

Increasing positive emotion in negative contexts: Emotional consequences, neural correlates, and implications for resilience

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Abstract

Human reactions to adversity can range from severe incapacitation to growth. What explains this vast variation in stress adjustment? Most scientific examinations of these responses focus on how individuals can avoid prolonged incapacitation, often through the ability to dampen negative reactions. However, this conceptualization largely ignores the remarkable human capacity to generate positive emotions such as happiness, hope, gratitude, and love, even in the face of adversity. We offer the possibility that it is precisely this ability that allows people to not only recover from adversity, but to grow (i.e., be resilient). In this chapter, we argue that cognitive reappraisal, or, re-evaluating a situation to change its emotional impact (“positive reappraisal”), is a particularly promising avenue to generating positive emotion in negative situations. We start by providing a conceptual framework for positive reappraisal (PR), its short-term effects on emotion, and its role in resilience. We then review literature in support of this framework, focusing, first, on the short-term effects of PR, including its emotional consequences and neural correlates, and, second, on more long-term effects of PR on resilience. Throughout, we highlight unique effects of PR by contrasting it to negative reappraisal (using reappraisal to decrease negative emotion, NR). We conclude with directions for future research.

Keywords: Cognitive reappraisal, emotion regulation, coping, cognitive control, positive emotion, stress, adjustment, resilience

Positive and Negative Reappraisal and Resilience: A Conceptual Framework

Responses to stress, while unpleasant, can be useful in that they promote adaptive behavior (Frijda, Markam, Sato, & Wiers, 1995; Keltner & Gross, 1999; Tamir, 2009). However, when stress responses are overwhelming, inappropriate, or chronically activated, they can cause a wide range of long-term negative consequences (Lupien, McEwen, Gunnar, & Heim, 2009; McEwen, 2000). Stress responses can be triggered by a variety of different types of stressors, including daily hassles, traumatic events, chronic stress, and stressful life events (SLEs). Because each of these types of stress can affect psychological health via different mechanisms, we focus here on one particularly pervasive type of stressor that can have pernicious effects on psychological health: stressful life events (SLEs) (Kendler, Karkowski, & Prescott, 1999; Kessler, 1997; Luhmann, 2012). SLEs have been most commonly defined as unexpected, significant, and negative events (Kendler, et al., 1999; Kessler, 1997; Lin, Simeone, Ensel, & Kuo, 1979; Tennant, 2002), and include events such as the death of a loved one, divorce, or serious illness. SLEs have been implicated in the onset, maintenance, and intensification of a number of debilitating psychological and physical disorders as well as decreased well-being (Kendler, et al., 1999; Kessler, 1997; Pagano et al., 2004; Tennant, 2002; Tosevski & Milovancevic, 2006). However, SLEs are not associated with negative long-term outcomes in *all* individuals¹. Some individuals exhibit impressive resilience, achieving maintained or even

¹ For present purposes, we use the term *adjustment* to refer to the full range of possible psychological-health outcomes (negative to positive) after a stressor and the term *resilience* to refer more specifically to maintained or enhanced (positive) psychological-health outcomes after a stressor (i.e., greater well-being and decreased mental-health problems).

improved mental health and well-being after SLEs (Bonanno, 2005; Freitas & Downey, 1998; Lucas, Clark, Georgellis, & Diener, 2003; Rutter, 1995; Ryff, Singer, Love, & Essex, 1998).²

How can we explain the remarkable human ability to not merely subsist, but to thrive in the face of potential ruin? Largely separate lines of inquiry point to two possibilities that might be potent facilitators of resilience. The first focuses on positive emotion, which has been shown to evoke powerful changes in emotional trajectory (Fredrickson & Levenson, 1998). The second is emotion regulation, which refers to the utilization of behavioral or cognitive strategies to modulate emotion intensity and duration (Davidson, 2000; Gross, 1998b; Thompson, 1994).

A rich history of research on positive emotion emphasizes "positive emotions are distinct from, and not the mere antithesis to, negative emotion" (Watson, Wiese, Vaidya, & Tellegen, 1999). This literature also provides evidence that positive emotion has effects not only on mood, but on cognition and social functioning (Lyubomirsky, King, & Diener, 2005). For example, positive emotion can speed both experiential and physiological recovery from negative emotion (Fredrickson & Levenson, 1998). In addition, positive emotion may increase creativity and the ability to think globally, which may be critical components of reappraisal (Fredrickson, 2001).

