# How Mindfulness Affects Resilience: Based on Mindfulness Based Stress Reduction and Mindfulness in Motion Therapy

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**ABSTRACT**

Notably, most individuals do not develop such psychiatric disorders after experiencing stressful life events. The ability to adapt positively in the face of stress and adversity is resilience. Although previous studies have explored the relationship between mindfulness and resilience, the underlying mechanism of the relationship remains unclear. This study explores the theoretical mechanisms by which mindfulness affects resilience, to better utilize mindfulness training to improve people's resilience. Taking mindfulness based stress reduction and mindfulness in motion as examples, this study finds that mindfulness training affects mindfulness through physiological pathways (such as cerebral cortex, brain waves and hypothalamic-pituitary-adrenal axis) and psychological pathways (self-regulation and self-efficacy). Future empirical research can explore the two paths of "mindfulness-self-regulation-resilience" and "mindfulness-self-efficacy-resilience", while future theoretical research can systematically study mindfulness and psychological A theoretical model of resilience. The findings of this study not only extend the theoretical progress on mindfulness and psychological resilience but also have implications for the practice of psychological resilience intervention.

***Keywords:*** *Mindfulness therapy, Resilience, Influence mechanism*

## 1. INTRODUCTION

Due to the outbreak of novel coronavirus disease (COVID-19) over and over again in recent several years, it has forced dramatic changes in aspects of socializing, working, learning, and recreation, causing stress and conflict. Stressful life events and chronic adversity can harm people's physical and mental health and can result in the development of psychiatric disorders [1]. Notably, most individuals do not develop such psychiatric disorders after experiencing stressful life events. Instead, they positively adapt to the changes brought by adversity. The ability to adapt positively in the face of stress and adversity is resilience [1]. Individuals with high resilience, in the face of external environmental changes and adversity, tend to be more adaptive. They will rebound to original mental health more easily and even achieve self-growth [2, 3]. Thus, resilience plays a key role in adapting to the dramatic changes and stress of COVID-19. Numerous studies have found that Mindfulness therapy is effective in enhancing individuals' resilience. But, no one has yet explained how mindfulness affects resilience. To better help people improve resilience through mindfulness, it is necessary to explore the potential pathways of mindfulness affecting resilience. Therefore, understanding how mindfulness affects resilience is meaningful. This study aim to introduce resilience, mindfulness therapies—Mindfulness Based Stress Reduction (MBSR) and Mindfulness in Motion (MIM), and suggest possible pathways of mindfulness therapies to enhance resilience in the context of mechanisms of mindfulness and resilience.

 

## 2. LITERATURE REVIEW

### *2.1. What is Resilience*

#### *2.1.1. Definitions of Resilience*

Fundamentally, resilience is the ability to maintain or regain mental health in the face of adversity [4]. As a force, it could motivate a person to grow through adversity [2], assist one in positively adapting to the changes brought on by adversity, and even help one attain self-growth. However, researchers from a variety of disciplines have researched resilience [4]. The definition of resilience changes as scientific knowledge increases. As a result, no operational definition of resilience has been widely acknowledged.

The study of resilient phenomena from diverse disciplines brought three waves of resilience development [2] and evolved two definitions of resilience. Initially, researchers used a phenomenological approach to characterize resilience and conceptualized resilience as personal traits coping with a short-lived trauma [2]. These traits operate as protective factors, helping people grow through adversity (i.e., self-esteem, self-efficacy) [2]. Then, resilience was enlarged to a dynamic process of positively adapting to adversity after concentrating on the fact that systems (families, schools, groups, and communities) can contribute to resilience.

#### *2.1.2. Sources of Resilience*

The psychological source of resilience includes personality traits (openness, extraversion [4], cognitive flexibility, cognitive appraisal, optimism, self-efficacy, etc [2]. Luthans and Youssef believe that resilience also comes from a firm acceptance of reality and a deep belief that life is meaningful [3]. Researchers focused more on the study of biological factors in resilience as neuroscience developed. Neuropeptide Y (NPY), the HPA axis (hypothalamic-pituitary-adrenal axis), changes in brain size, neural networks, receptor sensitivity, and neurotransmitter synthesis and reuptake, among other biological sources of resilience, have been discovered in recent studies [1, 2, 5].

