

Emotion Regulation

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Abstract

Emotion regulation refers to the processes by which we influence which emotions we have, when we have them, how we experience them, and how we express them. The study of emotion regulation has become an increasingly popular and fruitful area of research in the past few decades. In the following chapter, we summarize past research, highlight current findings, and suggest some potential future directions for the study of emotion regulation. We review foundational research highlighting the process model of emotion regulation and research comparing distinct emotion regulation strategies such as reappraisal and suppression. Then, we highlight new conceptualizations of emotion regulation that question the assumption that emotion regulation is inherently adaptive, that examine the effect of culture on emotion regulation, examine the contexts that lead to successful emotion regulation towards a variety of emotion goals. Finally we discuss promising future directions for the study of emotion regulation.

INTRODUCTION

Emotions often play helpful roles in our everyday lives by quickly and efficiently guiding our behavior. However, emotions can also mislead us, or overwhelm us, turning their helpful, adaptive functions into harmful, maladaptive dysfunctions. At such times, it is important to regulate, or change, our emotions. For the present purpose, we define an emotion as a coordinated set of changes in experience, behavior, and peripheral physiology occasioned by an evaluation, or appraisal (Mulligan & Scherer, 2012).

Emotion regulation refers to the processes by which we influence which emotions we have, when we have them, and how we experience them and express them (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Gross, 1998b, 2013). While our emotions can be regulated by others or by ourselves, for our purposes, we will focus on the processes through which an individual changes the latency, magnitude, or duration of his or her own emotion in behavioral, experiential, or physiological domains (Gross, 2002). Previous research has also demonstrated that emotion regulation can change dramatically throughout development (Silvers *et al.*, 2012); therefore, for our purposes, we will focus on adult emotion regulation to allow for a consistent discussion of the

most commonly investigated forms of emotion regulation.

We begin by reviewing foundational concepts and findings. Next, we review research that is propelling the field toward a thorough understanding of the costs and benefits of specific emotion regulation strategies, how the goal of emotion regulation need not be hedonic, and how broadening beyond the investigation of explicit emotion regulation is providing a more expansive view of the field by including other types of regulation. We then discuss our predictions as to where the field of emotion regulation will be in the future, and review the challenges that we face in this field.

FOUNDATIONAL CONCEPTS AND FINDINGS

COPING

The notion that one can regulate one's emotions in several distinct ways was first explored in the context of stress and coping. This work introduced the idea that an emotion is not merely a passive response to an encounter with a stimulus or situation, but rather a combination of a response and how one chooses to deal with that response (Lazarus, Averill, & Opton, 1970; Lazarus, Kanner, & Folkman, 1980). Further research built upon such findings by creating a taxonomy to categorize coping strategies and by identifying which strategies are relatively more or less helpful (Baum, Fleming, & Singer, 1983; Folkman & Lazarus, 1985). These efforts set the stage for subsequent theories of emotion regulation and helped guide the first inquiries into the differences among emotion regulation strategies.

THE PROCESS MODEL OF EMOTION REGULATION

Another important advance in the field of emotion regulation occurred with the establishment of the process model of emotion regulation (Gross, 1998b, 2014). According to the process model, emotion may be regulated at five distinct points as an emotional response unfolds: (i) when deciding which potentially emotional situations to approach or avoid (situation selection); (ii) when changing aspects of one's current situation in order to influence one's emotions (situation modification); (iii) when directing attention toward or away from various potentially emotional stimuli (attentional deployment); (iv) when evaluating emotional stimuli or situations so as to change one's emotional response to a particular situation (cognitive change); and (v) when modifying experiential, physiological, or behavioral responses directly (response modulation; Gross, 1998b).

