

A resilience framework for promoting stable remission from depression

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### **Abstract**

A significant proportion of people in remission from depression will experience a recurrence of depression. One theoretical mechanism for this recurrence is that with each additional episode of depression, people become more sensitive to the deleterious effects of less powerful stressors. We propose that research on resilience – the ability to adapt to and recover from stress – can inform interventions to prevent recurrence in people in remission. We conceptualize resilience as a dynamic process that may be deficient in people in remission from depression, rather than as a static personal quality that is unattainable to people who have experienced psychopathology. The three aspects of resilience that we suggest are the most important to target to prevent recurrence are (1) improving stress recovery from minor daily stressors that may aid remitted people in coping with major stressors, (2) increasing positivity, like promoting positive emotions during stress, (3) and training flexibility – the ability to identify different demands in the environment and employ the appropriate coping strategy to meet those demands. We offer suggestions for the appropriate assessment of changes in resilience in remitted people and provide some examples of effective resilience interventions.

*Keywords:* depression, resilience, remission, stress, recovery, positivity, flexibility

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### Introduction

Depression is a highly prevalent, severe mental illness that is related to substantial individual suffering. In terms of disability, estimations suggest that major depressive disorder (MDD) is among the leading causes of burden of diseases worldwide (e.g., Demyttenaere et al., 2004). Despite the availability of a wide variety of treatment options (psychological, pharmacological, and neurostimulation interventions) and strong investments in treatment research, major challenges in the treatment of depression remain. One particularly pervasive problem is the frequent recurrence of depression after remission.

Research shows that recurrence of MDD (i.e., experiencing a depressive episode after having exhibited full and/or partial remission from a previous depressive episode) is high in the general population (35% after 15 years), and even higher in those treated at specialized mental health centers (60% after 5 years and 85% after 15 years; Hardevald, Spijker, De Graaf, Nolen, & Beekman, 2010). In this research, recurrence is best predicted by the number of previous episodes and subclinical residual symptoms (Solomon et al., 2000). Solomon et al. (2000) found that 2/3 of people with one episode will experience another depressive episode within 10 years, and that after each episode, the likelihood of subsequent episodes increases by 16%. Not exhibiting full recovery also increases rates of recurrence. People with even mild residual symptoms after a depressive episode are at a much higher risk of relapsing, even when controlling for number of previous episodes (Judd et al., 1998).

Such findings have spurred a number of theories to explain increasing vulnerability after initial depressive episodes. A major theory is the stress kindling hypothesis (Monroe & Harkness, 2005; Post, 1992). Post noted that major life stressors have less of an impact on recurrent episodes of depression than they do on the first episode of depression and proposed that through stress kindling or sensitization new episodes can develop more autonomously from stress compared with first episodes of depression. Monroe and Harkness (2005) carefully

elaborated on this idea and distinguished between possible explanations. *Stress kindling/sensitization* suggests that this dissociation is due to the increased influence of lesser amounts of stress to cause recurrence, and *stress autonomy* suggests that depression just becomes independent of stress episodes, whatever their intensity. A recent longitudinal study of late-adolescent women provided support for the stress sensitization model over the stress autonomy model. The impact of non-severe life events on the likelihood of having an onset of a depressive episode was greater in individuals with a history of depression compared to those with no history of depression (Stroud, Davila, Hammen, & Vrshek-Schallhorn, 2011). This stress sensitization is also apparent in response to discrete lab stressors (Heim et al., 2000). Investigators found that increased emotional reactivity to a sad mood induction (listening to sad music while thinking about a sad time in their life) predicted earlier time to recurrence in people being treated for their depression (van Rijsbergen et al., 2013). Investigators have also found that increased cognitive reactivity to sad mood inductions predicts increased risk of relapse even when controlling for number of previous depressive episodes (Segal et al., 2006).

Although there is substantial heterogeneity in depression and mechanisms underlying depression (e.g. Hasler & Northoff, 2011), the evidence does indicate that increasing sensitivity to smaller stressors is a potential cause of recurrence (for a review see Monroe & Harkness, 2005). This implies that therapies and interventions that increase resistance to stress may be particularly effective at reducing the risk of relapse. First-line psychological treatments such as CBT (e.g., Beck, 1976; Clark, Beck, & Alford, 1999) and interpersonal therapy (IPT; Klerman, Weissman, Rousaville, & Chevron, 1984) attempt to change stress-reactivity by focusing on the interpretation of personally relevant stressful stimuli or events (e.g., feeling rejected after criticism). However, these therapies are mainly aimed at alleviating negative affect and pay only limited attention to building other skills related to resilience in overcoming stress. The past decades have witnessed a surge of interest in the psychobiological factors underlying resilience to stress and in line with others (e.g., Dunn, 2012; Padesky & Mooney, 2012; Southwick,

Vythilingham, & Charney, 2005; Wood & Tarrier, 2010) we propose that given the nature of recurrent depression, treatments should increasingly focus on building resilience.

In this article we argue that the knowledge gained from resilience research can improve our understanding of recurrent depression and its treatment. We view the capability to effectively handle stress as a unipolar dimension with increasing stress sensitivity on the negative end and increasing stress adaptability on the positive end (similar to ego-brittle vs. ego-resilience; Block & Kremen, 1996). Figure 1 illustrates how remitted individuals may change in their capability to handle stress over time. With increasing time/depressive episodes, remitted individuals become more vulnerable to depression via increasing stress sensitivity. The goal of a resilience intervention is to reverse this process – increasing people’s ability to handle stressors, and therefore their resilience, thus decreasing their stress-sensitivity and increasing their stress adaptability. Important to our conceptualization, however, is that although resilience may decline following depressive episodes, it does not mean that depressed people are completely non-resilient. Whereas disease models of mental illness might suggest that a depressive episode indicates a state of failed resilience, we argue instead that depression is not a static endpoint reflecting unattainable resilience but rather a highly difficult and challenging state where improving resilience factors can play a major role in the road to recovery and stable remission. In this article, we discuss our conceptualization of resilience specifically as it pertains to people who have already experienced depressive episodes and describe possible targets for intervention, assessments of change in resilience, and example resilience interventions.