Especially in the face of SLEs – highly emotional events – theorists have suggested that an inability to regulate their emotions renders people vulnerable to negative health outcomes (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Cohen, Gunthert, Butler, O'Neill, & Tolpin, 2005; Gross & Thompson, 2007; Teasdale, 1988; Troy & Mauss, 2011). Indeed, emotion regulation has been found to explain substantial variation in psychological health (Bonanno, et

² Although stress has implications for physical health as well as psychological health (Kubzansky & Kawachi, 2000; Marsland, Bachen, & Cohen, 2012; Mauss & Gross, 2004), we focus here on psychological health in the interest of space and because specific links and mechanisms underlying effects on physical health may at times differ from those on psychological health.

al., 2004; Eisenberg, Fabes, Guthrie, & Reiser, 2000; Gross & John, 2003; Hopp, Troy, & Mauss, 2011; Troy, Wilhelm, Shallcross, & Mauss, 2010).

Individuals can regulate their emotions in a number of different ways (Davidson, 2000; Gross, 1998b; Thompson, 1994). One type of emotion regulation appears to be particularly adaptive, namely, cognitive reappraisal. Reappraisal is an emotion regulation strategy in which the individual cognitively re-evaluates an emotional situation to change its emotional impact (Lazarus & Folkman, 1984; Gross, 1998b). For example, if we have an argument with a good friend, we can reframe the conflict as a natural part of friendship that will soon resolve (and thereby decrease our negative emotions) or we can remind ourselves how lucky we are to have our perspectives on the issue broadened by passionate, articulate company (and thereby increase our positive emotions). Several types of empirical evidence support the notion that reappraisal may be a linchpin process in adjustment to SLEs. First, it has been shown experimentally that individuals can use reappraisal successfully in powerfully negative situations (Gross, 1998a; Mauss, Cook, Cheng, & Gross, J. J., 2007; Ochsner, Bunge, Gross, & Gabrieli, 2002). Second, reappraisal is strongly implicated in psychological health (Folkman, 1997; Garnefski & Kraaij, 2006; Gross & John, 2003), especially after SLEs (Kraaij, Pruymboom, & Garnefski, 2002; Pakenham, 2005; Wrosch, Heckhausen, & Lachman, 2000). Third, reappraisal is involved in successful treatment of affective disorders (Bryant, Moulds, & Guthrie, 2001; Carrico, Antoni, Weaver, Lechner, & Schneiderman, 2005).

Together, these considerations motivate a conceptual framework that suggests reappraisal as a key factor in adjustment after SLEs. Importantly, as summarized in Figure 1, two different emotional targets might be at play when using reappraisal in the context of negative situations: one could either increase positive emotion or decrease negative emotion (Mauss & Tamir, in

press). These two types of reappraisal might have crucially different effects on the emotions that follow the SLE in the short term as well as on resilience in the longer term. Therefore, it appears fruitful to consider these two types of reappraisal separately. Specifically, using reappraisal to increase positive emotion (positive reappraisal, PR) compared to using reappraisal to decrease negative emotion (negative reappraisal, NR) might in the short term increase positive emotions without necessarily decreasing negative emotions. Because positive emotions have beneficial effects on health, these short-term effects of PR might over time translate into greater well-being and decreased mental-health problems (resilience). Because positive emotions have unique positive effects on health (above and beyond decreases in negative emotion), beneficial effects of PR might go above and beyond those of NR. Furthermore, increasing positive emotion without removing negative emotion might present a particularly attractive, feasible, and adaptive way to cope with stressors, because some negative emotion is important to experience in the context of SLEs. Therefore, we think that PR will be an especially potent and useful form of reappraisal. In the following sections, we examine the idea that PR will have distinct short-term emotional consequences, discuss the neural correlates might accompany it, and predict that it will lead to increased resilience, potentially above and beyond NR.

