Spring 2-25-2020

Enhancing Creative Thinking Through Open Awareness Walking Meditation

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December 2019

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Abstract

A documentary which follows 8 novice meditators as they engage in a 20-minute walking open awareness meditation practice for 6 weeks. The goal of the documentary is to explore if open awareness walking meditation enhances creative thinking. This project is important because it brings together several budding research fields: creativity, mindfulness, and walking. The topic of the documentary is inspired by several studies that demonstrate a positive correlation between walking, open awareness meditation, and increased divergent thinking ability—a key element in creative thinking. The participants report many positive experiences and some surprising benefits for doing this practice. Participants report that this practice not only enhanced their creative thinking but also had other personal benefits such as greater self-awareness of thought patterns, relaxation, general calming effect, insights into the direction of their life and work, and less stress.

Keywords: documentary, creativity, divergent thinking, creative thinking, open awareness meditation, open monitoring meditation, mindfulness, meditation, walking

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Introduction

This paper is designed to accompany a documentary film that explores the qualitative experience of 8 novice meditators who were asked to engage in a 20-minute open awareness walking mindfulness practice for 6 weeks. The goal of this documentary is to showcase how open awareness walking mindfulness practice may enhance the participants creative thinking.

Another important goal of this research is to highlight the recent scholarship which demonstrates open awareness mindfulness practice and walking increase creative thinking via divergent thinking ability. Additionally, this project will discuss of the basic concepts, definitions, and theories about mindfulness, creativity, and walking in order to understand how these constructs are related. This paper is split into five sections to aid comprehension. The first section seeks to help the reader understand what mindfulness is and different perspectives that have been proposed by researchers. Section two deals with the field of creativity and how it is defined and measured, and briefly outlines different theories of creativity. Section three discusses the recent literature that directly relates to how mindfulness practice can enhance creative thinking. Section four outlines how walking increases creative thinking ability. Section five outlines my reflections of the documentary and the importance—the rationale—for doing this creative project. Ultimately, the goal of this project is to explore whether a person's creative thinking may increase through walking open awareness meditation practice.

Understanding Mindfulness: Definitions, Constructs, Measurement, and Theories

In order to better determine whether mindfulness has an impact on creative thinking ability, it is imperative that mindfulness is defined, and measurement protocols are clearly articulated. Yet, in many instances, mindfulness can be challenging to define (Gethin, 2011; Hart et al., 2013; Chiesa 2013), especially because the entire construct is deeply embedded in various contemplative traditions (Williams & Kabat-Zinn, 2011). In fact, researchers recently identified

33 proposed definitions of mindfulness within the contemplative research community (Nilsson &

Kazemi, 2016). Interestingly, these researchers found that most of these definitions had similar

or overlapping characteristics which could serve as core elements of a unified definition of

mindfulness. These core elements were: "awareness and attention, present-centeredness, external

events, and cultivation" (Nilsson & Kazemi, 2016, p. 5). However, the researchers noted that

many eastern mindfulness constructs included a fifth element that was absent in western

constructs: ethical-mindedness. In order to bridge the gap between western and Eastern

mindfulness constructs and understanding, the researchers combine these core elements of

mindfulness to form a new definition: "mindfulness is a particular type of social practice that

leads the practitioner to an ethically minded awareness, intentionally situated in the here and

now" (Nilsson & Kazemi, 2016, p. 5). Since 2016, this definition is gaining more attention in

the contemplative community.

However, most Westerners think of mindfulness in less ethical terms (Schmidt, 2011). In

fact, most Westerners think of mindfulness in its cognitive sense, or as it has been articulated by

Jon Kabat Zinn, who famously said "mindfulness means paying attention in a particular way: on

purpose, in the present moment, and nonjudgmentally" (Kabat-Zinn, 2016, p. 89). Zinn's

definition is usually adopted within modern contemplative traditions or meditative circles, but it

also has had great influence in the nonreligious, non-Buddhist, and/or purely secular constructs

of mindfulness (Williams & Kabat-Zinn, 2011). In addition, Zinn's definition has certainly

influenced medical and scientific mindfulness constructs (Ludwig & Kabat-Zinn, 2008).