More concretely, situation selection allows an individual to opt in or out of a situation that he or she anticipates would cause a particular emotion. For

example, if one is scared of the dentist, one might avoid making an appointment despite a toothache. Situation modification allows that individual to modify a situation to regulate one's emotional response. In this case, one might select a dentist adept at handling fearful patients. Attentional deployment allows the individual to select which aspects of the situation he or she is focusing on, some of which may be more or less emotionally evocative than others. One commonly used form of attentional deployment is distraction, which involves directing attention away from emotional aspects of a stimulus or situation. Using this strategy, the fearful patient could focus on the soothing music playing in the dentist's office or on the picture of the smiling people above the chair. Cognitive change refers to altering the thoughts that lead to an emotion. One commonly used form of cognitive change is cognitive reappraisal, which involves reevaluating the meaning of an emotional event in a way that changes the subsequent emotion. In the dentist example, the patient could use cognitive reappraisal to tell oneself that the procedure is for the best in the long term and that they will feel much healthier after the visit. Finally, response modulation refers to attempts to directly influence emotional responses once they are fully elicited. One commonly used form of response modulation is expressive suppression, which involves trying to prevent any facial or bodily expressions of emotion. In this case, the upset patient could suppress one's urge to cringe or shudder when faced with the dentist's tools.

COMPARING EMOTION REGULATION STRATEGIES

Subsequent research on emotion regulation largely has focused on comparing the properties of these strategies—most commonly, distraction (a form of attention deployment), reappraisal (a form of cognitive change), and suppression (a form of response modulation; Gross & Levenson, 1997; McRae *et al.*, 2010; Ochsner, Silvers, & Buhle, 2012). The majority of these studies have examined the immediate effects of explicitly cued emotion regulation; that is, these studies have examined what happens when participants in laboratory studies are instructed to use one or another form of emotion regulation.

Studies examining distraction have revealed that reallocating attention to the less distressing aspects of an emotional stimulus—or to another stimulus all together—does decrease the intensity of the emotion (Craske, Street, Jayaraman, & Barlow, 1991; Thiruchselvam, Hajcak, & Gross, 2012; Urry, 2010). Reappraisal, or reinterpreting the meaning of the emotional stimulus to decrease its impact, has also been repeatedly shown to decrease the intensity of unwanted emotions, even more so than distraction (Gross, 1998a,

2014; McRae *et al.*, 2010; Ochsner *et al.*, 2004; Ray *et al.*, 2005). Finally, expressive suppression has been shown to decrease the experience of positive emotion, but not negative emotion, and to have paradoxical effects on emotion intensity such that bodily responding, as measured by the sympathetic nervous system, increases (Gross, 1998a; Gross & Levenson, 1997).

As a supplement to these experimental effects, correlational studies of self-reported reappraisal use have positive relationships with adaptive, healthy outcomes such as well-being and positive affect, while self-reported use of suppression is associated with less adaptive, unhealthy outcomes, such as depressive symptoms and negative affect (Gross & John, 2003). Therefore, reviews and meta-analyses of these findings typically conclude that reappraisal should be considered a relatively adaptive strategy, followed by distraction, and finally suppression (Gross, 2014; Webb, Miles, & Sheeran, 2012).

CURRENT CONCEPTUALIZATIONS OF EMOTION REGULATION

As we have seen, foundational work has identified the adaptive value of some emotion regulation strategies (such as reappraisal) as greater than others (such as distraction or suppression). However, this early work did not address factors that moderate the helpfulness of any given strategy. In addition, much of this work was focused on the goal of decreasing a negative emotional response. Finally, the vast majority of these studies investigated the use of a conscious, explicit instruction to regulate. In recent years, research on emotion regulation has expanded, revealing emotion regulation to be influenced by changes in context, not always increasing-positive or decreasing negative emotion, and inclusive of processes that are not necessarily under conscious control.

EMOTION REGULATION STRATEGIES ARE NOT INHERENTLY ADAPTIVE OR MALADAPTIVE

While foundational research established certain emotion regulation strategies as generally more adaptive, or helpful, than others (for a review, see Webb *et al.*, 2012), recent research has demonstrated that any one emotion regulation strategy is not inherently adaptive or maladaptive. The adaptive value of using any strategy is defined by two measures. The first measure is how well someone succeeds in changing his or her emotions in a particular context. The second one has to do with the consequences of emotion regulation. Different strategies often have side effects, impacting the cognitive or social functioning of the person regulating, which may also be different in different situations, or contexts.

Recent work has shown that both the success and the consequences of many strategies are very different in different contexts, or change when the properties of the emotion to be regulated are changed, and that this is different for different regulatory processes. As an example of the trade-off between emotion regulation goals and consequences, suppression is known to have surprising effects on negative emotion, such that attempting to suppress the expression of a negative emotion leads to increases in bodily signals that correspond to negative emotion (Butler *et al.*, 2003; Goldin, McRae, Ramel, & Gross, 2008; Gross, 1998a, 1998b). Thus, when the goal is to decrease the intensity of your negative emotion (e.g., when trying not to display anguish when going through a painful medical procedure), expressive suppression is typically an unhelpful choice. However, if you are in a strict social situation that requires expressive suppression (e.g., suppressing a laugh at a funeral) the social benefits of expressive suppression could outweigh the internal costs of an increase in autonomic activation and emotional intensity.