[INSERT FIGURE 1 HERE]

Short-term Effects of Positive Reappraisal: Emotional Consequences and Neural Correlates

Our framework leads to the predictions that PR increases the experience of positive emotion and changes measures of short-term emotional responding, even in the context of negative stimuli. Our predictions are specific to the use of reappraisal to increase positive emotion (PR). Although most studies of reappraisal focus on the consequences of manipulating

the negative emotion elicited by a negative stimulus (NR), these studies can give some insight into the potential consequences of PR. These studies often involve the presentation of negative images or films, paired with one of two sets of instructions – either to respond naturally, or to think of a way to reinterpret the negative situation that is depicted to make the situation seem less negative (i.e., use reappraisal; Gross, 1998a; Jackson, Malmstadt, Larson, & Davidson, 2000; Ochsner, et al., 2002). This type of experimental task has been a popular technique for examining the emotional consequences of reappraisal.

Short-term emotional consequences of positive reappraisal

Using this method, NR has been shown to successfully decrease several aspects of emotional responding, including self-reported negative emotion (Gross, 1998a), startle eyeblink magnitude (Dillon & LaBar, 2005; Jackson, Malmstadt, Larson, & Davidson, 2000; Ray, McRae, Ochsner, & Gross, 2010), and corrugator response (Jackson, et al., 2000; Ray, et al., 2010). Neuroimaging studies have replicated and extended the effects of NR by demonstrating that instructed NR decreases the event-related potentials associated with emotional arousal (Deveney & Pizzagalli, 2008; Foti & Hajcak, 2008; Hajcak & Nieuwenhuis, 2006) as well as amygdala activation (Ochsner, et al., 2002; Schaefer et al., 2002; Ochsner et al., 2004; Kim & Hamann, 2005), which is thought to process emotionally salient information and organize peripheral physiological responding and behavioral emotional responses. These studies suggest that NR can be used to decrease several key components of negative emotional responding. This leaves open the notion of whether PR can be used to increase key components of positive emotional responding.

A small handful of studies have examined this idea in the context of positive emotional stimuli. For example, behavioral and psychophysiological evidence indicates that individuals can

successfully increase and decrease both self-reported positive emotion and sympathetic nervous system activation when instructed to use PR while watching amusing films (Giuliani, McRae, & Gross, 2008). Neuroimaging studies have confirmed and extended these effects, reporting that both the amygdala and the ventral striatum are increased and decreased in concert with increases and decreases in positive emotion to positive pictures (Kim & Hamann, 2007). It is important to note that using PR in a positive context results in even *greater* levels of amygdala activation than increasing negative emotion (Kim & Hamann, 2007). Although amygdala activation is often associated with negative emotion, it also responds to positive emotion, novelty and arousal (Anderson et al., 2003; Cunningham, Van Bavel, & Johnsen, 2008; Whalen, 1998). Together, these studies suggest that people can use reappraisal not just to manipulate negative emotional responses in negative contexts but also positive emotional responses in positive contexts.

Can reappraisal be harnessed to increase positive emotion even in the context of negative emotional stimuli? And if so, how do the effects of PR compare to the effects of NR? A small number of studies have established that positive emotional experience can be increased by PR in a negative context (McRae, Ciesielski, & Gross, 2012, Shiota & Levenson, 2012). One such study compared PR to a distancing NR strategy in the context of negative film clips. Relative to distancing, increasing positive emotion resulted in shortened cardiac inter-beat interval paired with reduced blood pressure (Shiota & Levenson, 2012). This cardiovascular response profile has been previously associated with a “challenge” rather than a “threat” mindset (Tomaka, Blascovich, Kibler, & Ernst, 1997). A separate investigation measured skin conductance level (SCL) while using PR or NR in response to negative pictures. Based on the elevated amygdala activation observed when using PR in a positive context (Kim & Hamann, 2007), we predicted that PR would involve greater physiological activation than NR (McRae, et al., 2012). In line

with these predictions, this study reports smaller decreases in SCL when participants used PR compared to NR (McRae, et al., 2012). Together, these studies support the conclusion that there are unique physiological effects of PR compared to NR. These physiological differences indicate that using PR in a negative context does not result in reductions in all measures of emotion, but rather qualitative changes in physiological response systems that reflect a more engaged bodily state. This suggests that PR, compared with NR, might have an activating effect, rather than dampening down emotionality. This activated emotion might then be garnered to engage with and improve negative situations, rather than merely “riding out the storm.”

