Global Grassroots
CONSCIOUS SOCIAL CHANGE FOR WOMEN

SPOTLIGHT ON: MINDFULNESS

A Preliminary Review of the Scientific and Scholarly Literature on Personal Transformation and its Relationship to Social Change

INTRODUCTION

Global Grassroots is an international non-governmental organization (NGO), founded in 2004, which operates a mindfulness-based leadership program and social venture incubator for women survivors of war in East Africa. Over the last 15 years, we have invested deeply in the personal growth, inner leadership, wellbeing, hard skills, and the ideas of our change agents. We have witnessed their personal transformation as they have advanced their own solutions for the betterment of their community. We embarked upon this literature review to help us understand the link between personal transformation and social impact. The key question we were eager to answer through this review was: in what ways does the cultivation of human qualities such as mindfulness, agency, wellbeing, social intelligence, belonging or compassion contribute to a prosocial orientation and positively influence the advancement of positive social change?

To answer this question, we need to understand how various domains of personal transformation are defined, what happens within individuals and community when it takes place, how it transforms the people who experience it, and what outcomes result that may be relevant. Over the course of six months, Global Grassroots conducted a review of scientific and scholarly research on the topic of personal transformation as it relates to societal transformation. For the purposes of this paper, we define:

personal transformation as the process and experience of undergoing positive inner change towards personal growth and self-realization. Personal transformation can take place as the result of intentional effort over time, as well as a significant life changing experience that shifts our beliefs about ourselves and our relationship with the world.

social change or social transformation as a significant and positive shift in the functioning and wellbeing of society. This can result from changes in societal norms and values; changes in the behavior, beliefs and relations of the members of that society; the alleviation of a social ill; and/or through alterations of the systems, institutions, and structures making up that society.

We explored more than 370 key academic and scientific articles across the following five domains:

1. **Mindfulness: "**the capacity to pay attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1994, p. 4).
2. **Wellbeing and Resilience:** Wellbeing is "a state of being…where human needs are met, where one can act meaningfully to pursue one's goals, and where one enjoys a satisfactory quality of life" (ESRC Research Group on Wellbeing in Developing Countries, 2008, p. 4). Resilience is a positive adaptation despite adversity that leads to growth and greater wellbeing (Fleming & Ledogar, 2008; Luthar et al., 2000; Richardson, 2002).
3. **Social and Emotional Intelligence**: Emotional intelligence is the ability to be aware of our own and others' feelings in the moment and use that information to inform one's action in relationship (Goleman, 1995a; Salovey & Mayer, 1990). Social intelligence is "the ability to more deeply understand people by perceiving or experiencing their life situations and, as a result, gain insight into structural inequalities and disparities" (Segal, 2011, p. 266).
4. **Empowerment and Agency:** Empowerment is the ability to choose, including the existence of options and a capacity to make purposeful choices in a changing context where little power once existed (Alsop & Heinsohn, 2005; Kabeer 1999; Samman & Santos, 2003; Sidle, 2019).
5. **Community and Belonging:** A sense of community includes a feeling of belonging, a sense of mattering to the group, a feeling that needs will be met by shared resources, and having a shared emotional connection (McMillan & Chavis, 1986).

It has been our empirical observation, as practitioners in the field of personal transformation and social change, and our theory from wide-reaching conversations in the

social change sector that personal transformation is important for and takes place as an integral part of most long-term, sustainable, positive social change. But, it is not easy to measure these intangible experiences themselves, and there is little consensus on how to define the nature of personal transformation or the metrics with which to assess it. As such, there was a need to conduct a systematic review of the literature to help explain what is known about the process and experience of inner change and how it might be relevant to social change.

We explored a range of literature, including clinical studies, meta-analyses, literature reviews, analyses of scholarly discourse, reviews of measurement tools, proposed operational definitions and mechanisms, and working papers from practitioners. Our criteria included those studies that provided insight and critique on the definition, measures, mechanisms, outcomes, and potential evidence of the social impact of personal transformation.

We chose these five domains because they are the areas of personal transformation we have witnessed most on an ongoing basis and because there already exists a body of clinical work trying to understand the mechanisms and outcomes of each of them. We have undertaken this study at this time because there is a growth of interest in expanding from an exclusive focus on the external and concrete measures of social progress to including the contribution of more intangible, personal shifts towards long-term social change. Our contemporaries in the social justice and international development arena know that something is transpiring among the individuals and communities with whom they work. They believe that the internal condition of people matter, that relationships between them drive connection and community, and that their beliefs and

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values shape how institutions serve or disadvantage others - and change. Our approach and intention with this literature review, then, was to understand within each of these themes: the consensus definition of each concept; the documented mechanisms of such transformation; potential outcomes; measurement tools for and concerns with measuring each concept; future recommendations for research; and, the scientific and academic evidence for any relevance to social change.

Following are our general key findings and then the more specific review of literature within the domain of mindfulness.

Key Findings

Some of our key, cross-cutting findings from exploring this relationship include:

- There is little consensus on the definition, metrics and measurement methods for most domains of personal transformation, aside from the assessment of post-traumatic stress.
- There are a wide range of tools that have been developed for evaluating components of personal transformation, which can help begin to assess whether such transformation has taken place.
- Each domain is multi-faceted, usually involves a component of self-determination, and is context dependent. Tools can measure a range of elements, including self-assessed perspectives, observed behavior, neural activity, or external, material conditions. Therefore, no single tool is likely to be adequate on its own without deeper qualitative evaluation.
- Personal transformation is influenced by and has a direct impact on the nature of the community or external environment in which a person's transformation occurs. As such, the relational field - connection to some form of community or a sense of belonging or relationship with another – is often critical, even for a process of individual, inner transformation.
- Personal transformation involves a fundamental change in the structure and functioning of the brain and physiology, resulting in a more positive orientation towards self and the surrounding world.
- The domains of personal transformation re-

Personal transformation involves a fundamental change in the structure and functioning of the brain and physiology, resulting in a more positive orientation towards self and the surrounding world.

viewed have overlapping interrelationships and effects. Yet, the interpretation of data and outcomes are equally challenging. It is not always clear the directionality of impact between the personal, relational, and societal levels.

- The domains of mindfulness, wellbeing, social and emotional intelligence, empowerment and agency, and a sense of belonging and community help foster prosocial behavior (including helping, charitable altruism, concern, intrinsic motivation to act for the common good, and social communications.) This is influenced by the underlying capacities of self-awareness and self-regulation, compassionate understanding and connection with others, and developing a prosocial orientation for engagement. It is through this pathway that personal transformation is most likely to drive positive social change. *Read more about this pathway in our conceptual map of how personal transformation results in the positive conditions for the advancement of social change.*

- At this time though, there is little research documenting evidence that prosocial behavior itself translates into deep, systemic social transformation. This is likely largely due to the fact that most of the clinical research is conducted short-term in clinical settings versus the actual, practical application of personal transformation by practitioners in the social impact field that would allow us to see longer-term structural or systemic change.

In the following review, we focus on one individual domain of personal transformation, exploring its (a) history, (b) definitions, (c) any relevant practices and outcomes, (d) mechanisms, (e) measurement tools and approaches, (f) challenges with measurement, (g) future recommendations for research, and (h) applications for social impact. In a complementary text we propose a conceptual model for how the domains of personal transformation interrelate and influence social change, attempting to draw together from the evidence presented, a theoretical, operational model for this relationship. We have also compiled a sample list of the most commonly used measurement tools and a list of key studies for each topic. Finally, we share a survey of what actual organizations are finding from integrating inner work and personal transformation into the ways in which they deliver their social change programming. You may download this spot-light study here or access the full literature review here.

Limitations

There are limits to our exploration that we wish to acknowledge. Most of the clinical and scholarly study of these concepts that we were able to access through our search of known databases were predominately conducted by Western researchers in mostly clinical settings. More diverse studies, tools, and perspectives from the Global South and other less represented groups are needed for a comprehensive picture. Additionally, we would have liked to find more studies that focus on non-clinical applications among practicing organizations in the social change sector. We also know that our exploration could not possibly be exhaustive, given the explosion of works that have populated the field in the last decade. We acknowledge the risk that by emphasizing the inner shifts through this research, it might be inferred that concrete, material progress may not be necessary - that if someone finds happiness and life satisfaction, that they no longer need a pathway out of poverty. To the contrary, we believe that the most significant pathway towards long-term sustainable change requires the personal transformation that enables complex change on a deeper level. Our purpose through this initial work is to move the dialogue forward by assessing what is known and what more needs to be explored to understand and measure the relationship between personal transformation and social change.

Gratitude

Spotlight on: Mindfulness

History of Mindfulness

Mindfulness comes from the Pali word *sati*, which means having awareness, attention, and remembering (Davis & Hayes, 2011). The practices are rooted in ancient Buddhist tradition. There are two primary schools of Buddhism –Mahayana, which includes the Vajrayana/Tibetan and Zen traditions, and the Theravada school. Most of the mindfulness practices taught as secular practices in the West have their foundation in the Vipassana practices of the Theravada branch (Cullen, 2011). *Vipassana* is also a Pali word that means insight, and the practices involve monitoring one's moment-to-moment physical sensations, emotions, mental activity and the immediate environment with the purpose of drawing insight about the nature of things, including impermanence (Davis & Hayes, 2011; Lutz et al.).

Mindfulness began its journey into mainstream Western use beginning in the late 1970s with Mindfulness-Based Stress Reduction (MBSR), developed by Jon Kabat-Zinn for chronic pain management. Since 1979, MBSR and a variety of derivations and adaptations of the program, including Mindfulness-Based Cognitive Therapy (MBCT) developed in 2002, represent the most widely researched mindfulness-based interventions (MBIs) used for a diverse set of ailments (Cullen, 2011, Kreplin et al, 2018). The popularity and study of mindfulness has grown exponentially in the last decade among practitioners and researchers. A search of scientific journal articles using Scopus revealed about 2000 to 4000 articles on mindfulness in year 2000, and over 32,000 articles in 2015 (Van Dam et al., 2018). The number of randomized controlled trials alone have increased from one in the three-year period between 1995 and 1997 to a total of 216 in the period between 2013 and 2015 (Powell, 2018). The growth in interest may be driven by the search for an antidote to the pace of Western life and an interest in a broad range of secular applications, from social work to politics to policing to education (Bergman et al., 2016; Bristow, 2019; Christopher et al., 2015; Cullen, 2011; Davis & Hayes, 2011; Hick & Furlotte, 2009, 2010; Jones et al., 2019; Kang et al.,

2013; Ludvik & Eberhart, 2018; Neff & Pommier, 2012).