### **Relevance of resilience to remission from depression**

The term resilience is originally a metallurgy term that describes the ability for a metal to bounce back to its original form after being bent or ‘stressed.’ If a metal has particularly low resilience properties, then when bent it may either stay bent or break. Translating this metallurgy term to human experience, ‘being bent’ is typically connoted as experiencing some significant stressor that challenges an individuals’ homeostasis (McEwen, 1998), ‘bouncing back’

is typically connoted as returning to pre-stressor levels of functioning, and 'staying bent or breaking' is typically connoted as experiencing significant dysfunction and psychopathology. Put together then, one working definition of resilience is the process of experiencing some significant stressor and returning to pre-stressor levels of functioning without ever experiencing significant dysfunction or psychopathology.

One of the traditional approaches to resilience research is the person-centered approach (Masten, 2001) in which investigators characterize resilience in people by identifying those who have experienced significant life adversity, but who have never exhibited significant dysfunction or psychopathology. For example, in one of the earlier studies on resilience, Werner and colleagues followed children from the Hawaiian island of Kauai for several decades to examine how living in an impoverished environment might influence their health and development. A striking finding was that although children who grew up in poverty were more likely to have poor health and development outcomes than children living in enriched environments, a large percentage of these at-risk children never developed any significant problems and instead thrived in their environments (Werner & Smith, 1992, 2001). In another study that examined post-bereavement responses in recent widows, researchers characterized people as resilient if they exhibited low pre-loss depression and no change in depression from pre- to post-loss of their spouse (Bonanno et al., 2002).

These and other similar studies that characterize resilience by identifying resilient and non-resilient people have typically found that the majority of people are remarkably resilient. That is, given a group of people who have experienced a similar level of adversity, a majority of these people will exhibit resilient profiles – the absence of significant dysfunction and psychopathology. This fact has led resilience theorists to conclude that resilience is the typical or 'ordinary' profile of people who undergo these adverse life events (Bonanno, 2004; Masten, 2001). For example, of the people who experienced personal threats and violence in the 1992 Los Angeles riots, less than 10% of them met diagnostic criteria for post-traumatic stress

disorder (PTSD) and over 78% of them exhibited fewer than three PTSD symptoms (Hanson, Kilpatrick, Freedy, & Saunders, 1995). Relevant to depression, although certain risk factors for depression, like being the offspring of a depressed parent, increase the likelihood of becoming depressed, typically only a minority of people with that risk factor will eventually develop depression (e.g., < 40% for children of depressed parents; Hammen, 2009).

One implication of the person-centered approach is that by identifying resilient and non-resilient people, resilience can be viewed as a property of the person. Resilience is often treated as a relatively stable individual difference trait (Klohn, 1996; Ong, Bergeman, Bisconti, & Wallace, 2006; Waugh, Fredrickson, & Taylor, 2008) that at a particular point in time predicts whether people will experience psychopathology or not to a stressor (Fredrickson, Tugade, Waugh, & Larkin, 2003). This implication is particularly salient in genetics studies that claim that having a certain genotype puts people at much higher risk of succumbing to psychopathology given adverse life events (Caspi et al., 2003).

There are certainly advantages to assessing individual differences in resilience as a potential predictor of positive/stable outcomes following an adverse life event. For example, in the above Fredrickson et al., 2003 study, investigators found that people scoring high on a trait resilience measure (ego-resilience '89, ER89; Block & Kremen, 1996) before the 9/11 attacks subsequently showed fewer depressive symptoms after the attacks than those scoring low on resilience. Clearly, at any given moment in time, there are individual differences in people's resilience as the ability to handle stressors, however, a perhaps unintended consequence of treating resilience as an individual difference trait is that readers of this literature often get the impression that people who do experience depression and other types of psychopathology after experiencing an adverse life event are by definition not resilient people – that they are 'absent' in resilience rather than just 'lack' resilience. If this were the case, then attempts at devising interventions to enhance their resilience would be futile.

There is theory and evidence, however, that suggests that resilience is not a static, unitary property of the person, but rather a dynamic, multidimensional process. Luthar and Cicchetti (2000), for example, argue that there is no such thing as “the resilient person”, but rather people with different resilient trajectories. Each of these trajectories represents a different pathway to being resilient (Bonanno, 2004), and each pathway is associated with protective factors that may be more or less relevant to adapting to different stressors/adverse life events (Luthar & Cicchetti, 2000). For example, having supportive relationships with teachers is a protective factor for those children who presumably experience relatively few such relationships in their daily lives, but may not be as important for those who already come from supportive environments (Rutter, 2000). Masten (2001) suggested that these multiple pathways to resilience are part of a normal human adaptive functioning system, and that resilience is ‘ordinary magic’ because this system is present in all people, even if it may be compromised in some.

This notion that the potential for resilience is present in all people, even if deficient in some, paints a brighter picture for people in remission from depression. First of all, it suggests that even people with psychopathology may exhibit some characteristics of resilience. Supporting this notion, investigators administered the Connor-Davidson Resilience scale (Connor & Davidson, 2003) to people diagnosed with depression and/or anxiety disorders and found that there was significant variability in their responses to the resilience questionnaire, and that those who reported higher resilience reported greater purpose in life, spirituality, and more frequent exercising than those who reported lower resilience (Min et al., 2013). In another study using this scale to assess resilience in people diagnosed with PTSD, investigators found that people diagnosed with PTSD who reported higher resilience exhibited significantly better responses to treatment (both drug and therapy) than those reporting lower resilience (Davidson et al., 2005). One particularly striking example is that there is a relatively large group of individuals that demonstrate spontaneous remission from depression (Whiteford et al., 2013).



Whiteford et al. (2013) found that in a group of depressed individuals on a waitlist or who served as controls in clinical studies, 23% of adults experienced remission of depression without treatment in three months, 32% in six months, and 53% in a year. These high rates of spontaneous remission suggest that many depressed individuals manage to overcome depression without formal treatment, hence displaying some lingering aspects of resilience.