Neural correlates of positive reappraisal

In addition to studying the emotional consequences of PR and NR, neuroimaging studies allow for the identification of the neural regions associated with implementing reappraisal, which implicate specific cognitive processes that are involved in reappraisal. Again, most research to date has examined NR. This research suggests that several prefrontal and parietal regions are recruited consistently during NR, which are thought to be implicated in cognitive control and executive functioning (Kalisch, 2009; Ochsner & Gross, 2005; Ochsner, Silvers, & Buhle, 2012). More specifically, these regions include dorsolateral prefrontal cortex, which is thought to contribute to goal maintenance, left ventrolateral prefrontal cortex, which is thought to contribute to the generation of verbal material, as well as support working memory, right ventrolateral prefrontal cortex, which is thought to aid in response inhibition, the dorsal anterior cingulate, which is thought to detect and monitor conflicts as well as enhance self-focused emotional attention, and bilateral inferior parietal cortex, which is thought to direct attention in space (Aron, Robbins, & Poldrack, 2004 ; Carter & van Veen, 2007; Miller & Cohen, 2001; Ochsner & Gross, 2005; Smith & Jonides, 1999; Wager, Davidson, Hughes, Lindquist, & Ochsner, 2008).

Even more specifically, down-regulating negative emotion (compared with up-regulating negative emotion) recruits right lateral PFC and lateral OFC regions, that are thought to be involved in inhibiting pre-potent responses and tracking changing emotional values (Eippert et al., 2007; Kim & Hamann, 2007; Mak, Hu, Zhang, Xiao, & Lee, 2009).

Although PR might have distinct emotional consequences from NR, it is unclear whether it engages largely similar prefrontal and parietal control regions, and presumably similar cognitive processes, to NR, or whether it calls for different specific cognitive skills compared to NR. Although we are primarily interested in PR in *negative* contexts, very few studies have examined this directly. Instead, a foundation for understanding PR in negative contexts might be built from studies examining PR in positive contexts. Compared with increasing negative emotion, increasing positive emotion in a positive context uniquely recruits left lateral prefrontal regions, as well as dorsal medial prefrontal cortex (Kim & Hamann, 2007). Therefore, PR compared to NR might involve greater recruitment of some reappraisal-related control regions, especially on the left, and regions thought to represent self-referential processing (Kelley et al., 2002). This means that there might be some unique cognitive features of using cognitive control for the purpose of PR. However, there seems to be far more overlap than distinction in the control-related regions engaged during PR compared with NR.

To date, no neuroimaging studies we are aware of have directly compared NR and PR in a negative context. However, it should be noted that typically, participants are neither encouraged to nor restricted from increasing positive emotion as a way to decrease negative emotion, but the instructions typically only explicitly mention decreasing negative emotion. Consequently when the emotion target is not restricted, there is evidence that some people naturally engage in NR while other naturally engage in PR. This, in turn, allows for inferences

about the neural correlates specific to PR versus NR. For example, we have found that while some individuals engage the use of the ventral striatum, a brain region involved in positive emotion, and likely to be enhanced by PR, to a greater extent than others while reappraising (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008). Additional support for the idea that NR and PR recruit different neural regions comes from the observation that the relationship between control-related ventral PFC activation and reappraisal success is mediated by two separate neural pathways (Wager, Davidson, Hughes, Lindquist, & Ochsner, 2008). While utilizing the same control regions, one pathway involves decreases in amygdala activation, which may reflect NR, and the other increases in ventral striatum activation, which may reflect PR. Neither of these studies was able to verify that the increased ventral striatum activation actually corresponded with the goal to increase positive emotion. However, it is reasonable to predict that when instructed to use PR, both the amygdala and ventral striatum would be more strongly engaged than during efforts to use NR.

In sum, although few studies have examined PR in negative contexts, the existing research allows us some understanding of its short-term effects on emotion and its neural correlates. First, PR appears to allow people to generate positive emotions (as indexed by experience, physiology, and neural regions associated with emotion) even in intensely negative contexts. This stands in contrast to the emotional consequences of NR, which involve a dampened response. Second, PR appears to rely on control-related regions mostly similar to those engaged during NR. It thus seems that the emotional consequences of PR are far more distinct from NR than are the cognitive processes engaged by PR compared to NR. Therefore, one working hypothesis is that PR and NR use the same cognitive “fuel” but result in the production of different emotional responses. In other words, when people utilize these shared

cognitive processes for the purpose of PR, they might reap many of the unique benefits associated with positive emotion. We next turn to the implications these short-term emotional benefits might have for longer-term resilience.