Most of the studies and theoretical writing on the topic have focused on the mechanisms, efficacy, and outcomes of mindfulness fostered through mindfulness meditation for various symptoms (Shapiro et al, 2006; Davis & Hayes, 2011). However, there still remains a healthy debate among scholars and scientists about how to accurately define mindfulness and what standards of practices and level of experience enable it, because it can be described as a set of practices, a process of personal transformation, a momentary state, or a way of being (Davis & Hayes, 2011; Kreplin et al, 2018). As both a dispositional trait and a training technique, where various practices lead to different insights and outcomes, it is then challenging to explain exactly what it is, how it works and why. See more below on the scientific definitions of mindfulness.

As scientists work to identify and validate the various facets of mindfulness through neurological imaging, self-report survey instruments, and behavioral analysis, Buddhist tradition does not necessarily see that the multifaceted qualities of mindfulness can be separated (Baer, 2018). Yet many researchers are exploring isolated neurological, physiological, psychological, and interpersonal benefits of mindfulness practice without reference to Buddhist doctrine or tradition. As the secular adaptation and scientific study of mindfulness has increased exponentially, there are further tensions between Buddhist beliefs and the Western understanding of the original purpose behind the practices of supporting liberation from suffering (Kreplin et al, 2018). In particular, there are concerns that when mindfulness practices are separated from their ethical foundation and positive intentions, the practices can not only become a technique exclusively for self-centered benefit, but could even create harm (Sun, 2014). A common example frequently cited is the nature of a sniper using mindfulness to improve his performance in killing others (Cullen, 2011). And there can be a negative impact to a well-intentioned practitioner as well, depending upon the quality of attention. For example, there may be an increase in rumination and judgment when we focus attention on our thought patterns and emotions without the intentional attitude of openness and curiosity (Baer, 2018; Bishop et al., 2004). Yet, when mindfulness is conducted within an ethical framework or in the context of Buddhist concepts, such as with an awareness of our interconnection,

mindfulness can be a positive force for both personal growth and social change (Cullen, 2011; Sun, 2014).

Definitions of Mindfulness

As simple as it may first appear, mindfulness is inherently difficult to define. There is currently no consensus on one single definition. Mindfulness is both referred to as a process or skill to practice as well as a mental state.

As far as a process, mindfulness is seen as a form of brain-training conducted through a range of practices involving intentional present-moment attention regulation that brings our internal experiences, like emotional reactivity, under greater, conscious control (Bishop et al., 2004; Davis & Hayes, 2011). The most frequently referenced definition is that of Jon Kabat-Zinn: "**paying attention in a particular way: on purpose, in the present moment, and non-judgmentally**" (Kabat-Zinn, 1994, p 4). Another similar definition is: "**Moment -to-moment awareness, paying attention in a specific way, in the present moment, as non-reactively, nonjudgmentally and open-heartedly as possible**" (Van Dam et al., 2018).

Shapiro et al (2006) propose that mindfulness is an interwoven triumvirate of:
1. intention - along a continuum of self-regulation, self-exploration and self-liberation;
2. attention - focused awareness, switching attention, and cognitive inhibition; and
3. attitude - of patience, openness, and curiosity

that work simultaneously to allow a particular quality and process of moment-to-moment attention.

In 2004, a gathering of scientists sought to determine an operational definition. Participants agreed that mindfulness involved two primary components: (1) The self-regulation of attention on the present moment, and (2) an attitude of curiosity, openness and acceptance (Bishop et al., 2004). The more precise definition that evolved was:

> "A process of regulating attention in order to bring a quality of nonelaborative awareness to current experience and a quality of relating to one's experience within an orientation of curiosity, experiential openness, and acceptance. We further see mindfulness as a process of gaining *insight* into the nature of one's mind and the adoption of a decentered per-

spective (Safran & Segal, 1990) on thoughts and feelings so that they can be experienced in terms of their subjectivity (versus their necessary validity) and transient nature (versus their permanence)" (Bishop et al., 2004, p. 234).

In this case, intentional, present-moment awareness with an attitude of openness is married with (a) efforts towards avoiding elaborative or added thought processes like rumination or mind-wandering arising out of what is experienced, yet also (b) allows for insight into the nature of those experiences by taking a decentered perspective as an unattached observer. This allows individuals to notice that their experiences (thoughts, emotions, sensations) come and go and are not fused with who they are.

As a state, mindfulness is characterized by different facets or capacities that can produce other outcomes. Baer et.al. (2006) identified the following five facets of mindfulness, which are regularly referenced in studies of mindfulness capacities:
1. Non-reactivity - to inner experience
2. Observing - noticing sensations/perceptions/ thoughts/feelings
3. Acting with awareness - reduction in automatic pilot, non-distractedness and concentration
4. Articulating experience
5. Non-judgment - of experience

It is necessary and yet challenging to distinguish the precise relationship between mindfulness practices, its cognitive mechanisms, the facets describing it as a state, and its correlated or potential outcomes. For example, in Buddhist doctrine, there are considered four foundations of mindfulness – awareness of body, feeling tone, mental states and mental contents, which could describe either the nature of the practices and/or the capacities or facets developed by the practices (Cullen, 2011). Some of the challenges in defining mindfulness include that the terms "mindfulness", "meditation" and

"self-awareness" are often used interchangeably. Yet, critical to the definition of mindfulness is discerning whether we are referring to a wide range of mental states and/or practices and processes (Van Dam et al.,

2018). **Meditation** includes a variety of practices for training attention for self-regulation and awareness (Davis & Hayes, 2011). **Self-awareness** involves going beyond self-observation fostered by a practice like meditation to draw insight into the relationship between feelings, thoughts, and actions (Bishop et al., 2004). **Mindfulness** seems to include both a set of skills that can be developed with practice that include (but can go beyond) meditation, as well as mental states that are regulated through such practice (Bishop et al., 2004).

It is thus necessary to explore what we may know about the mechanisms of mindfulness to help shed further light on how we might better define mindfulness, how it works, and what it feels like when we experience it. Research on the mechanisms of mindfulness attempt to explain how a person develops mindfulness, what is happening in their brain, felt sense, and behavior, how these capacities and functions relate to each other, and what they result in as outcomes. The following sections will attempt to summarize current findings across these realms, as well as present how the facets and outcomes of mindfulness may be relevant to those working towards social change.

Mindfulness Practices

In order to begin to explore the mechanisms of mindfulness, it is critical to understand the range of actions research participants are undertaking to foster mindfulness. There is a large variety of mindfulness practices and programs that combine a range of skills.

We have organized mindfulness practices into four primary categories (Steidle, 2017): One category involves a set of practices called **focused attention** that is usually cultivated during a formal practice, like meditation, where we set aside explicit time from our day to concentrate with sustained attention on something specific like our breathing (Hadash & Bernstein, 2018; Levit-Binnun et al., 2019; Lutz et al., 2008; Steidle, 2017). Many Buddhist traditions start with focused attention practices before moving on to other practices that enable insight (Hölzel et al., 2011b). A second category, **open monitoring**, usually builds upon the focused attention skills and involves bringing a more general awareness, moment-to-moment, to everything happening inside and around us with non-reactivity and non-judgment (Hadash & Bernstein, 2018; Levit-Binnun et al., 2019; Lutz et al., 2008). Open monitoring practices do not require any sustained attention on any one target, but instead involve more open attention on whatever may arise into one's awareness from bodily sensations, emotional material, the activities of the mind, and the circumstances of the environment around the practitioner. The third category involves seeking deeper understanding about ourselves, others, and our experiences by using mindfulness practices that invite **insight**. Often, as in Vipassana meditation, the purpose of open monitoring practices is to recognize patterns in our emotions and thoughts, which naturally leads to greater insights into the nature of reality (Lutz et al., 2008). These may allow us to more easily dismantle our distorted and subjective perceptions as we become our own observers and separate our identity from our experiences (Levit-Binnun et al., 2019). The fourth category involves working to **cultivate certain qualities like compassion and lovingkindness** through intentional contemplative exercises. For example, Lovingkindness meditation, involves a practitioner visualizing offering a blessing or wish to themselves and others and visualizing the other receiving that blessing, such as "May they be happy" (Stell & Farsides, 2015). The broader family of Mindful Compassion Activities use various techniques including a focused attention on the body and emotions, active listening, or moment-to-moment open awareness with curiosity to develop a deeper understanding of how thought influences emotion regulation and to cultivate a more wholesome and prosocial orientation (Levit-Binnun et al., 2019; Ludvik & Eberhart, 2018). While there are similarities between the categories of practice, they can activate different parts of the brain.

Mechanisms of Mindfulness

As mentioned earlier, there are five facets of mindfulness: non-reactivity, observing, acting with awareness, articulating experience, and non-judgment (Baer et al., 2006). As we develop these capacities through mindfulness practice, there are certain neural mechanisms driving our experience. The mechanisms behind mindfulness can be organized into two primary sets of cognitive processes (1) present-centered attention regulation and meta-awareness, involving the mindfulness facets of observing, aware acting, and articulating experience, and (2) emotion acceptance and insight, involving the facets of non-judging and non-reacting, aided by the process of perspective taking, reappraisal and self-inquiry (Dahl et al., 2015; Jones, et al., 2019).