Effects of Cultural Context. Understanding the conditions in which a given emotion regulation strategy should be considered adaptive or maladaptive has been a central focus of recent research. One example of this work has begun to explore the impact of cultural context on the consequences of suppression. For example, the increased bodily responding associated with suppression is not as strong in individuals who hold Asian values (Mauss & Butler, 2010). Furthermore, studies have demonstrated that an individual who subscribes to an Asian value system will suffer fewer or none of the negative social consequences of suppression as compared to individuals who hold an European-American value system (Butler, Lee, & Gross, 2007).

Effects of timing. In addition to focusing on the consequences of emotion regulation, recent research has also examined when a given strategy will be most successful in achieving its emotional goal. Reappraisal, for example, is most successful when it is enacted early on as an emotion unfolds. If started too late, the strategy can be fairly ineffective, possibly because it becomes more difficult to manipulate your thoughts about what caused your emotion after a negative response is already underway (Goldin *et al.*, 2008; Sheppes & Gross, 2011). For example, if one receives a negative evaluation at work, telling oneself that this is an opportunity for growth (reappraisal) might assist in decreasing feelings of sadness or frustration early in the emotion generation process. On the other hand, distraction might result in more successful down-regulation of negative emotion later in the emotion generation process (Dan-Glauser & Gross, 2011; Sheppes & Meiran, 2008).

In the negative work evaluation example, after one is feeling full blown sadness or anger, reframing might seem futile and unrealistic; in this case, distraction might be more helpful.

Effects of emotion. Finally, how successfully an emotion is regulated may depend on specific properties of the emotion to be regulated. For example, reappraisal is more successful than distraction when used on low-intensity emotions, like mild irritation, but distraction is more successful than reappraisal when used on high-intensity emotions, like extreme anger (Sheppes & Gross, 2011). This finding speaks to the common practice of telling oneself that the blood in a gory movie is “just ketchup” (reappraisal of a low intensity emotion), but looking away when a terrifying beast appears on the screen (distraction during a high intensity emotion). In addition, there is evidence that reappraisal is more successful when used on negative emotions that are elicited conceptually, with stories, from the top-down, compared with those that are elicited perceptually, with pictures, from the bottom-up (McRae, Misra, Prasad, Pereira, & Gross, 2012). Specifically, when emotions are generated using perceptual stimuli such as pictures of emotional faces, cognitive reappraisal is less effective than when emotions are generated using conceptual stimuli such as a brief vignette describing a terrible situation.

EMOTION REGULATION GOALS ARE NOT ALWAYS HEDONIC

One great appeal of research on emotion regulation is that it can provide insights that might be helpful to those with mood and anxiety disorders. By and large, these disorders are often characterized by a surplus of negative affect and/or a paucity of positive affect (*Diagnostic and Statistical Manual of Mental Disorders*, 2000). Therefore, many laboratory studies of emotion regulation focus on emotion regulation when it is used to pursue hedonic goals—to decrease negative affect and/or increase positive affect. While understanding these processes is important, recent work has highlighted the fact that in everyday life, we sometimes pursue emotional goals that are not entirely hedonic, in that they do not minimize negativity or maximize positivity.

A burgeoning area of research is that on instrumental emotion regulation, which explores how strategies are used to up- or down-regulate an emotion for a specific purpose and what adaptive emotion regulation means in this new context (Hackenbracht & Tamir, 2010; Tamir, Mitchell, & Gross, 2008). This research demonstrates that while individuals often select hedonic regulation goals, they will also sometimes choose nonhedonic regulation

goals. For example, individuals may choose to increase the unpleasant emotion of anger when preparing for a confrontation or evoke sadness when seeking help (Ford & Tamir, 2012; Hackenbracht & Tamir, 2010; Tamir *et al.*, 2008). Examining instances in which emotion regulation is used to achieve nonhedonic goals has led to findings that suggest that different emotional goals can lead to emotion-congruent memory biases during later recall of appraisals (Holland, Tamir, & Kensinger, 2010) and that seeking nonhedonic goals may be more effortful than seeking their hedonic counterparts (e.g., trying to make oneself sad is harder than trying to make oneself happy) (Riediger, Wrzus, Schmiedek, Wagner, & Lindenberger, 2011).