Therefore, in this review, resilience is defined as the ability to adapt positively and grow in the face of adversity, which is influenced both by psychological and biological factors. We will propose the potential impact of mindfulness therapies on psychological and biological factors in resilience based on this definition and the mechanisms of mindfulness. Then, we will discuss the possible pathways of mindfulness therapies to enhance resilience.

### *2.2. What is Mindfulness*

#### *2.2.1. Introduction of Mindfulness*

Mindfulness was conceptualized from Buddhism to psychology as three concepts: the original meaning in Buddhism, the clinical descriptive definition and the operational definition in measurement. The original meaning in buddhism: mindfulness originated from the Satiparrhana Sutta, known as insight meditation. It is one of the noble eightfold paths, which is used to eliminate suffering and achieve self-awareness.

About descriptive definition, Since Kabat Zin applied mindfulness to clinical practice, mindfulness is widely understood as "the awareness that arises by paying attention on purpose, in the present moment, and non-judgmentally" [6]. About operational Definition: Bishop et al. proposed a two factor definition of mindfulness consisting of self-regulation of attention and a purposive, attitudinal orientation toward the present moment [7]. Then, with the development of different mindfulness scales, the operational definition of mindfulness changes with different structures and dimensions.

#### *2.2.2. The Mechanisms of Mindfulness*

##### *2.2.2.1. Psychological Mechanism of Mindfulness*

Many studies have found that mindfulness training can change the processing of self-concern, such as Experiential Selfless Processing (ESLP), self-regulation, and self-efficacy.

About experiential selfless processing, some researchers pointed out that Experiential Selfless Processing (ESLP), which is non self-referential processing, may be the potential metacognitive processing mechanism of mindfulness [8]. About self-regulation, Short et al. provide evidence for mindfulness training in significantly enhancing self-regulatory capacity [9]. About self-efficacy, Chang et al. examined the MBSR intervention on self-efficacy and found that post-intervention levels of mindfulness self-efficacy were significantly higher than pre-intervention levels [10].

##### *2.2.2.2. Physiological Mechanism of Mindfulness*

Studies showed that mindfulness training can lead to significant changes in the cerebral cortex, brain waves, neuropeptides, and so on. About the cerebral cortex, mindfulness training can improve the activation of the rostral anterior cingulate cortex (rACC), dorsal medial prefrontal cortex (dmPFC) [11], midline cortical structures, the right posterior cingulate cortex [12]. About brain waves, studies found that the effects of mindfulness training on frontal α-asymmetry of patients with depression is significant [13]. Neuropeptides: Dada

et al. found significant changes of mindfulness meditators in serum biomarkers, such as decreased cortisol and decreased β-endorphins [14].

### *2.2.3. Mindfulness Therapies*

Mindfulness is a type of non-judgmental awareness to the present moment [15]. Mindfulness therapy originated in Eastern Buddhist teaching of the Eightfold Path and was later used in clinical applications.

Mindfulness therapy is a general term for psychotherapy, which implements mindfulness as a concept in the psychological intervention process. Mindfulness therapy has a long history of development and is divided into the first wave and the second wave [16]. It is commonly referred to as the first generation and the second generation of Mindfulness therapy. General the first wave consists of the currently used Mindfulness therapies: Mindfulness-based Stress Reduction (MBSR), Mindfulness-based Cognitive Therapy (MBCT), Dialectical Behavioral Therapy (DBT), and Acceptance and Commitment Therapy (ACT), which are primarily applied in clinics for a long time. Also, the second wave, which started in the last five years, inherited the basic idea of the first generation of Mindfulness therapy and based on it, made some daily improvements. For example Meditation Awareness Training (MAT), Mindfulness-Based Positive Behavior Support (MBPBS), and Mindfulness in Motion (MIM).

Several empirical types of research have been conducted to apply Mindfulness therapy to clinical treatment, illness relief, relaxation, stress reduction [17], dealing with anxiety and depression, improving interpersonal relationships, enhancing well-being and work efficiency, and growing up resilience. This study focuses on MBSR in the first generation of mindfulness therapy and MIM in the second generation of mindfulness therapy to discuss how mindfulness affects resilience.