Neural Mechanism Category	Attention Regulation & Meta-Awareness	Emotion Acceptance & Insight
Practitioner Actions	Focusing attention, recognizing distractions, switching attention back to target of focus (i.e., breath)	Cognitive reappraisal, perspective taking,
Baer's 5 Mindfulness Facets or Capacities Developed through Practitioner Actions	Observing Aware Acting Articulating	Non-Judgment Non-Reactivity
Practices that Foster Facets	Focused Attention, Open Monitoring	Open Monitoring, Insight/Vipassana Meditation, Lovingkindness & Compassion Meditations
Outcomes	Greater interoception and meta-awareness, decreased rumination, enhanced working memory, improved attention, better emotion regulation, improved response flexibility	Greater empathy, compassion and self-compassion, increased positive affect and decreased negative affect, greater wellbeing, less distress in response to discomfort, decrease in anxiety, disengagement of automatic pathways, responding more consciously and integrating present-moment information, increased social and emotional intelligence, decreased bias, reduced conflict, increased inter-personal communication, increased sense of interconnection, and more positive relationships, ethical decision-making, less anger and assumed hostility
Part of Brain Activated	Dorsal anterior cingulate cortex and dorsolateral prefrontal cortex (conflict monitoring, executive attention); temporoparietal junction, frontal eye fields, intraparietal sulcus, and ventrolateral prefrontal context (selective attention); right frontal and parietal areas and thalamus (sustaining attention) medial prefrontal cortex (self-knowledge, metacognition, self-observation, subjective self-referential value, morality, and intuition), front-insular cortex (switching between brain networks for cognitive control), insula (interoception of internal experience)	Ventrolateral and ventromedial prefrontal cortex (extinction, labeling, regulation of limbic responses); dorsal frontal systems (cognitive reappraisal) precuneus and posterior cingulate cortex (assessing relevance to self); hippocampus (extinction of fear responses); reduced amygdala activity and gray matter (improved emotion regulation); reduced sympathetic tone (nonreactivity and reduced stress); high-amplitude gamma wave synchrony (quiet mind, clarity, focus, consciousness); anterior insula, somatosensory cortex, and anterior cingulate cortex (exteroception of external stimuli like pain and temperature)

Attention Regulation and Meta-Awareness

Attention regulation requires the following primary actions – consciously initiating, directing and monitoring the focus of attention (such as on your breathing), recognizing a distraction (perhaps an itch or memory), disengaging from that distraction, and then switching attention back towards the original target focus of sustained attention (Dahl et al., 2015; Lutz et al., 2008). Focused attention meditation results in a decrease in emotional reactivity in part because it is not possible when sustaining focused attention on something in the present moment (Lutz et al., 2008). This attention regulation is critical, especially in the early stages of learning mindfulness, to stay consciously aware of the present-moment without becoming distracted. The process of self-monitoring and regulating attention, then, necessarily involves meta-awareness.

Meta-awareness is being aware of the processes of consciousness and observing your own thought patterns, feelings, and sensations and being able to differentiate that you are separate from and not fused with those experiences (Bishop et al., 2004; Dahl et al., 2015). For example, meta-awareness would involve observing that you are experiencing a feeling of sadness, yet not getting wrapped up in the sadness and thinking you are a sad person or that the emotion is who you are. This process involves the brain not only monitoring and controlling one's attention, but the direct inhibition of unrelated and secondary elaborative processing of what is arising – that means, keeping yourself from mind-wandering, ruminating, daydreaming and other mental content to maintain present-moment awareness (Bishop et al., 2004; Dahl et al., 2015). In other words, in order to stay aware of the present moment, you need to be aware of when you are *not* in the present moment so that you can bring your attention back to the present. Too much mental activity leads to scattered attention, and too little mental activation leads to a reduced capacity to monitor attention (Isbel & Summers, 2019). Mindfulness with meta-awareness, however, sustains attention and reduces mind-wandering.

Mindfulness meditation stimulates the parts of the middle prefrontal cortex associated with self-knowledge and meta-awareness (Davis & Hayes, 2011). Further, the anterior cingulate cortex (ACC) enables executive attention, and the front-insular cortex is involved in switching between different brain networks for cognitive control

(Hölzel et al., 2011b). Experienced meditators have shown greater activation in the rostral ACC. However, over time, it is also seen that with greater expertise, these functions become more automatic, as greater activation may not be as needed to manage the ongoing control of attention (Hölzel et al., 2011b). From self-report findings, an attention on bodily sensations, such as is conducted in focused attention practices targeting one's breath, leads to greater clarity of more subtle interoception measured through an increase in insula activation (Hölzel et al., 2011b). Interoception is the sense of what is going on in your body, such as knowing when you are hungry.

Further, metacognitive awareness and decreased mind-wandering result in improvements in working memory that result in enhanced attention capacities and better emotional regulation (Davis & Hayes, 2011; Isbel & Summers, 2019). The meta-cognitive functions of regulating awareness of consciousness may share neural pathways with the regulation of emotion (Isbel & Summers, 2019). This is fostered by the capacity to recognize and reflect on such emotions in the present moment. First the mindfulness practitioner will notice the distressing thought or emotional challenge, then they use inhibitory cognitive control to pause and not react, then working memory allows the practitioner to consciously consider alternative responses, then they

use improved cognitive flexibility to put things into context, and then they finally initiate their response with self-regulation (Ludvik & Eberhart, 2018). Mindfulness practice can improve working memory capacity and, thus, emotion regulation, which often is diminished in times of stress (Davis & Hayes, 2011). In fact, through metacognition and the shifts in mental activity and emotion regulation, mindfulness can indirectly influence behavioral responses, such as promoting active listening and empathy (Jones, et al., 2019).

The training of attention in mindfulness meditation results in functional and structural changes in the brain, especially the attention-relevant neural networks (Dahl et al., 2015). When people are unable to regulate their attention and emotions or separate themselves from these experiences with greater awareness, we see disfunctions in the form of ADHD, addiction, depression and other forms of anxiety that affect mental health (Dahl et al., 2015; Isbel & Summers, 2019). While mind-wandering results in greater unhappiness, increased capacity for meta-awareness allows for an individual to adapt more easily to accepting reality and promotes wellbeing (Baer, 2011; Bishop et al., 2004; Dahl et al., 2015; Isbel & Summers, 2019; Killingsworth & Gilbert, 2010).

For novice practitioners to sustain such attention requires high levels of cognitive control and still results in frequent failures due to distraction (Isbel & Summers, 2019). Yet with experienced meditators (i.e., 44,000 hours of practice vs 19,000), as capacities get stronger, attentional control becomes increasingly automated, leaving room for insight, clarity and interpretation, and a corresponding reduction of activation in the areas of the brain responsible for such attention (Isbel & Summers, 2019; Lutz et al., 2008).

Still, Shapiro et al (2006) note that mindfulness requires more than just attentional practice, but intention and attitude too. Intention is the purpose behind the attentional practice, and tends to move on a continuum from stress management to self-knowledge to self-realization. Shapiro's work has found that the outcomes of such practice are correlated with the intentions set for such practices (Shapiro et al., 2006). Further, the attitude with which the attention is applied – the orientation of curiosity, openness, and self-acceptance – matter too. In particular, an attitude of non-judgment supports the capacity to detach from and be able to increasing-

ly disidentify with the content of experience. This, in turn, helps self-regulation by disrupting maladaptive and automatic behavior and creating more opportunity for finding acceptance, changing one's perspective, and acting with greater choice (Shapiro et al., 2006). Let us look closer at these transformative mechanisms.

Emotion Acceptance and Insight

Under the second family of mechanisms, mindfulness promotes a change in perspective. This happens through two primary functions – cognitive reappraisal and perspective-taking, both capacities fostered by the facets of non-judgment and non-reactivity developed through mindfulness practice.

Buddhist doctrine teaches that there is no permanent self, and that if we can become aware of our internal processes, we will find clarity and understanding of the roots of our suffering by releasing our identity and attachment to our rigid sense of self, and instead recognizing the impermanence of the nature of things (Hölzel et al., 2011b). Usually after developing proficiency in focused attention practices, practitioners begin to learn the open monitoring practices where they observe and contemplate their bodily sensations, emotions, and thoughts, leading to greater insights, especially a recognition that these experiences are always changing (Dahl et al., 2015; Hölzel et al., 2011b; Isbel & Summers, 2019). The processes of sustaining present-moment awareness and drawing insight through self-inquiry and deconstructing experience are very different, though meta-awareness fostered by the former enables the latter (Dahl et al., 2015). Open monitoring meditation supports a greater level of emotional flexibility, integrating present-moment information so that responses are less reactive and automatic (Davis & Hayes, 2011; Lutz et al., 2008). Bringing an intention of non-judgment and non-reactivity to whatever comes into awareness during meditation practice allows us to cultivate a more objective orientation towards our experiences. With this decentered attitude of curiosity and open acceptance, mindfulness can lead an individual to shift their perspective around what causes them discomfort and begin to experience those things as less distressing (Bishop et al., 2004; Shapiro et al., 2006; Davis & Hayes, 2011). Dahl et al. (2015) describe insight as "a shift in consciousness with a feeling of knowing, understanding, or perceiving something that had pre-

viously eluded one's grasp" (p. 6). This, in part, happens through the mechanism of cognitive reappraisal.

Cognitive reappraisal involves changing the content of thoughts and emotions by reframing them as beneficial, meaningful or unharmful, often by replacing underlying negative judgments and conceptions with a more adaptive orientation (Dahl et al., 2015; Hölzel et al., 2011b). To do so requires non-judgmental detachment from identifying with these emotional and mental experiences. As a mindfulness practitioner comes to process emotion more selectively, reappraisal fosters more positive emotions, a decrease in anxiety and other negative emotions, greater emotion regulation, and increased wellbeing, in part by activating the brain networks that involve adapting to stress (Bishop et al., 2004; Dahl et al., 2015; Davis & Hayes, 2011; Hölzel et al., 2011b; Isbel & Summers, 2019; Luberto et al., 2019). Jones et al. (2019) found that non-judging and non-reacting had different effects on people depending upon their level of meditation experience, suggesting that it takes practice for new meditators to let go of their own inner-critic and find acceptance of their emotional states.