MOVING BEYOND EXPLICIT EMOTION REGULATION

Many important instances of emotion regulation are explicit, conscious, and effortful in that individuals are aware that they are trying to change their emotions. However, there are also instances of emotion regulation that are less clearly a deliberate modification of an emotional experience. For example, there has been an increasing amount of attention paid to implicit emotion regulation.

Implicit emotion regulation includes process such as affective labeling (e.g., indicating whether someone is expressing sadness or anger), emotional conflict adaptation (i.e., more successful regulation after an instance in which you have just regulated another emotional response), habitual emotion regulation (e.g., one's automatic regulation of a reaction to an emotional event), and priming of emotion regulatory goals and evaluations (e.g., subtly imbedding the goal of changing how you feel about something by changing the way you think about it to encourage reappraisal) (Gyurak, Gross, & Etkin, 2011). Engaging in these types of regulation typically involves less effort than explicit emotion regulation, and each type can occur with varying degrees of conscious control. While they all conceptually fall under the umbrella of implicit emotion regulation, how each type of regulation changes an emotion may be distinct. Affective labeling, or naming the emotion present in an emotional stimulus, is often a deliberate process but is considered incidental in that it does not involve a deliberate attempt to change one's emotional response (Lieberman *et al.*, 2007). Similarly, emotional conflict adaptation, or the incidental regulation that arises immediately after control processes have been activated is also not deliberate in nature, and recent research reveals that the mechanisms through which each type of implicit regulation modulates a response are distinct (Etkin & Schatzberg, 2011). The relative automaticity of each implicit regulation strategy affords an opportunity to achieve the

results of emotion regulation without many of the cognitive costs, making this an area of research that is attracting growing attention.

In addition to examining implicit emotion regulation, subfields examining other types of self-control, or self-regulation, have begun to see how their areas of focus relate to emotion and emotion regulation. For example, recent research has demonstrated that positive affect can reenergize individuals after they have exerted effort during a self-regulation task (Ren, Hu, Zhang, & Huang, 2010). Traditional models of self-regulation have also historically spoken about the negative subjective experiences associated with depleted self-regulation resources (i.e., the fatigue or inability to complete a second regulation task after completing a first) (Baumeister, Muraven, & Tice, 2000) but only recently have studies begun to examine how modifying that emotional response can influence depleted self-regulation resources. In one case, self-affirmations (e.g., I am strong) replenished depleted self-regulation resources (Schmeichel & Vohs, 2009) and while self-affirmation may not be a distinct emotion regulation strategy as defined by traditional models, it is easy to see how developing and repeating positive self-statements could fall under the category of reappraisal. Such findings subtly suggest that self-regulation and emotion-regulation can be viewed as similar and complimentary processes, and theoretical discussions of the overlap between these two important fields have begun to emerge (Holodynski, Seeger, Kortas-Hartmann, & Wörmann, 2013).

FUTURE DIRECTIONS OF EMOTION REGULATION RESEARCH

Recent research has set the stage to begin answering some complex but essential questions about the adaptiveness of emotion regulation, the importance of nonhedonic emotion regulation, and how a broader definition of emotion regulation—to include implicit emotion regulation and other regulatory processes—relates to foundational work on emotion regulation. In the following section, we outline ways in which we predict each subarea of emotion regulation research will grow, and how this growth will contribute to our basic understanding of emotion regulation and its applications.

UNDERSTANDING ADAPTIVE AND MALADAPTIVE EMOTION REGULATION

Flexible matching of strategy to context, timing, and emotion. We predict that future research will extend the work being done on the dynamic helpfulness or unhelpfulness of specific emotion regulation strategies given the context, the individual, and the properties of the regulated emotion. This work can also be extended to understand the precise mechanisms through which variation in all three of these impact emotion regulations. For example, while

previous research has established that suppression holds more negative social consequences for individuals holding European values as compared to those holding Asian values (Mauss, Butler, Roberts, & Chu, 2010), why this discrepancy occurs is less understood. Are the negative social consequences suffered by individuals holding European values purely the result of violated cultural norms (e.g., you should be emotionally responsive to what I'm saying) or does the act of suppression lead to other cognitive or social deficits in European-value individuals (e.g., such as memory inhibition or lack of empathy in the suppressor) that others in the social group pick up on and dislike?