Second of all, and particularly important to the aims of the current article, characterizing resilience as a process suggests that it can be modified and improved in people with psychopathology. In the study presented earlier that examined resilience in PTSD patients, the investigators found that the participants' scores on the resilience measure improved significantly from pre- to post-treatment (Davidson et al., 2005). Indeed, there is some evidence that learning resilience may be even more relevant for people who are having difficulty adapting to their circumstances than for those who are adapting well (Neimeyer, 2000). In a review of the effectiveness of grief therapies, Neimeyer (2000) found that grief therapies were generally ineffective for people who were adapting well to their bereavement, but effective for those who were having difficulties overcoming their grief.

## **Summary**

In sum, the notion of resilience is highly relevant to examining successful remission from depression if one takes the view that resilience is a multifaceted process that may just be deficient in people who succumb to psychopathology rather than the view that resilience is a static, unitary property of the person.

## **Resilience factors to target**

There are many pathways through which people can be resilient and not all of these pathways are necessarily going to be applicable to people who are in remission from depression. Luthar and Cicchetti (2000) suggested that interventions that promote resilience should be focused on the vulnerability and protective mechanisms that are unique to certain risk conditions and the processes that underlie them. Although there are a myriad of risks associated with

having experienced depression, we have chosen to focus on increased sensitivity to lower amounts of stress since this plays such an important role in recurrence. In this section, we describe some of the attributes and characteristics of resilience that may be particularly suited to serve as targets for increasing stress adaptability.

### **Successful stress recovery**

Also known as ‘harm-reduction’ (Davydov, Stewart, Ritchie, & Chaudieu, 2010), being able to successfully recover from stress is a primary characteristic of resilience, although there is some debate about how to conceptualize recovery and its relevance to resilience. Bonanno (2004) stated that the traditional definition of ‘recovery’ is the process by which people experience some disruptive event and consequent psychopathology or pathology-like symptoms, and then gradually recover to pre-event levels. He argues that resilience, on the other hand, is the active maintenance of stability, in that people exhibit a ‘stable trajectory’ of healthy psychological functioning over time, evidenced by a lack of psychopathology and related symptoms. This dissociation of resilience and recovery are relevant if one considers ‘psychopathology’ as the experience being recovered from. However, given our emphasis on people with remitted depression, this dissociation may not be as relevant here. People in remission from depression are by definition ‘recovering’ from depression.

More relevant and potentially useful for understanding how resilience can be taught in remission is to conceptualize recovery in the context of more discrete stressors. Resilience is associated with normal levels of negative emotions and physiological distress in response to stressful situations (Fredrickson et al., 2003; Tugade & Fredrickson, 2004), but also with successful recovery from these normal stress responses (Tugade & Fredrickson, 2004). For example, Tugade & Fredrickson (2004) examined how individual differences in ego-resilience (Block & Kremen, 1996) predicted recovery from a stressor. They made participants believe that they were going to have to give a public speech that would later be evaluated by their peers. Meanwhile, participants’ cardiovascular reactivity was being measured. Later, the participants

were informed that they would not have to give the speech. Results showed that those participants who identified themselves as higher in ego-resilience exhibited faster cardiovascular recovery times (return to baseline) compared to participants who identified themselves as lower in ego-resilience. In another study, investigators found that when recovering from a potential threat, people scoring high on the ego-resilience measure exhibited more complete emotional recovery (Vaughn, Fredrickson, et al., 2008) and less duration of neural activation in brain regions associated with the visceral aspects of emotion (insula; Vaughn, Wager, Fredrickson, Noll, & Taylor, 2008) than people scoring low on ego-resilience.

Recovering from discrete stressors is important for people to be able to adapt to chronic stressors. According to McEwen (2003), allostasis is maintaining stability through change (Sterling & Eyer, 1988) and physiological systems such as glucocorticoids (e.g. cortisol; Sapolsky, Romero, & Munck, 2000), adrenaline, and cytokines can produce changes in physiology that are adaptive in the short term, but lead to allostatic load (tissue damage, inflammation, etc.. McEwen, 1998) if not turned off. Thus, the ability for people to maintain stability through change that is characteristic of resilience is in part due to successful physiological recovery from stressors that allows the body to reset, and to prevent allostatic load.

**Relevance to depression and remission from depression.** One of the main themes of this article is that increased stress sensitivity is a primary vulnerability factor for people in remission from depression. Some evidence suggests that poor stress recovery is a primary component of this increased stress sensitivity. In response to discrete stressors, people diagnosed with depression take longer (than people without depression) to exhibit successful cardiovascular (Salomon, Clift, Karlsdottir, & Rottenberg, 2009) and cortisol (Burke, Davis, Otte, & Mohr, 2005) recovery. This prolonged recovery is present even in individuals with subclinical levels of elevated depressive symptoms (Gold, Zakowski, Valdimarsdottir, & Bovbjerg, 2004). Most importantly, though, poor recovery from stress seems to be a vulnerability factor that persists past the depressive episode. People with previous episodes of dysphoria (but no longer

dysphoric) exhibited prolonged negative emotional responses to a mood induction than people who were never dysphoric (Gilboa & Gotlib, 1997). In a sample of college students, these prolonged mood responses to mood inductions interacted with life stressors and attention to predict later increases in dysphoria (Beevers & Carver, 2003). This prolonged stress recovery seems to be specific to self-reported emotional responses and may be due to cognitive biases (De Raedt & Koster, 2010). Studies examining cortisol responses to stress in people in remission from depression found either no differences in cortisol reactivity/recovery from never-depressed people (men in Bagley, Weaver, & Buchanan, 2011) or actually decreased cortisol responsivity relative to never-depressed people (women in Bagley et al., 2011; Ahrens et al., 2008). These findings suggest that interventions designed to improve stress recovery to increase resilience in remitted individuals may need to specifically target the vulnerable response modalities.

### **Positivity**

Also known as ‘promotion’ (Davydov et al., 2010), positivity represents those positive traits, emotions, and general well-being that are strongly associated with resilience. In their definition of resilience, Luthar and Cicchetti (2000) described it as the confluence of two constructs - experiencing positive adaptation (maintaining age-appropriate well-being, competence) despite experiencing adversity (situations that are statistically associated with maladaptive outcomes). They and others (Bonanno, 2004; Fredrickson et al., 2003; Luthar & Cicchetti, 2000; Ryff & Singer, 1998) have posited that resilience is not just the absence of negative outcomes in response to adversity, but also the presence of positive outcomes. Resilience interventions should therefore promote positive outcomes in addition to alleviating vulnerabilities (Luthar & Cicchetti, 2000).