In addition to non-judgment, the mindfulness facet of non-reactivity also supports cognitive reappraisal. Increasing awareness of bodily sensation including one's physical responses to emotion and reframing our experiences, allows individuals to change their reactions to their experiences, disengaging automatic and habitual pathways, and enabling more conscious responses that integrate present-moment information (Davis & Hayes, 2011; Hölzel et al., 2011b). This does not take place through avoidance. Instead, in mindfulness practice, the individual leans in, allowing the uncomfortable stimuli to come into awareness, then contemplates any emotional reaction. This then enables reappraisal, if not complete extinction of the previously habitual reaction (Hölzel et al., 2011b). This reduces unconscious reactivity and increases more adaptive emotional and behavioral responses (Bishop et al., 2004; Shapiro et al., 2006; Hölzel et al., 2011b; Lutz et al., 2008).

The processes behind self-inquiry and insight include questioning one's basic beliefs and assumptions, deconstructing one's experiences into various parts, and identifying patterns in the dynamics of experience for the self, others, and the broader world around us (Dahl et al., 2015). Mindfulness reduces the activity of the default mode network responsible for internally-interpreted processes. This includes the middle prefrontal cortex associated with self-knowledge, morality, intuition and fear management, and the posterior cingulate cortex and precuneus, which involve assessing the relevance or significance of something and its integration into our autobiographical sense of self (Dahl et al., 2015; Davis & Hayes, 2011; Hölzel et al., 2011b). Cognitive reappraisal is associated with activity in the prefrontal cortex and the anterior cingulate cortex (Hölzel et al., 2011b). Experienced meditators demonstrate more detached awareness of internal and external sensations, functions controlled by the insula and somatosensory cortex, and demonstrate more cognitive control over default systems that drive more emotional and self-referential responses (Hölzel et al., 2011b).

Mindfulness also increases the activation of the ventrolateral prefrontal cortex and reduces the activation of and gray matter concentration in the amygdala, which is associated with improved emotion regulation and inhibitory control (Hölzel et al., 2011b). The elimination of fear-based reactivity, which improves with mindfulness, involves the ventromedial prefrontal cortex and the hippocampus, which also reduces amygdala activity (Hölzel et al., 2011b). This supports a reduction in stress, an increase in parasympathetic activity that allows for relaxation, and a prevention of depressive symptoms (Davis & Hayes, 2011; Hölzel et al., 2011b).

Perspective-Taking, Self-Compassion, Empathy and Compassion

Mindfulness not only supports changes in self-awareness, insight, and emotion regulation, but it also changes our perspective on others and our external situations, called perspective taking (Hölzel et al., 2011b). Perspective taking is where we consider how another might feel, and includes empathy and compassion. Where empathy is a process of being able to put yourself in another's shoes and imagine feeling the way they feel, compassion is slightly different. Compassion similarly involves perceiving and appraising another's feelings, but also includes a desire to help alleviate the other's suffering. When someone comes in contact with someone who is distressed, they tend to experience one of three things: empathetic perspective-taking, emotional distress, or compassion (Berry et al, 2018). With empathy, there is sometimes the danger of empathetic fatigue and negative emotional experiences like distress and overwhelm

(Cameron & Frederickson, 2015; Luberto et al., 2018). This may be because empathetic distress involves a feeling of *imagining oneself in* someone else's situation, versus compassion, which involves *feeling with* someone else. Empathy can thus lead to a sense of emotional contagion that drives aversion or a withdrawal from the situation (Berry et al, 2018). Empathy and compassion both require maintaining a distinction between the observed and simulated state of the other and one's own state; failure to maintain such distinctions may influence burn-out (Garbarg & Brown, 2019). Empathy is seen as activity in the ventromedial prefrontal-striatal neural networks responsible for self-relevance, value and affiliation (Berry et al, 2018). In contrast, feelings of compassion are associated with the premotor and somatosensory networks responsible for processing the self and mirroring other's physical states (Berry et al, 2018). Feelings of compassion always involve a positive emotional orientation and altruistic stance towards helping. Through reappraisal, individuals are able to replace negative self-perceptions with more adaptive concepts of self, which can include patience and kindness and can also shift empathy into compassion (Dahl et al., 2015).

Self-compassion is "compassion directed inward" (Neff & Pommier, 2012, p. 1), which includes having kindness for the self without criticism, a sense of being connected to our common human experience, and being able to use mindfulness to be aware of and regulate thoughts and emotions without overly-identifying with them (Hölzel et al., 2011b). Mindfulness promotes self-compassion, which is partially responsible for the relationship between mindfulness and wellbeing (Hölzel et al., 2011b).

Overall, studies show that with non-judgment and non-reactivity fostered through mindfulness, we are able to shift our perspective towards ourselves - driving self-compassion – as well as towards others – resulting in less distress in response to others' suffering and more feelings of kindness, compassion, and interconnection (Davis & Hayes, 2011; Hölzel et al., 2011b; Neff & Pommier, 2012). Levit-Binnum et al. (2019) hypothesize that brain activity previously spent on our defense mechanisms and avoidances for our own self-preservation are then freed up through the process of mindfulness and compassion to allow one to more easily connect with others. Neff and Pommier (2012) demonstrated that self-compassion is directly enabled by perspective taking skills and highly correlated with other-oriented

concern, but that this is somewhat dependent on one's level of meditation experience as well as age and gender (more often witnessed among women). This suggests that as we age and egocentric behavior declines, and as meditation practitioners increase their level of compassion and interconnectedness, these capacities may drive altruistic behavior (Neff & Pommier, 2012).

Outcomes

> "At the heart of this transformative process is the intention to think and act more positively towards the world, other people, and oneself. Both ethical and psychological frames of reference see this as a positive direction of development. Within an ethical framework, this should bring about a more socially compassionate action, and should reduce aggressiveness and conflict. From a psychological point of view, positive affect brings about a sense of connection, which is usually positively experienced and is linked to wellbeing, secure attachment, and other positive outcomes. Positive outlook reduces negative bias, and creates a sense of wholeness and satisfaction" (Levit-Binnun et al., 2019, p. 9).

Outcomes from developing these facets are wide ranging, including compassion, greater positive emotions and reduced negative emotions, improved concentration and clarity, deeper understanding of one's sense of self and reality, and general wellbeing (Bishop et al., 2004; Davis & Hayes, 2011; Levit-Binnun et al., 2019; Luberto et al., 2018). Physiologically and psychologically, mindfulness has been shown to slow the markers for aging (Epel et al., 2009); reduce anxiety (Khoury et al., 2013); reduce depression (Way et al., 2010); reduce stress and anxiety (Davis & Hayes, 2011); decrease rumination (Corcoran et al., 2009); improve emotional regulation (Erisman & Roemer, 2010); and strengthen the immune system (Davidson et al., 2003). It is believed that meditation results in a relaxation response countering stress, which lowers negative emotion and improves positive emotion (Luberto et al, 2008).

With a decrease in stress and greater self-awareness and emotional regulation, mindfulness helps reduce anger, hostile aggression and the misinterpretation of hostile acts (Bergman et al., 2016; Christopher et al., 2015).

As a practice, mindfulness supports social and emotional intelligence as well (Ludvik & Eberhart, 2018). Social-emotional learning (SEL) involves the process by which an individual develops the capacity for managing emotions, experiencing empathy for others, building and sustaining positive relationships, setting goals, and making responsible decisions towards those goals (Ludvik & Eberhart, 2018). The skills needed for social and emotional intelligence include self-awareness, self-management, and social awareness, among others. These are many of the same capacities that mindfulness fosters – self-control and emotion regulation, cognitive flexibility, a sense of belonging, openness, and interpersonal skills (Ludvik & Eberhart, 2018). As in the mindfulness field, the SEL literature recognizes these skills are challenging to measure, there is little consensus on the duration and frequency of which SEL practices are necessary to foster social and emotional intelligence, and that an individual's temperament and personality can also strongly influence such capacities (Ludvik & Eberhart, 2018). Still, mindful compassion practices can help an individual notice emotional distress, reflect on the experience with curiosity, use inhibitory control for nonreactivity, draw upon working memory to consider more adaptive responses, then use cognitive flexibility to integrate present moment information, and respond consciously (Ludvik & Eberhart, 2018). This results in a reduction in conflict and bias, increased empathy and social connectedness, improved interpersonal relationships and happiness, and greater engagement in prosocial behavior (Dahl et al., 2015; Davis & Hayes, 2011; Jones, et al., 2019; Kang et al, 2013; Luberto et al., 2018).

Despite the fact that Buddhist communities have been practicing mindfulness purposely to achieve these results for centuries, and many of the studies in this paper show promising results, the scientific community considers these outcomes preliminary. Meta-analyses show inconsistent impacts stemming from the wide variations in definition, practice, method, and measure. Van Dam et al., (2018) writes, "…There is a common misperception in public and government domains that compelling clinical evidence exists for the broad and strong efficacy of mindfulness as a therapeutic intervention" (p. 12). The US Agency for Healthcare Research and Quality found that mindfulness-based interventions, compared to controls, had only moderate, low or no efficacy depending upon the disorder (Van Dam et al., 2018). A recent meta-analysis of 69 ran-domized controlled trials representing 55 samples of a total 4,743 subjects explored mindfulness-based interventions using mindfulness meditation for a specific disorder and found that MBIs showed larger changes in self-report measures of mindfulness (58.18% using the FFMQ or Kentucky Inventory of Mindfulness) than both active and waitlist control conditions at post-treatment, but that these gains were less evident at a later follow-up (Goldberg et al., 2019). Yet, this should not diminish the impact it has had or the fact that it could be an effective intervention for non-clinical outcomes.

Measuring Mindfulness

Because mindfulness involves several facets and predicts a broad range of behavioral, neurological and felt-sense outcomes, there are a wide-variety of tools that can be used to measure it and its related capacities.