### *2.2.4. The Relationship between MBSR and MIM*

MBSR is the most commonly used mindfulness therapy in the first generation that helps patients begin a journey of growth, learning, and healing in self-awareness and has grown steadily in the clinical intervention program since the Stress Reduction Clinic at the University of Massachusetts Medical Center was established in 1979 [15]. In the 8-week MBSR program, participants participate once a week in meditation, yoga practice, and are required to practice completing homework assignments [18].

MIM (Mindfulness in Motion) is a shorter, more flexible approach, which is based on a modification of first-generation mindfulness therapy to reduce stress and experience the benefits of mindfulness [19].

The relationship between MBSR and MIM is obvious. The length of the psychological intervention and the content of the group sessions for MBSR and MIM have much in common: Firstly the total length is 8 weeks. And second, both of them focus on yoga and breathing meditation exercises with some soft CD/DVD kinds of music. MIM is simpler than MBSR because it does not require changing any special yoga clothing or yoga place. You can do MIM practice just wear daily clothes during work breaks.

## 2.3. THE POTENTIAL PATHWAY OF MINDFULNESS AFFECTS RESILIENCE

### *2.3.1. The Evidence from empirical studies*

#### *2.3.1.1. Results of MBSR and MIM affect Resilience*

Many researchers examined the MBSR and MIM intervention on resilience, reappraisal, suppression, job stress, sleep quality, perceived stress, burnout, work engagement, depersonalization, personal accomplishment, destress tolerance, anxiety, etc, and they all found out that post-intervention levels of resilience were significantly higher than pre-intervention [20-24]. In terms of the participants of these studies, employees, medical workers, and vulnerable groups were studied. For example, employees working at OSUWMC reported 2.4 changes in CD-RISC [21]. According to the measurement tools of these studies, many studies used Conor Davidson Resilience Scale 10 (CD-RISC 10) to measure resilience [20-22], and some studies used the Brief Resilience Scale(BRS) and Resilience Scale (RS-14) respectively [23]. According to the site of intervention, previous studies have conducted mindfulness intervention offline, while Klatt has tried mindfulness intervention via the MIM password-protected website [21]. In terms of the intervention effect, most studies have significantly improved resilience through mindfulness intervention, and one study has not achieved significant results [23].

#### *2.3.1.2. Summary of the General Tend*

With the emergence and development of COVID-19 and the increase of social pressure, more and more high-pressure groups need to enhance resilience urgently. Participants in different industries will be studied to explore the effect of a mindfulness intervention on resilience. In addition, the online intervention will be more and more popular among researchers because it is not limited to time and space.

### *2.3.2. Hypothetical Model of Mindfulness affects Resilience*

#### *2.3.2.1. Description of the Model*

The model of mindfulness affecting resilience includes two paths: biological path and psychological path. In the biological path, mindfulness training will affect the individual's cerebral cortex, brain waves, neuropeptide Y, and HPA axis, which are significantly related to psychological elasticity. In the psychological path, mindfulness training will affect an individual's cognition, in which self-regulation and self-efficiency are significantly related to the level of psychological elasticity

#### *2.3.2.2. Biological Pathway*

The physiological mechanism of mindfulness and the physiological mechanism of resilience are very complex. In this study, we chose Neuropeptide Y (NPY) and the hypothalamic-pituitary-adrenal axis (HPA axis) as keywords to discuss the link between the physiological mechanism of mindfulness and the physiological mechanism of resilience. Based on this to explain how mindfulness affects resilience in the biological path.

First, in the physiological field of mindfulness, several studies have shown that mindfulness can alter an individual's cerebral cortex, brain waves, NPY, and HPA axis. The changes in the cerebral cortex and brainwaves through mindfulness have been discussed in the previous section. Mindfulness also plays a crucial role in promoting the release of NPY. Meditation practice may help promote the release of hypothalamic endorphins [25] and the secretion of dopamine in the brain [26]. In addition to this, studies have shown that after mindfulness, sympathetic tone decreases, HPA axis mediation is inhibited, and stress response is reduced, enabling and rapidly restoring the person to a state of homeostasis, which is obvious in all physiological mediators [27].