One strong exemplar of the positivity exhibited by people with resilient profiles is that they tend to experience positive emotions even in times of adversity and stress (Folkman & Moskowitz, 2000). For example, caregivers of people with AIDS were found to report similar

levels of positive emotions as reported by the surrounding community (Folkman, 1997). People with chronic illnesses reported experiencing more positive emotions than their non-hospitalized counterparts, even though they also reported experiencing more anxiety and depression (Westbrook & Viney, 1982), highlighting the importance of separately assessing positive adaptation and negative outcomes.

These positive emotions experienced during stress help people adapt. A study found that those people who experienced greater incidences of genuine smiling and laughter following the death of a loved one reported the highest level of adjustment to their new life circumstances (Keltner & Bonanno, 1997). In the previously mentioned study examining resilient responses to the attacks on 9/11, investigators found that people who self-identified as high in ego-resilience before the attacks reported higher levels of positive emotions after the attacks than those low in ego-resilience (Fredrickson et al., 2003). Further, these elevated positive emotions then predicted fewer depressive symptoms for the people high in resilience. This and other evidence indicates that experiencing positive emotions protects individuals with resilient profiles from experiencing psychopathology symptoms following stressful events.

One pathway through which positive emotions help people adapt to stressors is by improving stress recovery, our previously mentioned characteristic of resilience that is relevant to people in remission from depression. Ong et al., (2006) assessed daily diary reports of stress, negative emotions, and positive emotions, as well as trait resilience (with the same ER89 used in the Fredrickson et al., 2003 study above) in a sample of older adults. The investigators found that higher trait resilient participants exhibited better recovery from negative emotions following stressful days than did lower ego resilient participants. Similar to the Fredrickson et al. (2003) study, this association between resilience and stress recovery was mediated by positive emotions (Ong et al., 2006). In the previously mentioned cardiovascular recovery study, the faster cardiovascular recovery exhibited by people high in ego resilience following a stressor was mediated by self-reported positive emotions (Tugade & Fredrickson, 2004).

Resilience is also associated with cognitive schemas that support the experience of positive emotions in much the same way that people with depression (and remission from depression; Sheppard & Teasdale, 2004) have cognitive schemas that support the experience of negative emotions. Researchers have called this positive emotion schema ‘positive emotion granularity’ (Tugade, Fredrickson, & Feldman-Barrett, 2004), which refers to the propensity for people showing resilient profiles to report a greater variety of positive emotions, each of which are more specifically tailored to the situations in which these emotions arise. People with high positive emotion granularity think of their positive emotions as a more differentiated and specific palette of emotional experiences, which predicts greater coping resources in the face of adversity (Tugade et al., 2004).

**Relevance to depression and remission from depression.** One of the cardinal symptoms of depression is the lack of pleasure in previously enjoyable activities – also known as anhedonia. Anhedonia in depression is a multidimensional phenotype consisting of constructs such as differential responsivity to reward and lower positive affect (Heller et al., 2009; Sherdell, Waugh, & Gotlib, 2012; Treadway & Zald, 2011). It is currently unclear, however, whether such impairments are also observed in people in remission from depression and how these differential components of reward-responsivity (e.g. ‘wanting’ vs. ‘liking’; Berridge & Robinson, 2003) map onto the more general positive emotion findings in resilience outlined above. There is evidence, however, that improvements in positive emotions resulting from pharmacotherapy is a strong predictor of improvement in depression and subsequent remission (Geschwind et al., 2011). Also, some evidence suggests that greater positive affective responsivity to positive life events predicts lower recurrence of depression in people in remission from depression (Wichers et al., 2010).

### **Flexibility**

Recent advances in understanding resilience have focused on how people with resilient profiles adapt to ever-changing environments. The environment is constantly placing different

demands on people, whether they be positive or negative, and some theorists characterize resilience as the ability to flexibly adapt to those demands (Block & Kremen, 1996). This notion of 'psychological flexibility' highlights the importance of moving past characterizing resilient profiles as single adaptive responses to single events to characterizing them as the flexible application of a variety of adaptive responses to a variety of life events (Kashdan & Rottenberg, 2010). Beyond mere variability, flexibility is conceptualized as contextually appropriate responding in which an individual approaches the demands of different contexts by employing the appropriate responses to heighten the success of adapting to those contexts (Cheng, 2001; Waugh, Thompson, & Gotlib, 2011).

One example of the contextually appropriate responding characteristic of resilience is flexible emotional responding to emotion-inducing events. In one study, investigators instructed participants to either suppress or enhance their facial expressions in response to a series of stimuli. They measured expressive flexibility as the difference in facial expressiveness between the suppression and enhancement conditions and found that people high in expressive flexibility exhibited higher levels of positive adjustment three years later, especially for those experiencing high levels of life stress (Westphal, Seivert, & Bonanno, 2010). In a related study, investigators found that this emotional flexibility in resilient people also occurred naturally (i.e. when not instructed), in response to rapidly changing events (on the order of 10-12 seconds), and across multiple emotional response systems including self-report, facial expressivity, and startle-reflexes (Waugh et al., 2011).

Theorists will often tout the effectiveness of some coping strategy over another coping strategy, but some evidence highlights the adaptive qualities of being able to flexibly apply different coping strategies to different situations. Cheng (2001) described coping flexibility as variability in appraisals and use of coping strategies across situations, a good fit between the coping strategy and the demands of the situation, and the recognition of the effectiveness of these different coping strategies. In her study, she assessed the degree to which people

exhibited variability in their use of problem-focused coping and emotion-focused coping to different stressful situations. She found that, relative to those low in coping variability, those high in coping variability tended to match the demands of the situation (e.g. controllable or not) with the appropriate coping strategy (e.g. problem vs. emotion-focused) and reported less depression and anxiety.