Baer (2006) evaluated the most utilized mindfulness scale, including the 39-Item Kentucky Inventory of Mindfulness Skills (KIMS, Baer, Smith & Allen, 2004), the 15-Item Mindfulness Attention Awareness Scale (MAAS, Brown & Ryan, 2003), the 30-Item Freiburg Mindfulness Inventory (FMI, Buchheld, Grossman & Wallach, 2001), the 12-Item Cognitive & Affective Mindfulness Scale (CAMS, Feldman, Hayes, Kumar & Greeson, 2004), the 16-question Mindfulness Questionnaire (MQ, Chadwick, Hember, Mead, Lilley & Dagan, 2005), and found KIMS most relevant. Thereafter, Baer created a new tool to integrate the most important and validated features, called the 39-Item Five Facet Mindfulness Questionnaire (FFMQ, Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). This measures the five facets of mindfulness: observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience. Tools measuring mindfulness are often validated by using a range of established scales that measure other relevant components, such as attention regulation, emotion regulation, meta-awareness, cognitive reappraisal, self-concept, self-compassion, stress and resilience, bias, compassion, prosocial behavior, wellbeing and social-emotional intelligence (Baer et al., 2006; Bishop et al., 2004; Hick and Furlotte, 2010; Christopher et al., 2015; Hölzel et al., 2011b ; Jones, et al., 2019; Kang et al., 2013; Ludvik & Eberhart, 2018). The FFMQ has been validated and versions have been adapted for use in Spanish, Hindi, Chinese and French and in a wide range of applications.

See Appendix for a list of those key tools and others that measure more specific capacities.

Challenges with Measuring Mindfulness

There has been little standardization in the research around the study design, type of mindfulness-based interventions, and measures used, which results in several challenges:

Definition: Studies are usually limited in scope, testing one particular practice, facet or outcome without reference to the range of other facets or their interrelationship, which makes building a balanced consensus and validation for a complete definition difficult (Van Dam et al., 2018). For example, Buddhist scholars say mindfulness entails attention, awareness, memory/retention and discernment, but self-report measures may exclude various capacities (Van Dam et al., 2018). This has implications for the metrics used, as most questionnaire developers are not Buddhist scholars. They may apply different definitions of mindfulness, isolate unique components that were not meant to exist alone, and offer different instructions for their interventions, which may diverge from the original intentions of mindfulness practices (Baer, 2011).

Practices and Study Design: In terms of the practice utilized, across studies there is a lack of consistency in the technique and its instructions, whether the participants complied with instructions, the intensity and duration of the practice, whether the participants were experienced meditators or novices (and what even constitutes having meditation experience), how mindfulness is defined within the study, and what was subsequently measured and how (Berry et al, 2018; Cullen, 2011; Hölzel et al., 2011b; Ludvik & Eberhart, 2018; Lutz et al., 2008; Van Dam et al., 2018). Further, there may be bias among the experimenters themselves, especially those leading the practice instruction, as they can unintentionally communicate their preferences related to outcomes (Baer, 2018; Van Dam et al., 2018). Most of the studies reviewed by Van Dam et al. (2018) did not involve the gold standard for randomized controlled studies, and among those that did, only nine percent moved to Stage 2b of comparing to an active control, according to the NIH stage model for clinical science. Only one percent of studies were conducted outside research contexts (Van Dam et al., 2018). And, while MBSR is the most frequently studied mindfulness practice, the practices used across the research vary in type, duration, and frequency. This leaves no consistent intervention that can yet be adopted as the gold standard for clinical treatment by other practitioners (Van Dam et al., 2018). That being said, non-clinical applications of mindfulness, as will be detailed below, show significant promise, and practitioners can be thoughtful about selecting the mindfulness intervention and corresponding measurement tool that has the most promising connection to their desired outcomes.

Measures: Self-report, behavioral, and neural imaging measure different aspects of mindfulness mechanisms, states, and outcomes, without enough clarity on the relationship between all the various aspects and without standardized methods for interpreting results (Van Dam et al., 2018). Further, there is not enough construct validity in measures. It is not easy to determine how the mind changes through practice or how increased mindfulness affects other brain functions or psychological symptoms, which may just be a function of personality and temperament (Hölzel et al., 2011b; Ludvik & Eberhart, 2018; Van Dam et al., 2018). Mindfulness is not easily observed externally and behavioral measures cannot describe the neural mechanisms of mindfulness (Baer, 2011; Isbel & Summers, 2019). While neuroimaging can track improvements in sustained attention and working memory, they do not allow for observing neural activity in daily life circumstances (Baer, 2011; Van Dam et al., 2018). They can also be easily affected by differing levels of experience between meditators, such as breathing rates (Baer, 2011; Van Dam et al., 2018). Further, many researchers assume mindfulness is a trait that is consistent over time and circumstances, when in reality it changes with practice and experience and in various situations (Baer, 2011). As a result, the interpretations of data involving the neural mechanisms may be questionable (Van Dam et al., 2018).

Yet, self-report scales may also be distorted by bias among experienced meditators who understand, interpret, and value facets differently, have more experience noticing these capacities, or who may recognize how much more mindful they may be able to be, underreporting mindfulness (Baer, 2011, Van Dam et al., 2018). There may also be issues among novices who may have self-selected into the study and want to appear mindful (overreporting mindfulness) or have little experience noticing such capacities and interpret them differently than experienced meditators (Baer, 2018;

Van Dam et al., 2018). Further, some practices may be attractive and helpful in different ways to different people (Hölzel et al., 2011b). Similarly, it is hard to validate the claims in self-report studies of changes in mental and physical aspects after conducting the mindfulness practice, because the practice itself involves introspection (Van Dam et al., 2018). Finally, many self-report studies involve reverse-scored items that contribute to an overall score, where the absence of a quality does not necessarily suggest the opposite (Baer, 2011).

Contraindications: There are potential adverse effects from practicing mindfulness that are not always well-documented or known, such as in anxiety-based disorders like bipolar disorder, schizophrenia, PTSD, suicidality, and psychosis (Van Dam et al., 2018). In fact, less than 25 percent of studies actively explore adverse effects (Van Dam et al., 2018). And, there are inconsistent results as to the efficacy of mindfulness as a therapeutic intervention (Kreplin et al, 2018). There is little regulation of mindfulness practices, and risk is managed primarily through informed consent overseen by those developing and testing interventions. So far, two universities – University of Massachusetts and Oxford - have created recommendations for exclusion criteria for practicing MBSR and MBCT (Van Dam et al., 2018).

Future Recommendations for Research

To improve upon the mindfulness research, there are several recommendations. Rather than using mindfulness as a broad and generally-defined term, researchers should be specific about exactly how they are defining mindfulness, what practices are being taught, and what they are measuring (Cullen, 2011; Van Dam et al., 2018). What exactly constitutes a mindfulness-based intervention also needs further clarification. Further, given mindfulness is always practiced in a particular context, future studies should clearly define and explore the effect of those contexts (Lutz et al., 2008).

Given the tension and inconsistencies between Buddhist doctrine and practice and clinical research and instructions, more collaboration and the accessibility and translation of Buddhist texts in secular contexts for their study in the psychological and scientific communities would be useful (Baer, 2011). Further, given mindfulness involves engagement with the practitioner's inner and outer life perspectives and behavior, it should be clear under what ethical expectations mindfulness is

to be applied, and an agreement that mindfulness used for harm is not actually mindfulness (Cullen, 2011).

In terms of study design, more randomized controlled studies are needed with double-blind procedures, larger and more diverse sample sizes, that are longer in scope (Kreplin et al, 2018; Luberto et al., 2018). Studies should also seek to show some consistency in definitions, practice and measures, and only use meditation teachers that are not related to the study and analysis to avoid bias that may come from how instructions are presented (Kreplin et al, 2018).

With each mindfulness-based intervention, it is critical to not only measure whether it had a significant effect on a particular symptom, but also deconstruct the mechanisms that underlie the changes to understand how and why it works. (Baer, 2011; Dahl et al., 2015; Goldberg et al., 2019; Kreplin et al, 2018). It is a best practice to utilize a range of behavioral, neurobiological, and self-report measures to validate results rather than simply assessing the aggregate of "mindfulness" (Baer, 2011; Van Dam et al., 2018). Researchers can also use observable behavior tests that allow self-report with third party validation of changes (Van Dam et al., 2018). Further, it is important to continue to study and disentangle the impact of temperament, personality, cultural context, belief systems, ethics and interpersonal dynamics on mindfulness experiences (Dahl et al., 2015). Given mindfulness as a state can vary over time, it is suggested that test instruments are conducted immediately after a practice to reduce any memory bias, and that it is understood they are testing mindfulness within the context of a specific situation (Bishop et al., 2004). Studies should avoid reporting only moderately significant results and ensure consistency in evaluating pre vs. post or post vs. follow-up, or between participants (Kreplin et al, 2018).

Within the international development context, researchers and practitioners need to be conscientious of the spiritual, religious and cultural context in which mindfulness practices are being taught and used, including misconceptions about practices that may foster distrust and opposition. Further, as will be touched upon in the wellbeing literature, it is important to be careful that if there are increases in an individual's acceptance of reality due to mindfulness practice, that such gains are not used as rationale to uphold inequality or to suggest that material progress is no longer necessary.

Finally, there needs to be additional research on the possible adverse effects of meditation (Van Dam et al., 2018). Given the uncertain impacts and contraindications, with little regulatory oversight of practices, it is recommended that mindfulness not be used as an initial or primary intervention with certain anxiety-based disorders without further study (Van Dam et al., 2018).

Applications of Mindfulness for Social Impact

Mindfulness has been studied in a wide range of applications, but most have to do with its impacts on individual emotional, psychological, and physiological health. There are fewer studies that explore the outcomes that may have social impact implications. Most fall into two categories: perception of others (compassion and bias) or behavior towards others (prosocial or helping behavior and ethical decision-making).

Perception of Others

Compassion can result in a permanent change in one's motivation and feelings towards others (Berry et al, 2018; Leiberg et al., 2011). Because mindfulness builds our awareness, non-judgmental acceptance, and non-reactivity, it also fosters shifts towards more positive, other-regarding emotions. (Jones, et al., 2019; Kang et al., 2013; Stell & Farsides, 2015).

After six to seven weeks of compassion training, participants showed improvements in positive affect, life satisfaction, and stress (Leiberg et al., 2011). Mindfulness also results in greater relationship satisfaction, likely because of improved interpersonal communications, empathy, and a reduction in conflict due to lower reactivity (Davis & Hayes, 2011). Jones et al. (2019) found that the three mindfulness facets of observing, describing, and non-judging directly affected the ways people reappraised their views of others with higher levels of empathy and active listening. Mindfulness also helps with comfort in silence and the ability to align responses with clients' needs among therapists (Davis & Hayes, 2011). The relaxation response experienced during mindfulness meditation may also involve oxytocin-mediated improvements in attachment and distress tolerance, which can improve feelings of connectedness (Luberto et al., 2018).