Longer-term Effects of Positive Reappraisal: Positive Reappraisal and Resilience

Several lines of research provide initial support for the idea that PR may play a crucial role in psychological adjustment to SLEs. As we showed in the previous section, PR is associated with increased positive emotion while NR is less so. In turn, multiple lines of evidence support that increased frequency and intensity of positive emotion is positively associated with resilience. First, positive emotions are generally associated with adaptive outcomes, including enhanced psychological functioning (Fredrickson, 2001; Harker & Keltner, 2001; King, Hicks, Krull, & Del Gaiso, 2006). Evidence is accumulating that positive emotions are not just the *consequence* of adaptive functioning. Rather, they appear to causally contribute to a wide range of positive outcomes, including improved psychological health (Fredrickson, 1998, 2001; Lyubomirsky, et al., 2005). For example, interventions that increase positive emotion increase well-being and decrease psychological-health problems (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008; Lyubomirsky & Layous, 2013). Importantly, some evidence supports the notion that these beneficial effects of increased positive emotions are independent of the effects of reduced negative emotions (Diener, 1994; Folkman & Moskowitz, 2000; Lyubomirsky, et al., 2005). For example, mood disorders such as depression are characterized by deficits of positive emotion, not merely an abundance of negative emotion. Conversely, well-being is characterized by high levels of positive emotion, not merely the absence of negative emotion (Brown, Chorpita, & Barlow, 1998; Bylsma, Morris, & Rottenberg, 2008; Clark & Watson, 1991; McMakin, Santiago, & Shirk, 2009). Given these positive effects of positive

emotions in general, it stands to reason that positive emotions may be beneficial in the context of SLEs (cf. Folkman & Moskowitz, 2000; Lechner, Tennen, Affleck, Lopez, & Snyder, 2009). In fact, given that times of stress are characterized by a dearth of positive emotions, positive emotions may be especially useful during such times.

Indeed, the experience of positive emotions appears to have several distinct positive effects in the context of negative emotion and stress. For example, increased positive emotions have been shown to be correlated with adaptive coping styles (Burns et al., 2008; Cohn, Fredrickson, Brown, Mikels, & Conway, 2009; Tugade & Fredrickson, 2004) as well as to predict better outcomes after SLEs (Bonanno & Keltner, 1997; Fredrickson, Tugade, Waugh, & Larkin, 2003; Keltner & Bonanno, 1997; Moskowitz, Folkman, & Acree, 2003). Some studies have further shown that the effects of positive emotions on coping are distinct from those of negative emotion (Fredrickson & Joiner, 2002; Moskowitz, Epel, & Acree, 2008; Moskowitz, et al., 2003). For example, Fredrickson & Joiner (2002) found that positive but not negative emotion was associated with broad-minded coping (a form of adaptive coping). In fact, it may be that increasing positive emotions is adaptive precisely because it does not necessarily involve decreasing negative emotions. After all, negative emotions can serve important functions: in negative situations they convey important information, prioritize adaptive behaviors, and keep us and others motivated to address issues (Frijda, 1986; Keltner & Haidt, 1999; Tamir & Ford, 2012). Increasing positive emotion without removing negative emotion might thus present a particularly adaptive way to cope with stressors.

Importantly, there is evidence to suggest that positive emotions are not just a correlate of successful coping but also a cause of it. For instance, interventions that increase positive emotion improve recovery from depression (Dichter et al., 2009; Dimidjian et al., 2006; McMakin,

Siegle, & Shirk, 2011; Seligman, Rashid, & Parks, 2006; Sin & Lyubomirsky, 2009). Beyond recovery from depression, studies in samples exposed to SLEs begin to suggest that positive emotion interventions might specifically enhance successful coping with stress (Moskowitz et al., 2012). These studies support the notion that positive emotions play a causal role in coping with stress.