That resilience can be characterized by emotional and coping flexibility suggests that flexibility should be a target of resilience interventions. Many interventions are tailored to help people cope with specific stressors like graded exposure therapy for people with phobias, or grief therapy for people mourning the loss of a loved one. Interventions that target flexibility, however, would require training on multiple strategies to cope with an array of possible stressors. Flexibility interventions could focus on improving a) discrimination facility (Cheng, 2003) – the ability to accurately appraise situational characteristics and the associated demands, b) coping fit – matching the appropriate coping strategies to each situation, and c) coping knowledge – how to effectively use each particular coping strategy.

**Relevance to depression and remission from depression.** Whereas flexibility is a core characteristic of resilience, evidence suggests that psychological inflexibility may be a characteristic of depression. In a meta-analysis of the literature on emotional responses to various stimuli in people with depression, investigators found that people with depression are characterized by decreased positive emotional responses but sometimes also decreased negative emotional responses (Bylsma, Morris, & Rottenberg, 2008; although this effect is mixed in daily diary studies, Bylsma, Taylor-Clift, & Rottenberg, 2011). They use these data to support the formulation that depression is characterized by emotional context insensitivity – not exhibiting the appropriate emotional responses to emotional events (Rottenberg, Gross, & Gotlib, 2005). Related to inflexibility, investigators have also found that depressed people exhibit greater negative affect ‘inertia’ in which their negative affect from one event carries over to a subsequent event (Koval, Pe, Meers, & Kuppens, 2013). Depressed people also exhibit reduced



contextual processing during cognitive tasks (Msetfi, Murphy, Simpson, & Kornbrot, 2005), and this inflexibility may be related to the high levels of internal attention seen in maladaptive rumination (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). There is meta-analytic evidence that emotional inflexibility prospectively predicts poorer courses of depression (Morris, Bylsma, & Rottenberg, 2009), and increased stimulus-appropriate emotional reactivity – even to negative stimuli – prospectively predicts recovery from depression (Rottenberg, Salomon, Gross, & Gotlib, 2005).

These studies suggest that people in remission may be more emotionally flexible than when they were in the midst of their depressive episode. However, evidence suggests that people in remission still exhibit some deficits in flexibility that should be targets for intervention to reduce the likelihood of relapse. Remitted depressed individuals are characterized by impaired disengagement of negative information and reduced cognitive control (De Raedt & Koster, 2010; Vanderhasselt & De Raedt, 2009). In a prospective study, remitted depressed individuals that had stronger impairments to shift attention away from negative information held in working memory showed a larger increase in depressive symptoms a year later (Demeyer, Koster, De Lissnyder, & De Raedt, 2012). Moreover, in an event-related potential study, Vanderhasselt and De Raedt (2009) found that cognitive control impairments increased with a higher number of past depressive episodes. Cognitive control and the ability to disengage attention from negative information are considered important cognitive factors that are crucial for emotion regulation flexibility whereas impairments in disengagement and cognitive control contribute to inflexibility as evidenced by high levels of rumination (Koster, De Lissnyder, Derakshan, & De Raedt, 2011).

## **Summary**

Because we focus on increased stress sensitivity as a primary vulnerability factor in people in remission from depression, the three aspects of resilience that we suggest are the most important to target to prevent recurrence are (1) improving stress recovery from minor

daily stressors that may aid remitted people in coping with major stressors, (2) increasing positivity, like promoting positive emotions during stress, (3) and training flexibility – the ability to identify different demands in the environment and employ the appropriate coping strategy to meet those demands.

Although we have presented these aspects of resilience separately, there is a strong likelihood that improving one would elicit improvements in the others. Both induced positive emotions (Fredrickson, Mancuso, Branigan, & Tugade, 2000), and individual differences in positive emotions (Tugade & Fredrickson, 2004) have been found to predict improved recovery from stressors. Positive emotions have also been linked to flexibility. Supporting Fredrickson's broaden-and-build theory of positive emotions (Fredrickson, 1998, 2001), studies have found that positive emotions lead to cognitive (Johnson, Waugh, & Fredrickson, 2010) and social (Waugh & Fredrickson, 2006) flexibility. Indeed, in one study, investigators suggested that responsivity to positive emotion inducing events is a primary mechanism underlying the emotional flexibility characteristic of resilience (Waugh et al., 2011). Lastly, investigators have suggested that one form of emotional flexibility is the successful recovery from stressors that allows for the conservation of resources needed to flexibly engage with subsequent opportunities/stressors (Waugh, Wager, et al., 2008).

### **Relevant assessments of resilience**

The selection of the appropriate measurement of resilience will guide interventions as well as help determine whether these interventions were successful. Resilience assessments will differ in the degree to which they pertain to people in remission. We next discuss briefly general categories of resilience measurement (Davydov et al., 2010) and their merits/weaknesses.

### **Self-reported aspects of and related to resilience**

The simplest measurement of resilience is to ask people if they consider themselves resilient. There are a myriad of self-reported resilience questionnaires available including the

Connor-Davidson Resilience scale (CD-RISC, Connor & Davidson, 2003) and the ER89 – ego-resilience scale (Block & Kremen, 1996). These scales typically assess constructs related to resilience directly like the ‘ability to adapt to change’ (CD-RISC) and constructs that are believed to be aspects of a resilient profile like sociability, openness to experience, and self-efficacy (ER89). One merit of these scales is that they are easy to administer and show good predictive validity. For example, higher scores on the ER89 before the attacks on 9/11 predicted more resilient responses in the months following 9/11 (Fredrickson et al., 2003).

Investigators have also used questionnaires that assess constructs that closely resemble the construct of resilience or constructs that are thought to predict resilience. For example, hardiness (Kobasa, Maddi, & Kahn, 1982) is a closely related construct to resilience and has also been shown to predict resistance to stress. The personality characteristic of hardiness is composed of three parts: finding meaning in life, learning from one’s experiences, and having high perceived control (Bonanno, 2004) and also has good predictive validity. Florian and colleagues (1995) found that Israeli soldiers who reported having the hardiness factors of high control and high commitment experienced greater mental health after a grueling 4-week combat training period (Florian, Mikulincer, & Taubman, 1995).