In addition to cultural context, recent research has demonstrated that across contexts (e.g., academic vs. social situations, emotional intensity, and type of emotion) what most predicts mental health is the flexible use of adaptive emotion regulation strategies (Aldao & Nolen-Hoeksema, 2012). Understanding why some people are able to enact emotion regulation strategies more flexibly than others could lead to important interventions to assist those who currently do not benefit from emotion regulation. Future research will be required to uncover the precise mechanisms that lead to contextual changes in the consequences of emotion regulation, which will result in a more precisely defined landscape of when the use of different strategies is relatively adaptive and maladaptive.

When successful emotion regulation is maladaptive. While recent research has begun to outline the conditions under which reappraisal is more or less successful, future research might begin to explore instances when even highly successful reappraisal may not be the most adaptive regulation choice. In other words, are there times when successful emotion regulation and adaptive action represent two competing goals? For example, are there contexts in which the ability to successfully down-regulate negative emotion might cause peers to resent the regulator, or view him or her as less authentic or genuine, or as an out-group member? Examination of this unique type of context, one in which service of a regulatory goal runs counter to larger goals, would provide another defining feature when considering when, whether, and how to regulate emotion.

Managing the cognitive demands of emotion regulation. In addition to social costs, recent research has provided evidence of the cognitive costs of emotion regulation (Burns & Friedman, 2012; Jamieson, Mendes, Blackstock, & Schmader, 2010). Just as helpful emotion regulation might involve a balance between social goals and individual emotional goals, helpful emotion regulation may also be supremely sensitive to cognitive context (i.e., the

individual's cognitive resources at the time of reappraisal). Knowing the specific cognitive demands that are created by the combination of emotion regulation strategy and context will be crucial for defining adaptive emotion regulation. For example, not all reappraisals are created equal, and examining how a challenge to the reality of the situation (i.e., an "it's not real" reappraisal) differs from a change in future consequences (i.e., "things will get better with time") may shed light on the subtle ways in which specific reappraisals move the individual toward his or her emotional goal (McRae, Misra, *et al.*, 2012). It is possible that the engagement of cognitive resources in order to use one strategy is distinct from another, such that a change in future consequences reappraisal requires greater prefrontally mediated cognitive control (i.e., cognitive control that is characterized by greater activation in prefrontal areas associated with effortful processing) than a challenge to reality strategy but may also create more activation in ventral striatum areas (areas involved in reward processing and positive affect), leading to greater subjective positive affect. Depending on the degree to which an individual has prefrontal resources available, he or she might choose a challenge to reality strategy to conserve cognitive resources, or a change in future consequences reappraisal to maximize their movement toward their emotional goal. In contrast to reappraisal, distraction is a process that requires relatively few cognitive resources and is preferable when the stimulus will not be encountered again (Thiruchselvam, Blechert, Sheppes, Rydstrom, & Gross, 2011) but because it involves disengaging with the event that caused the emotion, it is not beneficial as a long-term strategy. For example, if faced with a scary image, looking away might be an adaptive and efficient choice; however, if that scary image is on your company's letterhead, then perhaps reframing it so you do not have an emotional response every time you encounter it would be more beneficial. Understanding the specific costs of each emotion regulation strategy will help determine which strategy to select given the social and cognitive demands of a particular context, allowing an individual to make the most adaptive choice possible.

CHARACTERISTICS OF NONHEDONIC EMOTION REGULATION

An extension of work examining nonhedonic uses of emotion regulation will flesh out the differences between emotion regulation that targets short-term hedonic goals and regulation that does not. Previous research suggests that pursuit of nonhedonic goals might be more cognitively taxing than pursuit of hedonic goals (Riediger *et al.*, 2011) and understanding why this is the case will provide important insight into the evolutionary benefits of hedonic states and the mechanisms behind emotion regulation. For example, is

it more difficult to pursue nonhedonic goals (e.g., making yourself angry before playing an aggressive sport) purely because the individual is going against the grain of powerful pleasure-seeking? What are the long-term consequences of exerting effort to oppose these processes? For example, could chronically pursuing nonhedonic goals (such as the up-regulation of anger) contribute to the development of certain psychopathologies? One possible mechanism of this would be that pursuing nonhedonic goals might make it more difficult to pursue their hedonic counterparts, suggesting that when practicing emotion regulation, it is not simply the act of regulating that is being strengthened but also the path to that specific emotional goal. In addition to providing insight into the functions and mechanisms of emotion regulation processes, understanding why pursuits of nonhedonic goals are costly will allow future research to investigate ways to decrease such costs, making instrumental emotion regulation an increasingly valuable tool.