Given these emerging beneficial effects of positive emotions in the context of coping with stress, individuals' ability to *self-generate* positive emotion via emotion regulation, and to do so in emotionally negative contexts, might be a particularly powerful resilience factor for at least two reasons. First, during times of stress there are relatively few situational cues to positive emotion, and thus self-generation of positive emotion is especially useful. Second, the good feelings that accompany positive emotions, as well as their downstream effects such as cognitive broadening and enhanced social connection, might be particularly useful in times of stress, because they are most needed then (Folkman & Moskowitz, 2000; Tugade & Fredrickson, 2007). Thus, a person who can self-generate positive emotion when faced with a negative situation might be at a distinct advantage.

What evidence supports the notion that self-generating positive emotions via PR supports resilience? While few studies have directly examined PR and coping with SLEs, several pieces of converging evidence support that PR is associated with – and may causally contribute to -- resilience. In a correlational study, for example, Shiota (2006) found that participants who self-reported using PR in response to daily stressful events experienced greater positive (but not lower negative) mood. Some research also suggests that such effects can be observed under highly stressful conditions and that they are prospective. In their research on partners of men with AIDS five months before and five months after their partner died, Moskowitz and

colleagues (1996) found that during the stress of caregiving and bereavement, participants reported using PR. In turn, use of PR was associated with greater experience of positive mood before and after bereavement and was negatively associated with negative mood after bereavement. Importantly, PR was the only one of eight assessed coping strategies that showed these positive effects before and after bereavement, as well as when controlling for the previous month's mood and for the seven other types of coping. An analysis of the events for which participants reported positive emotion suggested that PR was not only used to render ordinary events more positive, but even highly stressful aspects of caregiving such as the partner's night sweats (Folkman, 1997).

To further examine the idea that PR is useful in the context of SLEs, we recruited a group of women who had recently experienced an SLE (Troy, et al., 2010). Because self-reports of reappraisal might be subject to biases, we measured these women's ability to use reappraisal with a laboratory challenge. This challenge indexed reappraisal ability with the extent to which participants decreased self-reported and physiological responding when instructed to use reappraisal versus simply watching a sad film clip. As predicted, greater ability to utilize reappraisal in the laboratory challenge buffered participants from the negative effects of stress. Specifically, at high levels of stress, women with high ability to use reappraisal exhibited less depressive symptoms than those with low ability to use reappraisal. In follow-up analyses, we distinguished the ability to decrease negative emotion from the ability to increase positive emotion in the same laboratory paradigm (Troy & Mauss, 2010). Crucially, the ability to increase positive emotion using reappraisal, above and beyond the ability to decrease sadness, was associated with better well-being in this sample.

In summary, research makes a strong case in support of the notion that the positive

emotions that are enhanced by PR play a crucial positive role in resilience, and that they do so above and beyond decreases in negative emotion associated with NR. Moreover, the emerging research on PR suggests that people naturally use PR, that they apply it to ordinary as well as stressful events, and that PR is associated with positive well-being and psychological-health outcomes, even under extreme stress. Thus, PR may be an important resilience factor, and it may be so above and beyond NR.

Directions for Future Research

We reviewed emerging evidence in support of the ideas that PR has unique effects on positive emotion and that it constitutes a crucial resilience factor beyond other types of emotion regulation, including NR. More research is needed to more fully evaluate PR. We highlight especially important directions for future research, centering, first, on our basic understanding of PR and, second, on its role in resilience.

Experimental work on reappraisal can be extended in several ways to learn more about the short-term emotional consequences as well as the cognitive processes engaged during PR. Laboratory paradigms can be used to manipulate the emotional goal of reappraisal by instructing participants to use PR specifically. In addition, measuring the degree to which different emotions are targeted during unrestricted reappraisal instructions, could provide insight into spontaneous PR. Both types of paradigms (experimental and correlational) could contrast PR to other types of emotion regulation (e.g., NR), in order to enhance insights about the effects specific to PR. In addition, carefully noting the emotional context, whether PR is used in positive or negative situations, will help document contextual effects of PR, or conversely, identify points of overlap that represent relatively indelible characteristics of PR.