When evaluating self-report measures of resilience in the context of remission, investigators should be wary that the act of having experienced depression may somehow bias responding on these measures. First, if people have belief systems that resilience connotes never having succumbed to psychopathology given life adversity, then they may believe that having been depressed disqualifies them from ever being resilient. This belief system may be particularly difficult to overcome for people who endorse entity theories of personality that traits are stable and not subject to growth or learning (Dweck & Leggett, 1988). To ameliorate this issue, investigators will need to emphasize the dynamic nature of resilience, the potential for growth in resilience, and possibly adapt scales to assess facets of resilience by instructing people to consider their ‘recent experience’ as opposed to their life history (e.g. ‘usually’ or ‘in

general'). One caveat to this recommendation, however, is that investigators will need to be wary of the pendulum swinging the other way. People will often contrast their current experience with their recent hardship and report great changes in resilience and 'post-traumatic growth' that may (Tedeschi & Calhoun, 2004) or may not (Frazier, Gavian, Tomich, & Tashiro, 2009) reflect real changes in resilient behavior. Second, people who have had depression often exhibit affective instability – frequent and severe changes in mood (Thompson, Berenbaum, & Bredemeier, 2011; Thompson et al., 2012) – and day to day changes in mood states can influence people's report of their overall states of well-being/resilience (Schwarz & Clore, 1983). To overcome this issue, investigators will need to administer self-reports of resilience across multiple days.

Another issue with self-report measures of resilience is that whereas some evidence suggest that they have good predictive validity (Florian et al., 1995; Fredrickson et al., 2003), these studies have almost exclusively been conducted with people who have yet to exhibit psychopathology. Some evidence suggests that scores on these scales can predict responses to treatment for psychopathology (Davidson et al., 2005). It is not yet clear, however, how these resilience scales might predict successful and continued recovery from depression. This predictive validity will need to be demonstrated before these scales can be used as endpoints for a resilience intervention.

### **Criterion tests of resilient behavior**

An alternative method to assess resilience is by indexing changes in resilient behavior. Instead of (or in addition to) asking people to self-report on their behavior, investigators can directly assess their behavior either in the field or in a laboratory setting. Although this method may be more costly to employ, it circumvents the issue with self-report in which people incorporate their beliefs about resilience and personality change into their responses. In the previous section on resilience targets, we discussed precisely those behaviors that we believe would reflect increases in resilience during remission. To examine *successful recovery*

from stress, investigators could index resilient responses as complete/quick physiological and/or emotional recovery from some stressful situation that they have undergone either in the lab (Tugade & Fredrickson, 2004) or in daily life (Ong et al., 2006). To examine *positivity*, investigators could assess the presence and maintenance of positive emotions in normal daily life (Fredrickson et al., 2003), and during naturalistic (Folkman, 1997) or lab stressors (Tugade & Fredrickson, 2004). In addition to positive emotions, investigators could assess physiological indicators of good mental and physical health (e.g. strength of the parasympathetic nervous system; Kok & Fredrickson, 2010). Lastly, to examine *flexibility*, investigators would need to assess multiple situations (either in the lab; Waugh et al., 2011, or in daily life; Cheng, 2001) and the appropriateness of an individual's coping response to those situations.

Similar to the predictive validity issue with self-report assessments, behavioral assessments have also been mostly validated as predictors of resilience in people who have never experienced psychopathology. For example, emotional flexibility in the lab predicts good psychosocial outcomes years later (Westphal et al., 2010) and positive emotions predict successful coping with bereavement (Keltner & Bonanno, 1997) and fewer depressive symptoms in response to a traumatic life event (Fredrickson et al., 2003). Some studies have shown that increases in contextually appropriate responding predicts recovery from depression (Rottenberg, Salomon, et al., 2005), however, it is still unclear whether these behavioral indices of resilience will predict sustained recovery from depression in remitted individuals. As with self-report measures, the predictive validity for behavioral indices of resilience in people in remission from depression will need to be established before they can be used as endpoints of resilience interventions.

## Summary

Choice of resilience assessment should be guided by how well that assessment reflects the mechanisms that investigators are targeting for intervention. Self-report assessments are quick and easy, but may be biased by pre-existing belief systems about resilience and lingering

depressive cognitive schemas in people in remission from depression. Criterion assessments of resilience may avoid cognitive biases, but are more difficult to implement and have yet to be validated as predictors of sustained recovery from depression.

### **Resilience interventions**

We have thus far provided a theoretical justification and framework for enhancing resilience in prevention and treatment for recurrent depressed individuals. In this section we will briefly provide a few examples of the many treatment approaches that have been specifically developed or have strong potential to enhance successful stress management, positivity, and flexibility. We will not review the extensive literature on more typical interventions such as CBT, IPT, Mindfulness-based cognitive therapy and acceptance and commitment therapies since these therapies are covered by other papers in the special issue. We do emphasize that given the current evidence obtained in outcome research, CBT and IPT are considered first line choices for treatment of depression (Cuijper, in press; see also Padesky & Mooney, 2012 for a resilience-based version of CBT), with emerging evidence for the usefulness of mindfulness based cognitive therapy and preventative cognitive therapy in the prevention of recurrence (Bockting, Spinhoven, Wouters, Koeter, & Schene, 2009). The current overview of therapeutic possibilities, therefore, is mainly aimed to point towards new directions in clinical intervention research.

An important element shared by many of the interventions discussed next is the focus on building positive functionality rather than on reducing negative symptoms. We have argued that resilience and vulnerability are on the same continuum, so ‘reducing vulnerability’ *should* be conceptually identical to ‘improving resilience.’ In practice, however, having the goal of preventing some negative outcome (e.g. ‘vulnerability’) is associated with avoidant behaviors and attitudes (like reducing negative emotions), whereas having the goal of promoting some positive outcome (e.g., ‘resilience’) is associated more with approach behaviors and attitudes (like increasing positive emotions; Higgins, 1998). Compared to traditional therapeutic

approaches, resilience interventions tend to be more focused on promoting positive attributes and emotions, rather than reducing negative symptoms and emotions (see Hayes, Strosahl, & Wilson, 1999; Ryff & Singer, 1998), but the desired result is the same - to ultimately make people less vulnerable and more resilient. We briefly describe some of these interventions and selectively review some of the key findings.