Through the above changes in physiological mechanisms can be demonstrated the effect of mindfulness therapy on neuropeptide Y and HPA axis. In the meantime, physiological mechanisms of psychological resilience have not been thoroughly studied, and several studies have found a relationship between NPY and the HPA axis in resilience. Resilience can be viewed as an individual's ability to recover after trauma or adversity, in which adversity is interpreted as having a damaging effect on one or more neural substrates. First, NPY is a neurotransmitter with anxiolytic effects that are released in response to anxiety scenarios and serves to protect the organism [28]. Second, people who are exposed to an anxiety situation lead to alterations in the HPA axis. the HPA axis is involved in the physiological and psychological responses to stress [29], and reducing stress-induced activation of the HPA axis and limiting glucocorticoid overproduction can effectively suppress the stress response [30]. Furthermore, a recent study indicated that two NPY haplotypes represented by three single nucleotide polymorphisms (SNPs) were associated with increased susceptibility to anxiety disorders following childhood adversity. It was shown that this behavioral effect can be mediated by alterations in NPY expression and subsequent inhibition of HPA axis reactivity under the influence of genetic variants [31].

The release of the NPY and the inhibition of the HPA axis through mindfulness therapy bring about the recovery of the individual. In short, changes in both affect the physiological mechanisms within the organism and, in so doing, respond to the experiential stimuli. We consider this to be a dynamic flow of neurological processes, which is consistent with the mobility model of this study.

#### *2.3.2.3. Psychological Pathway*

To explore how mindfulness changes people's cognition, it is important to understand the structure of mindfulness. In previous research, based on the definition of mindfulness, modules, and related literature, scholars [33] have proposed a simple structure of mindfulness, IAA, namely (1) intention, (2) attention, and (3) attitude. The intention is the purpose of practicing mindfulness. Attention means observing the operation of one's internal and external experience at all times. Attitude refers to the state of one's attention to the experience. The practice of mindfulness requires one to bring an attitude of acceptance, kindness, and openness. In IAA, intention, attention, and attitude occur in a cycle of interaction simultaneously. Mindfulness is one such interactive process [32].

Thus, mindfulness, as a process, helps people to detach from the content of consciousness and focus on each moment of the experience [33]. The process of focusing on experience with the state of standing outside of consciousness is called 'decentering' [33]. In decentering, people could achieve a fundamental shift in perspective, turning the original subject into an object, i.e., to view their experience from an objective third perspective [32]. By consciously focusing on the contents of consciousness with nonjudgmental attention, people will not be controlled by those contents and are no longer clinging to them. Rather, people will perceive and observe these contents again. During the process, people become more objective, inclusive, peaceful, and serene [32].

Decentering can facilitate the positive effects—self-regulation—of mindfulness [32]. In an empirical study in 2010, mindfulness was found to be significantly associated with self-regulation variables [34]. According

to Shapiro [32], self-regulation helps people maintain the abilities of functional stability and adaptability to change. And its basement is feedback loops. When negative thoughts arise, people automatically generate undesirable feedback out of habits, such as anxiety and depression. Then, behaviors like drinking and smoking come out to regulate the feelings [32]. However, decentering could cultivate nonjudgmental attention, helping people re-perception the progress of feedback loops. Then, they will be less likely controlled by negative thoughts and be more tolerant of undesirable states. As a result, the automatic feedback process will be interrupted. People have more chances to build and enhance positive feedback consciously [35]. With the support of a healthy and positive mental state, the improvement of self-regulation motivates people to discover and apply the power of self-actualization, to reintegrate in the adaptation process resiliently, even achieve self-growth [2].