One particular practice, lovingkindness meditation, where a practitioner visualizes offering a blessing or wish to themselves and others, has been shown to increase connectedness and compassion, and decrease implicit bias (Cameron & Frederickson, 2015; Kang et al., 2013). This may be due to mindfulness creating more positive associations through reappraisal and perspective taking (Kang et al., 2013). Implicit bias - the unconscious attitudes and stereotypes that affect our beliefs - and explicit (conscious) bias involve different cognitive processes. Kang et al. (2013) found implicit bias is a better predictor of actual behavior. The researchers studied 101 non-blacks and their attitudes towards blacks and homeless people before and after participating in a six-week lovingkindness practice. The study found that bias against blacks involved fear and vulnerability, whereas bias against the homeless involved feelings of disgust and contempt (Kang et al., 2013). Lovingkindness meditation overall helped to decrease implicit bias towards race (Kang et al., 2013). Stell & Farsides (2015) also found that just seven minutes of lovingkindness meditation reduced prejudice against target racial out-groups.

Behavior towards Others

Mindfulness increases compassion and decreases anxiety, which helps drive prosocial behavior (Leiberg et al., 2011; Luberto et al., 2018; Lutz et al., 2008). Prosocial behavior can include helping another in need, advocating for fairness, reciprocity, inclusivity, active listening, and charitable giving (Leiberg et al., 2011). Because mindfulness results in people becoming less reactive and more accepting, people are more likely to respond constructively, and be more likely to engage in helping others (Davis & Hayes, 2011; Luberto et al., 2018).

Kreplin et al. (2018) and Luberto et al. (2018) both conducted meta-analyses of the prosocial effects of meditation, reviewing 22 RCTs involving 1685 people and 26 studies with 1714 subjects, respectively. Kreplin et al. (2018) found that meditation improved compassion and empathy, while Luberto et al. (2018) found that in 85 percent of studies meditation showed improvement, compared to controls, in at least one prosocial outcome, including connectedness and awareness of other's suffering. A third review of six formal meditation studies found that compassion meditation resulted in an increased social and emotional sense of connection, which resulted in increased altruism, measured as charitable giving (Luberto et al., 2018). A few specific studies involving helping behavior as well as active listening deserve mention.

Mindfulness drives inclusive helping behavior through the facets of present-focused attention and non-judging acceptance, which increase compassion and more positive, other-oriented feelings even during distressing experiences (Berry et al., 2018; Cameron & Frederickson, 2015; Leiberg et al., 2011). Researchers propose that with present-focused attention, the individual can focus on their intentions, engage in more perspective taking, and avoid rumination, so that they end up experiencing the positive benefits from helping (Cameron & Frederickson 2015). Berry et al. (2018) studied college students engaged in a ball tossing game, and found that mindfulness was correlated with empathetic concern, helping, and inclusion. Leiberg et al. (2011) found that compassion training increased prosocial behavior, especially with experiences of reciprocity, even if the costs of helping went up. The effects lasted up to five days after the training, influencing behavior in unrelated situations and with strangers (Leiberg et al., 2011). Similarly, Cameron & Frederickson (2015) found that among 313 adults, especially experienced meditators, present-focused attention resulted in more positive feelings during helping, including openness and connectedness, while non-judgmental acceptance predicted a decrease in negative feelings like disgust or guilt.

Mindfulness also has a particular impact on active listening. Jones et al. (2019) studied 183 college students for mindfulness' influence on person-centered communications. The study found that mindfulness facets of observing and describing positively impacted empathy, reappraisals, and active listening (Jones, et al., 2019). But the study found that non-judging was negatively correlated to empathy and active listening (Jones, et al., 2019). These outcomes were different with experienced versus novice practitioners. This may mean that it takes new meditators longer to let go of one's own emotional experiences to be able to focus on others, but that with experienced meditators, mindfulness encourages greater acceptance of others and provides the discernment needed for meaningful and compassionate conversations that enable others to accept themselves (Jones, et al., 2019).

Mindfulness has also been shown to increase ethical decision-making (Ruedy & Schweitzer, 2010). In two series of tests, Ruedy & Schweitzer (2010), demonstrated that individuals with higher self-reported mindfulness were more likely to act ethically, uphold their moral identity, and value and apply ethical standards. They believe this is due to mindfulness' promotion of self-awareness, which improves the likelihood of one recognizing with acceptance an ethical issue, one's own potential conflict of interest and biases versus reacting with self-protective (and potentially unethical) behavior (Ruedy & Schweitzer, 2010). They also found that mindful participants were more inclined to act in accordance with their internal values and self-image of *being* ethical versus any external rewards of *appearing* ethical (Ruedy & Schweitzer, 2010). This suggests that with mindfulness practice, increased levels of awareness, insight, and positive, other-oriented feelings will be complemented by more ethical and prosocial action as well.

Applications

While there are many examples of mindfulness employed in the field of social justice, the scientific research field has been slow to study, validate, and explain the mechanisms that underlie the relationships of mindfulness to social change. Only a few studies have evaluated realms where mindfulness could have a concrete impact on social change issues, though it was mostly related to perspective shifts and behavior orientation. No study yet identified in this review has actually studied how mindfulness has resulted in positive social impact. For example, while Kang et al. (2013) has studied in a clinical setting the impact of mindfulness on racial bias, the study has not gone on to see how mindfulness has resulted in improved racial relations between groups or other social impact when used as a practical application. One study by Hick and Furlotte (2009), assessed an intentional application of mindfulness among homeless people or those at risk of becoming homeless to explore how mindfulness shifted their views towards the systems of inequity. The study found that mindfulness positively impacted participants' perspective on their experience, and had *the potential* to empower people to act towards social change (Hick and Furlotte, 2009). However, the study stopped short of examining or demonstrating that any shift in perspective actually resulted in transforming systems of oppression by those same participants. What it does provide, though, is a valuable theoretical proposal for the mechanisms of how mindfulness can support greater social awareness and agency to act on such information towards greater equity.

Hick and Furlotte (2009) propose that without awareness we participate in maintaining a status quo of inequity.

The more we foster self-awareness, the more we develop self-compassion and compassion, including an understanding of our interdependence and participation in the common human experience (Hick and Furlotte, 2009). This offers the opportunity to examine how we are affected by and contributing to social inequity through our unconscious behavior, including bias and reactivity.

In the Hick & Furlotte 2010 study, the researchers went on to train a very small sample of 11 severely economically disadvantaged people in an adaptation of MBSR called Radical Mindfulness Training (RMT). RMT integrates mindfulness practice and interpersonal skills with an analysis of social justice themes, such as power, political and economic structures, and oppression to understand the systemic roots of poverty affecting the participants (Hick & Furlotte, 2010). The program found improvements in social connectedness, a decrease in self-judgment, and an increase in self-compassion and wellbeing - defined as life satisfaction - among participants (Hick & Furlotte, 2010). The researchers believe that through self-acceptance, participants could change how they perceived, connected with and accepted others, leading to greater personal wellbeing (Hick & Furlotte, 2010). They also could improve relationships with others and their interactions with structures around them, through the reduction in reactivity and improvements in adaptive responses fostered by mindfulness (Hick & Furlotte, 2010).

Mindfulness has also been used in the realm of politics with initial positive outcomes. Since 2013, over 200 members of the UK Parliament have attended 8-week MBCT sessions (Bristow, 2019). Self-reported benefits have included heightened attention in concentrating despite the barrage of information, greater kindness and decreased reactivity towards political opponents, and the capacity to consider their own bias, reduce defenses, and de-identify with their emotions (Bristow, 2019). The experiment has also catalyzed conversations about the positive implications of integrating mindfulness into policy for national wellbeing, including lower-cost preventative mental health treatments and increased compassion in medical care. Very obviously here, though not yet scientifically studied, there may be benefits from an investment in mindfulness for both self-management and interpersonal relations which can then extend into policy-making and public benefit.

Two studies have shown the promise of mindfulness among law enforcement officers, where high stress levels and elevated cortisol levels have significant implications for health and public safety decision-making including hostility from uncontrolled anger (Bergman et al., 2016; Christopher et al., 2015). In policing, anger decreases ethical and constructive problem-solving, increases the interpretation of cues as hostile as well as aggressive responses, and can result in emotional exhaustion (Bergman et al., 2016). Trauma and chronic stress can compound the situation. In a study of 37 police officers who undertook a program in Mindfulness-Based Resilience Training, an adaptation of MBSR, Bergman et al., (2016) found that the mindfulness facets of nonjudging and aware acting reduced such anger and stress (Bergman et al., 2016). Christopher et al. (2015), found that an 8-week intervention in mindfulness training among law enforcement officers resulted in significant increases in resilience, mental and physical health, and emotional intelligence. Overall, mindfulness is negatively correlated with hostile attribution and aggressive reactions, anger, fatigue, stress, sleep disturbances, burnout, and rumination (Bergman et al., 2016; Christopher et al., 2015). This may be due to an increase in awareness and open acceptance that drive greater emotion regulation and decreases in rumination (Bergman et al., 2016). However one study noted a slight lag before benefits were accrued, as mindfulness started increasing before stress started decreasing (Christopher et al., 2015).

Wamsler et al. (2017) conducted a literature review of the role of mindfulness in sustainability and climate change science, practice, and teaching. The review found a blind spot in the research explicitly examining the active role of mindfulness in sustainability, yet also found scientific support for the positive contributions of mindfulness to the field, including its influence on intrinsic core values, wellbeing, consumption behavior, a connection to nature and indigenous wisdom, social activism and equity, as well as adaptive responses (Wamsler et al., 2017). Most of the actual scientific research involves the use of MBIs towards treating resilience after natural disaster, though the review recognizes the growing integration of mindfulness in actual practice outside of scientific study (Wamsler et al., 2017). This particular intersection is only emerging; the researchers found that nearly all the relevant literature had been published in the most recent five years preceding the review (Wamsler et al., 2017). The reviewers propose

that the importance of mindfulness to sustainability includes recognition of the interconnectedness of beings; the importance of consciousness and compassion in motivating adaptive behavior and minimizing habitual and harmful actions; the contribution of mindful awareness towards increased social activism for climate change mitigation; its use in education for a more positive interpersonal and reflective learning environment; and MBIs for coping with climate adversity (Wamsler et al., 2017). The study concludes that mindfulness can be a critical asset for sensitizing people to a more holistic and interdependent understanding of our environment and for fostering more just behavior towards adapting to and addressing climate change (Wamsler et al., 2017). Yet, more scientific research is necessary to help understand on a micro-level how mindfulness influences disposition and personal transformation towards more sustainable action, as well as on a macro-level how mindfulness-based interventions actually translate into structural and systemic change (Wamsler et al., 2017).