DEFINING BOUNDARIES BEYOND EXPLICIT EMOTION REGULATION

Implicit emotion regulation. Implicit emotion regulation is a very promising line of research and much remains to be done to fully understand the nature of this type of emotion regulation. Like much research on implicit processing, defining a boundary between implicit and explicit processing can be tricky. For example, are processes that could be accessible to conscious awareness considered implicit (Bargh, 1994; Bargh & Morsella, 2008)? In addition, it is still unclear exactly where the boundary conditions are between implicit emotion regulation and a naturally low response to an emotional event. If an implicit regulatory process is entirely inaccessible to conscious awareness, and its only effect is on the size and strength of the emotional response, how are we to know if this is a regulatory process or if it merely changed the initial emotional response? Neuroimaging evidence for engagement of regulatory regions (e.g., prefrontal regions) might provide a hint that regulatory processes were engaged (Meyer, Berkman, Karremans, & Lieberman, 2011). However, it is also possible that with time and practice, regulatory processes that once required the recruitment of cognitive control regions no longer require their active engagement. Future work should closely examine the boundary between explicit and implicit regulation, as well as the boundary between implicit regulation and altered emotional reactivity.

Other forms of self-regulation. In addition to the often-blurred boundary between implicit and explicit emotion regulation, it is unclear where to draw the line between emotion regulation and other types of regulation such as

executive functioning (i.e., a set of processes that allow us to pair past experiences with future action such as working memory, strategizing, organizing, etc.) and self-regulation. Emotion regulation has been conceptualized as one type of cognitive control, requiring multiple processes generally thought components of executive functioning (Gross, 2014; Ochsner *et al.*, 2012). This raises a question regarding the degree to which emotion regulation should be considered as similar to executive function processes such as inhibition, switching, or working memory (Miyake, Friedman, Emerson, Witzki, & Howerter, 2000). Are individuals who are skilled at one or more types of executive functioning also more skilled at one or more types of emotion regulation? Which types of executive functioning contribute most strongly to emotion regulation? Do different executive functions predict the ability to use a single emotion regulation strategy well, (Gyurak, Goodkind, Kramer, Miller, & Levenson, 2012; McRae, Jacobs, Ray, John, & Gross, 2012; Schmeichel & Demaree, 2010) the ability to use multiple emotion regulation strategies well, or the ability to choose between different emotion regulation strategies (Sheppes, Scheibe, Suri, & Gross, 2011)?

Even more broadly, how does emotion regulation fit in with other types of self-regulation and willpower? Research on self-regulation often considers regulatory abilities that are not inherently emotional, such as choosing a healthy snack over an indulgent one, or being able to endure an unpleasant physical stimulus without electing to stop (Baumeister *et al.*, 2000; Hagger, Wood, Stiff, & Chatzisarantis, 2010). Theorists have conceived of these self-regulatory processes as a specific and limited resource, such that exerting self-regulatory effort at time 1, makes it more difficult to self-regulate at time 2 (Muraven & Baumeister, 2000). It is not yet clear how to best integrate emotion regulation into this more general conceptualization of self-regulation. Such inquiries would shed light on both the overlap and distinction between these two critical processes. The self-regulation literature contains rich information about the consequences of using self-regulation on subsequent self-control tasks. Therefore, understanding how emotion regulation relates to these more general forms of self-regulation would allow the area of emotion regulation to benefit from years of exploring the costs, benefits and mechanisms of self-regulation.

CHALLENGES OF EMOTION REGULATION RESEARCH

The future of emotion regulation research seems to hold a great deal of promise but also clearly poses a set of difficult challenges. In the following section we will discuss some of these challenges that face future research, but acknowledge that these are problems not unique to the field of emotion regulation and extend to the scientific study of emotion in general. We

will then discuss ways in which the field can work with or through these challenges to contribute meaningfully to the field of emotion regulation.