### **Positivity training**

As identified earlier, a key ingredient in resilience is promotion of positive emotions/well-being. Ryff and Singer (1998) argued that therapies should not focus just on relieving negative emotions, but also on accentuating positive psychological resources. There is some encouraging evidence that these 'positive' interventions aimed at increasing well-being, positive emotions and resilience have beneficial effects in depression. For instance, a meta-analysis revealed that interventions aimed at enhancing positive emotions (e.g., encouraging gratitude, considering positive events) enhance well-being and decrease depressive symptoms (Sin & Lyubomirsky, 2009). Ryff and Singer (1998) as well as others also posit that promoting positivity is not necessarily the same as reducing negativity, a claim that is supported by studies on emotion showing that negative and positive emotions are independent from each other (Cacioppo & Berntson, 1994). Furthermore, research has demonstrated quite convincingly that positive emotions are a unique predictor of resilience. For instance, a study showed that daily positive emotions predicted increases in both resilience (measured with the ER89) and life satisfaction and that negative emotions did not influence the effects of positive emotions (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009). Thus, interventions solely aimed at alleviating negative emotions may not necessarily help to promote positive emotions.

One example of positivity training is well-being therapy. Ryff and colleagues (Ryff, 1989; Ryff & Keyes, 1995; Ryff & Singer, 1998) developed well-being therapy based on Ryff's conception of well-being as being composed of 6 factors: environmental mastery, personal growth, purpose in life, autonomy, self-acceptance, and positive relations with others. Well-

being therapy is a short-term psychotherapeutic strategy provided typically for 8 to 12 weekly sessions. It provides an individually tailored program that uses self-registration through diaries and in-session interaction between patients and therapist. Early phases of treatment emphasize developing skills and the capacity to sustain attention to aspects of daily experience or emotions that are positive. Later phases of treatment aim to promote psychological well-being.

There are several studies examining the efficacy of well-being therapy in the context of recurrent depression. One study that included individuals with multiple recurrent episodes of depression examined whether well-being therapy combined with other cognitive behavioral treatments was more effective than clinical management alone (Fava, Rafanelli, Grandi, Conti, & Belluardo, 1998). Interestingly, the group that received cognitive behavioral therapy plus well-being therapy reported significantly fewer residual symptoms after drug discontinuation relative to the clinical management group. These beneficial effects were also observed at two-year and six-year follow-ups; the groups receiving well-being therapy exhibited lower relapse rates than the group receiving clinical management (Fava et al., 2004).

### **Stress inoculation training**

One of the counter-intuitive findings in the mental health literature is that sometimes moderate amounts of stress can help people become more resilient to future stressors. This 'stress inoculation' phenomenon has been observed in a wide variety of contexts. For instance, in one study, monkeys who were separated from their mothers and placed into a novel environment at an early age showed better adaptability later (reduced latency to explore novel environments) than non-inoculated monkeys (Parker, Buckmaster, Schatzberg, & Lyons, 2004). There are also some data to support the existence of stress inoculation in humans. Exposure to a limited number of major life stressors predicts better outcomes (lower global distress and functional impairment) than do zero life stressors or several life stressors (Seery, Holman, & Silver, 2010). Similarly, in an investigation on the effect of floods on people's mental health,



investigators found that people who had previously experienced floods did not exhibit increased anxiety when a new set of floods occurred, whereas those who had no experience with floods experienced mild increases in increased anxiety/distress (Norris & Murrell, 1988).

An intriguing question is whether stress inoculation could be effective for people in remission from depression who exhibit increased sensitivity to stress. Critically important may be whether the stress occurs in a controlled environment that allows for the individual to learn how best to cope. Stress inoculation training (Meichenbaum, 2007) was developed specifically with this goal in mind. The treatment goals of SIT are to enlarge the coping repertoire (intra- and interpersonal skills), as well as confidence in the ability to flexibly apply coping skills to meet perceived demands of stressful situations. Three phases are identified in SIT: (1) Conceptualization – education designed to establish therapist relationship and client’s understanding of their stressors and how they are impacted by them; (2). Acquisition and consolidation of coping skills that are first practiced in session and then gradually transferred in vivo; (3) Application and follow-up where the acquired coping skills are applied to increasingly demanding stressors.

Although there is little research on the effectiveness of SIT in remitted depressed patients, several interesting strands of research provide some indication that SIT could be useful in depression. For example, investigators examined the effects of SIT in emergency medical personnel (Varker & Devilly, 2012). In this study, SIT included training on thought-stopping techniques (replacing maladaptive thoughts with adaptive ones), serial desensitization to still images of car accidents, and on the importance of social support. Those receiving the SIT training vs. ‘accident pragmatic instruction’ exhibited decreasing levels of depression and stress after seeing a graphic car accident video. In another study, investigators tested the effectiveness of a form of SIT that features stress management techniques (cognitive restructuring, problem-solving) and relaxation techniques (progressive muscle relaxation). They

found that, in healthy college-aged participants, participants in the SIT group vs. a wait-list control group exhibited less cortisol reactivity to the trier social stress test, suggesting that the effects of SIT may generalize to social stressors (Gaab et al., 2003). Although these findings are encouraging, future investigations are needed to determine whether SIT would be effective in building resilience people with a history of depression.

## **Meditation**

Meditation is a form of mental training that takes advantage of the brain's inherent neural plasticity – changes in neural structure and functioning in response to environmental demands (Buonomano & Merzenich, 1998). As a form of mental training, meditation has an advantage over other types of skills training in changing neural structure and functioning (Slagter, Davidson, & Lutz, 2011). Meditation, and other forms of mental training, do not rely on external stimuli, but instead rely on the mental simulation of core cognitive and emotional processes that support a wide range of related skills (Slagter et al., 2011). This propensity for meditation-induced changes in neural processes to support skills that transfer to novel areas of one's life provides one powerful mechanism through which meditation can induce lasting behavioral and emotional changes.