In the realm of youth education, mindfulness and other contemplative practices like Transcendental Meditation has been shown to improve student wellbeing and increase prosocial behavior and social competence (Waters, et al., 2015). There is not enough evidence yet to demonstrate reliable impact on academic performance, but studies do show that mindfulness practice improves cognitive performance and emotion regulation, both of which may contribute to student success (Waters, et al., 2015).

Though no *scientific studies* have been found explicitly validating the contributions of mindfulness to social impact in the following fields, it is increasingly found as a complementary practice, if not, a core and integral strategy towards positive outcomes in many other fields as well:

- Law and criminal justice reform: assisting better performance during arguments, more positive client relationships, more ethical community engagement, decreased implicit age and race bias, and stress management (Magee, 2016)
- Therapeutic and social work: for their client's self-knowledge, their own self-care, better listening, improved attention and awareness, empathy towards clients, and enhanced accountability (Davis & Hayes, 2011; McGarrigle & Walsh, 2011)
- Education: for treatment of youth symptoms of psychopathology (Zoogman et al., 2014) and for supporting teachers as mindful, aware and

emotionally-stable role models (Jennings, 2015)
- Health care professionals: for combating empathetic fatigue, promoting resilience and building support systems, trust and rapport between providers and patients (Duerr, 2008).
- Economics: to mitigate the impact of systemic over-consumption and the destruction of natural resources driven by unsustainable growth, systemic inequality, and systemic instability of markets driven by speculation with more mindful approaches to social justice, equity, ecological sustainability and stability (Magnuson, J., 2007).

Conclusion

Through this preliminary literature review of the scientific and scholarly writing on personal transformation, we have explored the existing knowledge and challenges of defining, measuring and understanding the mechanisms and outcomes of some of the more intangible aspects of human nature. Despite a lack of consensus on the precise definitions and metrics that would adequately capture all aspects of personal transformation, evidence suggests that it involves a process of self-development with a range of positive outcomes. The five domains of personal transformation reviewed tend to work through a five-part pathway to influence prosocial outcomes and potentially social change: (1) Mindfulness and emotional intelligence build the self-awareness and self-knowledge that enable us to (2) move into a place of greater self-regulation. From this process of inner growth, we find greater agency and wellbeing, and (3) develop the capacity to understand others more completely. As we continue to invest in our inner development and relationships, we (4) find deeper connectedness and engage positively with others. As we continue to foster mindfulness, social and emotional intelligence, and a sense of belonging and/or community, we (5) cultivate the foundational prosocial orientation that motivates us to act on behalf of the common good. While the existing research reviewed does not yet demonstrate a direct, causal link between prosocial behavior and positive systemic change, we propose that personal transformation creates positive *conditions* for the advancement of social change as mindfulness, social intelligence, belonging, and agency combine to drive altruistic action towards greater collective wellbeing. We have outlined the details of this proposed conceptual model for the interrelationships between personal transformation, prosocial

behavior and social change in an accompanying paper. Additional research, especially in non-clinical settings, is still necessary to determine whether and how prosocial behavior results in systemic social transformation. For now, we hope that this review engenders greater dialogue about what is known and what more needs to be explored to understand more deeply the relationship between personal transformation and social change.

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MINDFULNESS MEASUREMENT TOOLS

The following table contains an index of some of the more common tools used to measure this domain of personal transformation and its subcomponents.

Tool	Author	Description and Note	Link to Find Tool
39 and 24 item Five Facet Mindfulness Questionnaire	FFMQ Baer, Smith, Hopkins, Krietemeyer & Toney, 2006 24-item short form version of FFMQ (FFMQ-SF) developed by Bohlmeijer (2011)	After evaluating all of the seven most utilized mindfulness scales, Baer created this new one to integrate the most important and validated features, called the FFMQ. This measures the five facets of mindfulness: observing, describing, acting with awareness, non-judging of inner experience, and nonreactivity to inner experience.	FFMQ: https://www.researchgate.net/publication/319444696_Five_Facet_Mindfulness_Questionnaire_FFMQ FFMQ-SF: http://good-medicine.org.uk/files/assessment,%20mindfulness%205%20facets%20short_1.pdf
39-item Kentucky Inventory of Mindfulness Skills	KIMS, Baer, Smith & Allen, 2004	Measures observing, describing, acting with awareness, and accepting without judgment. Can be divided into subscales for each. Baer et al. (2006) evaluated the next six mindfulness scales and found KIMS most relevant.	http://www.mindfulness-extended.nl/content3/wp-content/uploads/2013/07/KIMS-E-EN.pdf
15-item Mindfulness Attention Awareness Scale	MAAS Brown & Ryan, 2003	Treats mindfulness as a trait involving awareness and attention.	https://ggsc.berkeley.edu/images/uploads/The_Mindful_Attention_Awareness_Scale_-_Trait_(1).pdf
14-item Freiburg Mindfulness Inventory	FMI, Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006	Considered heavily qualitative over quantitative, measures ability to regulate attention with orientation of openness, curiosity, and non-judgment. Measures trait mindfulness and should not be split up into subscales.	http://www.mindfulness-extended.nl/content3/wp-content/uploads/2013/07/Freiburg-Mindfulness-Inventory.pdf

Tool	Author	Description and Note	Link to Find Tool
Cognitive & Affective Mindfulness Scale 12-item Cognitive & Affective Mindfulness Scale - Revised	CAMS, Kumar, Feldman & Hayes, 2005 CAMS-R, Feldman, Hayes, Kumar, Greeson & Laurenceau 2007	Measures attention, present-focus, awareness and acceptance	https://ggsc.berkeley.edu/images/uploads/The_Cognitive_and_Affective_Mindfulness_Scale_%E2%80%93_Revised.pdf
14 or 21-item Langer Mindfulness Scale	LMS, Pirson, Langer, Bodner & Zilcha-Mano, 2012	Incorporates a socio-cognitive perspective	https://www.researchgate.net/publication/291372253_Developing_the_Langer_Mindfulness_Scale
13-item Toronto Mindfulness Scale	TMS, Lau, Bishop, Segal, Buis, Anderson, Carlson, Shapiro, & Carmody, 2006	Consists of two subscales – curiosity and decentering	http://www.personal.kent.edu/~dfresco/mindfulness/Lau_et_al_TMS.pdf
20-item Philadelphia Mindfulness Scale	PHLMS, Cardaciotto, Herbert, Forman, Moitra & Farrow, 2008	Measures present-moment awareness and acceptance of present.	https://journals.sagepub.com/doi/
30-item Solloway Mindfulness Survey	SMS, Solloway & Fisher, 2007	Measures knowledge and experience of mindfulness – used for tracking progress of students	https://dts.lectica.org/mindfulness/SMS/m-intro.html
7-item Mindfulness Process Questionnaire	MPQ, Erisman & Roemer, 2012	This new mindfulness questionnaire was developed to assess the extent to which mindfulness is intentionally practiced, to assess switching ability, and evaluate judgment. (Christopher et al., 2015)	http://roemerlab-umb.com/wp-content/uploads/2012/08/Erisman-and-Roemer-ABCT-2009.pdf

Tool	Author	Description and Note	Link to Find Tool
ATTENTION REGULATION AND CONFLICT MONITORING			
Attention Network Test	ANT, Fan, McCandliss, Sommer, Raz & Posner, 2002	This tool measures attention regulation and conflict monitoring (observing, aware-acting and describing), as well as executive attention. Two studies found better performance among experienced meditators (Hölzel et al., 2011b).	https://sacklerinstitute.org/cornell/assays_and_tools/ant/jin.fan/
Vigilance		These tools measure skills in self-regulating the focus of attention, sustaining attention over time (vigilance), and the switching of attention back to the breath (Bishop et al., 2004).	https://www.parinc.com/Products/Pkey/94
Heartbeat awareness tests		Self-report tests show attention on body awareness leads to clarity and subtle interoception (Hölzel et al., 2011b). This is supported by FA meditation.	
EMOTION REGULATION			
36-item Difficulties in Emotion Regulation Scale	DERS, Gratz & Roemer, 2004	Mindfulness decreases emotional reactivity, decreases negative emotions, increases positive emotions, reduces rumination and reactive thoughts (Hölzel et al., 2011b). This increases prefrontal cortex activity, decreases amygdala activation, and increases activity in the ventrolateral PFC (greater inhibitory control). There is a difference seen based on the experience of the meditator. Difficulties in emotion regulation include a lack of emotional awareness, lack of emotional clarity, difficulty controlling impulsive behavior when distressed, a lack of goal-directed behavior when distressed, non-acceptance of negative emotions, and limited access to effective emotion regulation strategies. (Christopher et al., 2015)	http://cairncenter.com/forms/difficultiesinemotionalregulation_scale.pdf
Toronto Alexithymia Scale	TAS-20, Taylor, 1992	This measures intentional investigative self-observation and understanding of thoughts and feelings. This means mindfulness would be positively correlated with measures of emotional awareness (Bishop et al., 2004).	http://www.gtaylorpsychiatry.org/tas.htm
META-AWARENESS & COGNITIVE REAPPRAISAL			
The Measure of Awareness and Coping in Autobiographical Memory	MACAM; Moore, Hayhurst & Teasdale, 1996	This measures decentry, the ability to observe thoughts and feelings as transitory and not truth. Requires trained coders, and takes time (Baer, 2011).	
Psychological Mindedness Scale	Conte 1997	This measures one's capacity to see the relationships between thoughts, feelings and actions or psychological mindedness (Bishop et al., 2004).	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3330424/pdf/250.pdf

