocal link between multiculturalism and perspective-taking: How ideological and self-regulatory approaches to managing diversity reinforce each other. *Journal of Experimental Social Psychology*, *48*(6), 1394–1398.

Tomarkenand, A. J., & Keener, A. D. (1998). Frontal brain asymmetry and depression: A self-regulatory perspective. *Cognition & Emotion*, *12*(3), 387–420.

Troy, A. S., & Mauss, I. B. (2011). Resilience in the face of stress: Emotion regulation as a protective factor. *Resilience and Mental Health: Challenges Across the Lifespan*, *1*(2), 30–44.

Wager, T. D., Davidson, M. L., Hughes, B. L., Lindquist, M. A., & Ochsner, K. N. (2008). Prefrontal-subcortical pathways mediating successful emotion regulation. *Neuron*, *59*(6), 1037–1050.

Webb, T. L., Miles, E., & Sheeran, P. (2012). Dealing with feeling: a meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. *Psychological Bulletin*, *138*(4), 775–808.

Webb, T. L., Ononaiye, M. S., Sheeran, P., Reidy, J. G., & Lavda, A. (2010). Using implementation intentions to overcome the effects of social anxiety on attention and appraisals of performance. *Personality and Social Psychology Bulletin*, *36*(5), 612–627.

Webb, T. L., & Sheeran, P. (2003). Can implementation intentions help to overcome ego-depletion? *Journal of Experimental Social Psychology*, *39*(3), 279–286.

Weinberger, D. A. (1998). Defenses, personality structure, and development: Integrating psychodynamic theory into a typological approach to personality. *Journal of Personality*, *66*(6), 1061–1080.

Williams, L. E., Bargh, J. A., Nocera, C. C., & Gray, J. R. (2009). The unconscious regulation of emotion: Nonconscious reappraisal goals modulate emotional reactivity. *Emotion*, *9*(6), 847.

Worthington, E. L., & Scherer, M. (2004). Forgiveness is an emotion-focused coping strategy that can reduce health risks and promote health resilience: Theory, review, and hypotheses. *Psychology & Health*, *19*(3), 385–405.

Wurtman, R. J. (2005). Genes, stress, and depression. *Metabolism*, *54*(5), 16–19.

Yuan, J., Ding, N., Liu, Y., & Yang, J. (2015). Unconscious emotion regulation: Nonconscious reappraisal decreases emotion-related physiological reactivity during frustration. *Cognition and Emotion*, *29*(6), 1042–1053.

Zahn-Waxler, C., Shirtcliff, E. A., & Marceau, K. (2008). Disorders of childhood and adolescence: Gender and psychopathology. *Annual Review of Clinical Psychology*, *4*, 275–303.

Zaki, J., & Williams, W. C. (2013). Interpersonal emotion regulation. *Emotion*, *13*(5), 803.

Zlomke, K. R., & Hahn, K. S. (2010). Cognitive emotion regulation strategies: Gender differences and associations to worry. *Personality and Individual Differences*, *48*(4), 408–413.

Zvielli, A., Bernstein, A., & Koster, E. H. (2015). Temporal dynamics of attentional bias. *Clinical Psychological Science*, *3*(5), 772–788.

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