After understanding how mindfulness affects people's cognition, it is time to explain how the changes in cognition affect psychological factors in resilience. This review will focus on the analysis of self-regulation and self-efficacy in resilience. Empirical studies suggested that self-regulation is an important psychological factor that affects people's level of psychological resilience while playing a key role in the development of resilience [36]. When people face adversity, they sometimes arise negative emotions or thought for the sudden change in the external environment. At this time, people practice mindfulness to manage stress and adapt to changes. During mindfulness, they are in the state of decentering, from being a subject in adversity to an object standing outside adversity. Hence, they will no longer be controlled by adversity and stop acting bad behaviors out of habit, effectively interrupting negative feedback. Meanwhile, with the help of nonjudgmental attention, people re-perceive the whole adversity in interruptions [35] and accept it with a higher degree of tolerance. Then, they could reflect on their previous habitual behaviors and try hard to build a positive feedback model for adapting the changes more success. In this sense, people's resilience is higher than before. It could suggest that higher self-regulation can enhance resilience.

Self-efficacy is a person's belief in his or her capability to successfully perform when dealing with future situations [37]. High self-efficacy helps people work hard and persevere in the face of adversity while reducing strong negative feedback [38]. Some empirical studies have found that mindfulness can increase people's self-efficacy, and there is a significant correlation between them [39]. During mindfulness, people will not feel strong negative feelings in the nonjudgmental attitude. Therefore, attention, rather than being controlled by feelings, focuses on the empirical facts of the adversity and analyzes it rationally. To solve problems, people will have a more clear understanding of their capability, and then make a feasible plan [38]. In the process of gradually implementing the plan, people gradually adapt the adversity positively. When the plan is completed, the positive sense of accomplishment will improve people's belief in their capability. Hence, in the future, when facing adversity again, people with higher self-efficacy will adapt the adversity positively to achieve self-growth. So, it shows that the level of resilience reaches a higher level. As a result, people's resilience is enhanced by the improvement of self-efficacy.

## 3. LIMITATIONS AND FUTURE IMPLICATIONS

Although many empirical studies using mindfulness therapy to intervene in resilience have made some progress, most of them are still in the exploratory stage, and there are still limitations in research methods, research ideas, and theoretical construction.

In terms of research methods, there are noncontrolled experimental designs. In the future, controlled experimental designs should be used to eliminate the influence of irrelevant variables as much as possible. In terms of measurement tools, the Connor Davidson Resilience Scale is used in most studies to measure resilience. This scale is developed in the research project on post-traumatic stress disorder and is mostly used to measure the level of resilience of ordinary people and patients. In addition, there is a Resilience Scale for adults and a Resilience Scale. The final revision of the RSA scale is the verification of the scale for military college students, including six dimensions: self-perception, plan, social ability, organizational style, family cohesion, and social resources. RS scale is a data survey and scale test for the elderly in the community, including two dimensions: personal ability and acceptance of self and life. Future research can select measurement tools with reliable dimensions according to the corresponding research objects, to conduct more detailed correlation and regression analysis.

In terms of research ideas, what needs to be further improved is the evaluation of the effect of mindfulness therapy on improving resilience. Although many empirical studies have proved that mindfulness therapy can significantly improve resilience, it has not been well demonstrated which dimensions of resilience improve significantly. Moreover, there is a lack of randomized controlled empirical research on the improvement effect of different mindfulness therapies on the dimension of resilience. Therefore, future research should focus on the mechanism of mindfulness therapy to improve resilience, and actively learn from different dimensional measurement tools and different mindfulness therapies for empirical research.

In the theory of mindfulness, mindfulness originated from Eastern Buddhism, but it did not form a theoretical model in the clinical process, while resilience has its model. Therefore, future research can use resilience as a measurement tool to construct a set of mindfulness theories to improve psychological resilience.

## 4. CONCLUSION

The current evidence on the theoretical mechanism of mindfulness therapies affecting resilience is limited by scales, research methods, analysis methods, and theoretical models of mindfulness and resilience. In the evaluation of intervention results, only using the psychological rehabilitation scale cannot explore the theoretical mechanism behind it, and future research may benefit from methods such as regression analysis. In the analysis of the intervention results, the effects of each dimension of mindfulness on resilience and the effects of different mindfulness therapies on resilience were missing. Future research may benefit from differential analysis of the effects of each mindfulness dimension and each mindfulness therapy on resilience.

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