Tool	Author	Description and Note	Link to Find Tool
CHANGE IN PERSPECTIVE ON SELF			
Tennessee Self-Concept Scale	TSCS:2, Fitts & Warren, 1996	One study showed changes in positive self-esteem, self-acceptance, and self-concept after 7-days of mindfulness (Hölzel et al., 2011b)	https://www.parinc.com/Products/Pkey/462
Self-concept scales of the Temperament and Character Inventory	Cloninger, Svrakic & Przybeck 1993	Experienced meditators show positive change (Hölzel et al., 2011b).	https://www.research-gate.net/publication/316321904_The_Temperament_and_Character_Inventory_TCI
SELF-COMPASSION			
Self-Compassion Scale	SCS, Neff 2003	Self-compassion is correlated with wellbeing, social connectedness, self-determination and emotional balance (Hick and Furlotte, 2010).	https://self-compassion.org/wp-content/uploads/2015/06/Self_Compassion_Scale_for_researchers.pdf
21-Item Compassionate Love Scale for Humanity (CLS) also known as the Santa Clara Brief Compassion Scale	CLS, Sprecher and Fehr 2005		https://www.midss.org/content/santa-clara-brief-compassion-scale-scbcs
STRESS AND ANXIETY			
Anxiety Sensitivity Index	Reiss, Peterson, Gursky & McNally, 1992	Also a metacognitive skill – monitoring and control – or a direct experience of events, not suppression, which results in an ability to inhibit rumination. Beginner's mind involves observation as if for the first time with a commitment to maintain an attitude of curiosity and acceptance. This can lead to experiencing emotional distress or unpleasant experiences as less unpleasant and threatening "since the contract of acceptance changes their subjective meaning". This results in improved emotion regulation (Bishop et al., 2004).	https://www.sciencedirect.com/science/article/abs/

Tool	Author	Description and Note	Link to Find Tool
6-Item Brief Resilience Scale	BRS, Smith, Dalen, Wiggins, Tooley, Christopher & Bernard, 2008	The brief resilience scale assesses the ability of a person to bounce back.	https://ogg.osu.edu/media/documents/MB%20Stream/Brief%20Resilience%20Scale.pdf
14-point Perceived Stress Scale 4-item Perceived Stress Scale-4	PSS Cohen 1983 PSS-4, Cohen 1988	This measures how unpredictable, uncontrollable, and overloaded one is (Christopher et al., 2015).	http://www.mindgarden.com/documents/PerceivedStressScale.pdf
16-item Oldenburg Burnout Inventory	OLBI, Demerouti 2003	This measures exhaustion and disengagement (Christopher et al., 2015).	https://stresscenter.ucsf.edu/measures/burnout
BIAS AND PREJUDICE			
Implicit Association Test	IAT, Greenwald, Poehlman, Uhlman 2009	(Kang et al., 2013)	https://faculty.washington.edu/agg/iat_materials.htm#
EMPATHY AND COMPASSION			
Compassion Scale	Pommier, 2011	(Ludvik & Eberhart, 2018)	http://goodmedicine.org.uk/files/other-compassion%20scale,%20tahoma.pdf
Interpersonal Reactivity Index	IRI, Davis 1994	Measures empathy.	https://docs.google.com/document/d/1Y-CKkyg-OVpT0Qz36qF-dHM7yeSGj0DsUYgyyx-9u7ubnc/edit
PROSOCIAL BEHAVIOR			
Emotional support subscale of the Interpersonal Competence Questionnaire	ICQ, Buhrmester 1988	Measures facilitating reappraisals (Jones, et al., 2019).	https://pdfs.semanticscholar.org/87df/a1c-ba25fc8ef3fb6cfdabe79f-d0add6700f4.pdf
Active-Empathic Listening Scale	AELS, Bodie 2011	Active listening has cognitive, affective and behavioral processes (Jones, et al., 2019)	http://www.grahambodie.com/aels

Tool	Author	Description and Note	Link to Find Tool
BEHAVIORAL MEASURES OF MINDFULNESS TESTS			
Observe Scale of the Interpersonal Reactivity Index (IRI)	IRI, Davis, 1980	Used with heartbeat detection tests (Hölzel et al., 2011b).	https://fetzer.org/sites/default/files/images/stories/pdf/selfmeasures/EMPATHY-InterpersonalReactivityIndex.pdf
Mindful-Breathing Exercise	MBE	Measures mindfulness of objects through experience sampling (ES) - awareness of an anchor in the present moment like breath. The Mindful Breathing Exercise demonstrated acceptable reliabilities and preliminary evidence of construct validity. It also showed evidence of validity in predicting key criterion beyond self-report measures between experienced and novice meditators (Hadash and Bernstein, 2018).	http://projects.hsl.wisc.edu/SERVICE/courses/whole-health-for-pain-and-suffering/Script-Mindful-Breathing.pdf
Breath Counting Task	BCT	This test measures time-course of sustained mindful awareness and the time it takes to re-engage in mindful awareness. The Breath Counting Task was most effective and demonstrated acceptable reliabilities and preliminary evidence of construct validity (Hadash and Bernstein, 2018)	https://www.researchgate.net/publication/324166741_The_Breath_Counting_Task
Heartbeat Detection Tasks		This test measures sensitivity primarily through the first and third person correspondence method (Hadash and Bernstein, 2018).	https://www.researchgate.net/publication/280999666_Methodological_Recommendations_for_a_Heartbeat_Detection-Based_Measure_of_Interoceptive_Sensitivity
Single Experience and Self-Implicit Association Test	SES-IAT, Hadash and Bernstein, 2018	This measures attitudes including associations between self and fear during frightening videos. This test was most effective and demonstrated acceptable reliabilities and preliminary evidence of construct validity (Hadash and Bernstein, 2018).	https://mindrxiv.org/c8vap/

MINDFULNESS ESSENTIAL STUDIES

Following are a selection of key studies that help define this domain of personal transformation, provide an assessment of tools for its measure, or provide insights on its relevance to social change.

Study	Citation	Summary	Link
Using Self-Report Assessment Methods to Explore Facets of Mindfulness.	Baer, R.A., G.T. Smith, J. Hopkins, J. Krietemeyer, and L. Toney. "Using Self-Report Assessment Methods to Explore Facets of Mindfulness." Assessment 13 (2006): 27-45. https://doi.org/10.1177/1073191105283504	Baer et al. evaluated the psychometric characteristics of available mindfulness self-report scales, then compiled to assess the multi-faceted impact of mindfulness.	https://www.researchgate.net/publication/232885729_Measuring_Mindfulness
Mindfulness: A Proposed Operational Definition	Bishop, S., Lau, M. Shapiro, S., Carlson, L., Anderson, N. Carmody, J., & Segal, Z. (2004) Mindfulness: A Proposed Operational Definition. Clinical Psychology: Science and Practice 11 (3): 230–241. doi:10.1093/clipsy/bph077.	Bishop et al. proposes an operational definition for mindfulness for the purposes of developing an instrument to measure it. .	https://goamra.org/wp-content/uploads/2014/06/bishop_2004.pdf
Reconstructing and deconstructing the self: Cognitive mechanisms in meditation practice.	Dahl, C. J., Lutz, A., & Davidson, R. J. (2015). Reconstructing and deconstructing the self: Cognitive mechanisms in meditation practice. Trends in Cognitive Sciences, 19(9), 515–23. PMCID: PMC4595910.	Dahl et al. propose a novel classification system that categorizes specific styles of meditation into attentional, constructive, and deconstructive families based on their primary cognitive mechanisms..	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4595910/
What are the Benefits of Mindfulness? A Practice Review of Psychotherapy-Related Research.	Davis, D.M., and J.A. Hayes. (2011) What are the Benefits of Mindfulness? A Practice Review of Psychotherapy-Related Research. Psychology 48(2), 198-208.	A meta-analysis of the benefits and outcomes of mindfulness practice.	https://www.apa.org/pubs/journals/features/pst-48-2-198.pdf
Mindfulness and Social Justice Approaches: Bridging the Mind and Society in Social Work Practice	Hick, S., & Furlotte, C. (2009). Mindfulness and Social Justice Approaches: Bridging the Mind and Society in Social Work Practice. Canadian Social Work Review / Revue Canadienne De Service Social, 26(1), 5-24.	Articulates concepts of how mindfulness may affect social justice work.	https://www.jstor.org/stable/41669899?seq=2#metadata_info_tab_contents

Study	Citation	Summary	Link
How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective.	Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011b). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. Perspectives on Psychological Science, 6(6), 537–559. doi:10.1177/1745691611419671.	Hölzel et al. explore several components through which mindfulness meditation exerts its effects: (a) attention regulation, (b) body awareness, (c) emotion regulation (including reappraisal and exposure, extinction, and reconsolidation), and (d) change in perspective on the self. The authors suggest that the mechanisms work synergistically, establishing a process of enhanced self-regulation.	https://ftp.science.ru.nl/CSI/CompMath.Found/BrittaHolzel_LWS.pdf
Mindfulness: A practical map of practices and their transformative domains.	Levit-Binnun, N., Arbel, K., & Federman, A. (2019, May 14). Mindfulness: A practical map of practices and their transformative domains. doi: 10.31231/osf.io/fsz85.	Levit-Binnun et al. created a theoretical map of four types of practices and four categories of transformation or insights and mapped out the mechanisms for each combination.	https://mindrxiv.org/fsz85/
Systematic Review and Meta-analysis of the Effects of Meditation on Empathy, Compassion, and Prosocial Behaviors.	Luberto, C. M., Shinday, N., Song, R., Philpotts, L. L., Park, E. R., Fricchione, G. L., & Yeh, G. Y. (2018). A Systematic Review and Meta-analysis of the Effects of Meditation on Empathy, Compassion, and Prosocial Behaviors. Mindfulness, 9(3), 708–724. doi:10.1007/s12671-017-0841-8.	An analysis of 26 studies of 1714 subjects, Luberto et al., found that 85% of studies showed some form of prosocial behavior improved due to meditation..The authors suggest the mechanisms for why.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6081743/