MEASURING EMOTION

Emotion researchers commonly assert that there is no gold standard measure of emotion, and instead rely on the use of multiple methods to confidently measure emotion. However, there is little consensus about how to interpret the effects of emotion regulation on a particular emotion when multiple measures do not agree (Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). In the context of emotion regulation, identifying change in emotion in accordance with the regulatory goal is key. When should emotion be considered successfully regulated? For example, what might it mean if an individual reports successfully decreasing negative emotion, but measures of bodily activation show no change? Is this a meaningful effect of emotion regulation on certain response systems but not others, or should this be considered a weaker, less complete effect of emotion regulation? As future research aims to identify more and more nuanced accounts of the emotional changes that result from the use of different emotion regulation strategies, consistently interpreting convergent and divergent patterns of changes in different measures of emotion will be crucial.

DEFINING ADAPTIVE OR MALADAPTIVE EMOTION REGULATION

Determining which conditions lead to the most adaptive, helpful behavior is a central focus of past, present and future research concerning emotion regulation. A recurring challenge of this type of research is the ability to clearly define what 'adaptive' means in any given context. So far, adaptiveness has been defined as a combination of the degree to which emotion regulation goals are achieved and the cognitive, social and long-term affective consequences of that type of regulation. However, as we review above, this definition does not consider nuances such as the fact that different emotional goals are more and less adaptive, and that the side-effects of different strategies may change by context or situation. These nuances are a hurdle to a comprehensive definition of helpful emotion regulation, and might even limit the ability of the field to explore flexibility in the use of distinct emotion regulation strategies (Sheppes *et al.*, 2011). Eventually, it is possible that any definition of helpful emotion regulation will be a product of a combination of several distinct factors. Until then, clearly defining what adaptive means in the context of one study is imperative, and understanding how that definition is distinct from that in other contexts is one way

in which the nuances of adaptive emotion regulation can begin to be fully understood.

DEFINING MECHANISMS OF OVERLAPPING FORMS OF REGULATION

Understanding how explicit emotion regulation relates to implicit emotion regulation—as well as to other forms of self-regulation—represents an important challenge. Progress in this arena would allow researchers to examine the overlap and disparities between their subspecialties of regulation, thereby speeding progress toward an understanding of each regulation type and regulation as a whole. However, there are many barriers to a clear and swift integration of these different literatures. For example, most studies of explicit emotion regulation employ instruction-based laboratory procedures, in which someone's response to an emotional picture or film is altered in accordance with an experimental cue to regulate. Although there is some variation in how this is accomplished, many emotion regulation experiments examine the effects of emotion regulation over the course of several seconds or a few minutes. By contrast, studies of executive functioning often employ experimental conditions where trial types change far more rapidly to examine an individual's ability to respond accurately or quickly, on the level of milliseconds (Miyake *et al.*, 2000). On the other end of the spectrum, self-regulation tasks are often employed over multiple minutes, and relate to choices that individuals make repeatedly over days and weeks (Hagger *et al.*, 2010). Recent work has begun to bridge this gap by relating performance on these cognitive control tasks to real-world self-regulation abilities like smoking cessation (Berkman, Falk, & Lieberman, 2011). However, if the mechanisms behind executive function, emotion regulation and self-regulation are to be directly compared, traditional laboratory procedures should be modified to allow for the measurement of these processes on the same timescale.

CONCLUSION

Emotion regulation is associated with both adaptive and maladaptive outcomes (Gross, 2014; Webb *et al.*, 2012). Delineating the multiple, interacting factors that lead to its most adaptive outcomes holds great promise for alleviating clinical symptoms as well as maximizing well-being. More specifically, future work on the flexible determination of adaptiveness based on contexts, individuals, emotions, and goals, as well as the relationship between emotion regulation and related regulatory processes will propel our understanding of emotion regulation even further. This precise mechanistic understanding could lead to the development of efficient, targeted and

individualized interventions. Although the pursuit of these questions will not be without challenges, the field of emotion regulation has, is currently and will continue to contribute a more nuanced understanding of the influence we have over our emotions, guiding us toward more sensitive, calibrated, and fulfilling emotional lives.

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