There are substantial data indicating that meditation is a useful technique to improve the components of a resilient profile. Mindfulness based therapy, for example, has been shown to be effective in reducing stress reactivity as well as in increasing behavioral flexibility (for a review, see Davis & Hayes, 2011). For example, investigators found that the more people practiced compassion meditation over a 6-week period the less was their stress-induced IL-6 responsivity (involved in the immune response) as well as self-reported stress reactivity (Pace et al., 2009). Interestingly, an fMRI study comparing neural reactivity to induced sadness in participants completing 8 weeks of mindfulness training and waitlist controls found that with

mindfulness training there was greater activation in visceral and somatosensory areas associated with body sensation. This increase in interoceptive awareness was associated with decreased depression scores, which suggests that individuals' increased bodily awareness helps them to deal more efficiently with stress. In another study, investigators found that 8 weeks of mindfulness-based stress-reduction meditation training predicted reductions in gray-matter density in the amygdala, which in turn predicted reductions in self-reported current life stress (Holzel et al., 2010). These findings suggest that the neural plasticity triggered by meditation is consequential – it supports the positive physiological and behavioral changes that may allow people to be more resilient in the face of future stressors.

Meditation training also has documented beneficial effects on positive emotions and cognitive flexibility. In a longitudinal experiment, loving kindness meditation increased daily levels of positive emotion for those who practiced it, which then led to increases in personal and social resources like purpose in life and social connection (Kok et al., 2013). Similarly, emerging evidence suggests that mindfulness can facilitate cognitive flexibility. In a study on affective reactions to emotional movie clips, participants in a mindfulness condition not only reported significantly greater positive affect in response to the positive film but also reported more adaptive regulation in response to an affectively mixed clip (Erisman & Roemer, 2010). Such findings have led to the introduction of meditation and mindfulness techniques in applied settings including, among others, military contexts to promote resilient responses to the upcoming stress of deployment to a war zone (Stanley & Jha, 2009). Relevant to remitted depression, investigators have combined elements from these meditation techniques with elements from cognitive behavioral therapy for depression to form mindfulness-based cognitive therapy (MBCT; Teasdale et al., 2000), a therapy shown to help prevent recurrence of depression (see Khoury et al., 2013).

## Conclusion

In this article, we have presented a justification and framework for employing resilience interventions in people who are in remission from depression (Figure 2). If resilience is considered to be a collection of adaptive processes that are present in some form in all people, then people who have experienced a depressive episode could be considered to be 'deficient' in resilience rather than 'lacking in resilience.' This formulation opens the door for the potential to improve resilience in this population. To do so, one must first identify the vulnerability factors in that population that relate to this possible deficiency in resilience. In this article, we chose as this vulnerability remitted people's increased sensitivity to stress-induced subsequent depressive episodes given that a prominent definition of resilience is experiencing stress and not exhibiting any type of psychopathology. We do not claim that this is the only vulnerability present in remitted individuals, but that this vulnerability is particularly relevant to a model of deficient resilience. One task for investigators will be to identify other vulnerabilities in this and related populations that may be similarly impacted by resilience training.

There are a myriad of psychological and physiological profiles associated with good stress responding. We chose to focus on three that are highly relevant to resilience: stress recovery, positivity, and coping flexibility. Investigators should explore, however, the many other profiles of good stress responding that or may not be independent of those listed above. For example, we focused on intrapersonal mechanisms, but interpersonal processes also influence stress responding both via the mechanisms listed above (e.g., people can derive great happiness and positive emotions from social situations, Gable, Reis, Impett, & Asher, 2004), and possibly independently (e.g., sociality influencing genetic expression in stress-related genes; Cole, 2009).

Given that the average resilience profile is one in which people are able to adapt to even highly stressful circumstances (Bonanno, 2004), resilience interventions should generally have the goal of improving the resilience in remitted individuals to match those of ordinarily functioning people. One important avenue of research will be to determine whether reaching

'ordinary' levels of resilience may sometimes require overtraining on some elements underlying resilience. For example, although the findings were mixed, one study found that depressed people who responded well to certain treatments reported higher positive affective persistence than both depressed non-responders and healthy controls (Hohn et al., 2013). Another avenue of research will be to determine the appropriate timing of these resilience interventions to match the needs of the situation and symptomatology of the patient. During the early parts of remission, when residual depressive symptoms are still high, it will still be important for therapy to focus on the source of those residual symptoms. Yet, reconnecting the client back to positive emotions and experiences relatively early in treatment may also be important for having the client experience that he/she can feel differently and has been able to do so in the past.

Many people experience their first onset of depression during adolescence (Kessler, Berglund, Demler, Jin, & Walters, 2005), a substantial percentage of whom will also experience their first remission period and subsequent relapse while still an adolescent (Lewinsohn, Clarke, Seeley, & Rohde, 1994). Resilience is perhaps most often studied as a childhood/adolescent process, with investigators identifying both age-general resilience factors such as competence as well as age-specific resilience factors such as having adult role models (Masten, Best, & Garnezy, 1990). Although we focused on resilience and remission in adults in this article, it will be important for investigators to adapt and perhaps revise the framework described herein to be helpful for understanding the relation between resilience and remission from depression in adolescents and children.

In sum, resilience training may be an effective additional tool available to therapists and counselors in helping people in remission from depression. Needed now are empirical studies that test the effectiveness of both established and new resilience interventions for increasing resilience in remitted individuals. Importantly, these interventions are not meant to supplant, but rather supplement existing therapies with the ultimate goal of reducing the likelihood of the recurrence of depression.



### **Acknowledgments**

The authors thank Earnest Strickland, Megan Keiffer, Lynn Bruyneel, and Tiffany Kichline for their help in gathering sources for this article. Preparation of this manuscript was partially supported by Grant BOF10/GOA/014 for a Concerted Research Action of Ghent University (awarded to Ernst Koster).

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### Figure Captions

**Figure 1.** Hypothesized relationship between resilience/vulnerability and stress sensitivity/adaptability during periods of recurring depressive episodes or resilience interventions.

**Figure 2.** Framework for improving resilience in vulnerable populations and examples of how to do so in individuals in remission from depression.