Moreover, research efforts will be exciting that explore the effects of PR on specific positive emotions, such as love, gratitude, joy, or contentment (Campos, Shiota, Keltner, Gonzaga, Gian & Goetz, 2013; Griskevicius, Shiota & Nowalis, 2010). Distinctions such as between high-arousal and low-arousal positive emotion (Tsai, Knutson & Fung, 2006) self-versus other-focused positive emotions, or positive emotions experienced as *meaningful* versus not (Folkman & Moskowitz, 2000; Seligman et al., 2006) might prove to be important. For example, we might ask whether some positive emotions are easier to generate with PR than others. Or, it might be that some positive emotions generated by PR are more tied to resilience than others. For instance, meaningful positive emotions are likely to be more powerful than indiscriminate or superficial positivity, that is disconnected from the gravity and reality of the situations surrounding us (Folkman & Moskowitz, 2000; Seligman et al., 2006).

In terms of PR's role in resilience, it will be important to elucidate the causal contributions of PR on resilience. One fruitful avenue to this would be interventions that enhance PR in samples exposed to recent SLEs. Well-designed active control groups will help us rule out important confounds, such as expectation for change, motivation to change, positive social contact, behavioral activation, or adherence. To enhance the specificity of the conclusions we can draw from such interventions, it will be important to compare PR interventions to interventions targeting other types of emotion regulation, including NR. Such comparisons will allow for increased insight into the beneficial effects that PR has above and beyond other types of emotion regulation. One important corollary of our argument is that PR may be especially useful to some people because it allows them to completely *self-generate* positive emotion rather than relying on positive experiences. Thus, it may be particularly useful to people experiencing high levels of adversity, while other types of positive emotion interventions might be most useful

at lowers levels of adversity. This type of hypothesis can be tested by comparing effects of PR interventions to those of other interventions that rely on positive experiences (e.g., counting blessings, gratitude, savoring; Emmons & McCullough, 2003; Sheldon & Lyubomirsky, 2006) in participants exposed to varying degrees of stressor severity.

Once the causal effects of PR on resilience have been more firmly established, it will be important to examine potential mediators (e.g., the ability to utilize PR during stressful events, levels of positive and negative emotion, physiological markers of improved positive emotional responding) (cf. Kok & Fredrickson, 2010; Lyubomirsky & Layous, 2013). For example, we argued that PR might be beneficial because it enhances positive emotion without necessarily diminishing the experience of justified – and potentially useful -- negative emotions. Mediation analyses could examine this type of hypothesis.

Research should also take into consideration potential moderators and boundary conditions of effects of PR interventions, including initial levels of well-being and PR, to help us understand for whom PR might be most useful, for whom it might be less useful, and for whom it might be even harmful. For example, in our research we have found that the pursuit of positive emotion can under some conditions backfire, leading to decreases rather than increases in positive emotion (Mauss, Tamir, Anderson, & Savino, 2011). Others have found that at times it is beneficial for people to experience less positive emotion (Gruber, 2011; Tamir, 2009). In those contexts a PR intervention might be considered misguided. Such findings suggest that it will be a crucial contribution to understand better the precise boundary conditions of PR interventions.

Concluding Comment

Everyone experiences stressful life events (SLEs) at some point of another in their lives. While the experience of SLEs is an unavoidable part of human life, human reactions to SLEs can

range from severe incapacitation to growth. What explains this vast variation in stress adjustment? Much prior research has focused on people's ability to dampen negative emotions as a linchpin process in stress adjustment. We argued here that in addition, people's ability to self-generate positive emotions such as happiness, hope, gratitude, and love, and to do so even in adverse situations, should be considered. One particularly powerful way to generate positive emotion is to transform the very meaning of the stressful situation one finds oneself in ("positive reappraisal," PR). Emerging research supports the idea that PR makes an important contribution, and that it does so over that of negative reappraisal. This is evident in its short-term emotional consequences as well as its long-term effects on resilience. Thus, PR may be uniquely poised to not merely side-step negative emotion, but use emotional engagement as fuel for growth and resilience.

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Figure 1: Short-term and long-term effects of positive and negative reappraisal.

1. Emotion
regulation
processes

2. Short-term
effects

3. Individual
differences in stress
adjustment

Positive reappraisal
(PR)

Increased positive
emotion

Greater well-
being

Negative reappraisal
(NR)

Decreased negative
emotion

Decreased
mental health
problems