In addition to these well-known mindfulness definitions, some prominent contemplative

researchers have segmented mindfulness practices into three categories of practice: Focused

Attention (FA), Open Monitoring (OM), and Lovingkindness (LK) to better understand the

specific benefits of each of these mindfulness' practices (Goleman & Davidson, 2018; Lutz et al., 2008; Travis & Shear, 2010). As these same researchers suggest, a significant weakness of mindfulness and contemplative research in recent years is the lack of knowledge surrounding the different mindfulness traditions and practices, each with unique mental and emotional processes (Lutz et al, 2008). Consequently, contemplative research in general has suffered from weak research design and rigorous scientific standards. As a recent study published in *Nature* suggests, in order to define, study, and understand mindfulness and its effects, it is imperative to "clearly understand the history and traditions from which such practices have emerged" and to understand their use case (Tang et al, 2015, p. 3).

As is becoming apparent to many contemplative researchers (Goleman & Davidson, 2018), the need to systematize a standard definition of mindfulness for research purpose is imperative to avoid the confusion and errors in research design that have occurred (Tang et al., 2015). Several prominent researchers argue that "unless and until a more thorough, precise, and comprehensive definition of mindfulness is formulated, it will be difficult to create protocols, scales, and instruments that properly and precisely measure its effectiveness" (Nilsson & Kazemi, 2016, p. 5). Significant effort is underway to better understand and codify the diversity of mindfulness practices, their history, and how to properly measure them (Siegel et al., 2009).

As evidence of this effort and to offer the reader an understanding of the vast array of different perspectives and theories on mindfulness that have emerged in recent years, one need only look at the numerous "mindfulness scales" which have been developed, and continue to be rigorously tested and validated (Chiesa, 2013). For example, some of the most widely utilized mindfulness scales include: the *Mindful Attention Awareness Scale* (MAAS), (Brown & Ryan, 2003; Lawlor et al., 2014); the *Five Facet Mindfulness Questionnaire* (FFMQ), (Baer et al.,

2006; Baer et al., 2008); the *Applied Mindfulness Process Scale* (AMPS), (Li et al., 2016); the

Cognitive and Affective Mindfulness Scale (CAMS), (Feldman et al., 2007); *Freiburg*

Mindfulness Inventory (FMI), (Walach et al., 2006; Trousselard et al., 2010); the *Child and*

Adolescent Mindfulness Measure (CAMM), (Greco et al., 2011; de Bruin et al., 2014); the

Philadelphia Mindfulness Scale (PHLMS), (Cardaciotto et al., 2008); the *Mindfulness-Based*

Relapse Prevention Adherence and Competence Scale (MBRP-AC), (Chawla et al., 2010); the

State Mindfulness Scale (SMS), (Tanay & Bernstein, 2013); and *The Langer Mindfulness Scale*

(LMS), (Pirson et al., 2012; Haigh et al., 2011). There are many other mindfulness research tools

in development that could be mentioned here (Tang et al., 2015) but these may not be as relevant

to the current inquiry. However, if one wishes to learn more about future developments in

mindfulness research, an excellent place to start is The American Mindfulness Research

Association. They are doing much to organize and systematize the various definitions, practices,

and constructs of mindfulness across contemplative fields.

For the present inquiry, perhaps the most useful definition and construct of mindfulness is

the "operational definition of mindfulness" proposed by Bishop et al., (2004). Under this view,

mindfulness practices are codified based on their "neural and cognitive operations" (Bishop et

al., 2004, p. 1). This definition is similar to many of the mindfulness constructs discussed earlier,

but its focus is on the cognitive and neural operation, which is different than many other ideas of

mindfulness. Bishop et al., (2004) definition of mindfulness seems best suited to understand

mindfulness' role in creative thinking. This is because, as we will see, creative thinking is

thought to be a cognitive and neural operation (Dietrich, 2004; Kozbelt et al., 2010). So, as some

researchers suggest, perhaps the best way to understand mindfulness' role in enhancing creative

thinking in individuals is to see how it directly impacts the cognitive and neural processes

thought to govern creativity (Capurso et al., 2014).

Understanding Creative Thinking: Definitions, Measurement, and Theories

The creativity research community, like mindfulness, is relatively young (Cropley, 2019).

Despite this fact, the number of research studies investigating creativity has increased

dramatically in recent years (Sternberg, 2006). Much of the research on creativity and creative

thinking today seeks to understand basic questions such as: what is creativity? How do we define

it? and how do we measure it? These questions lead to theories of creativity and creative

thinking. There are many contemporary theories of creativity (Runco, 2014), but the principle

theories discussed here are the social (Csikszentmihalyi & Sawyer, 2014), cognitive (Simonton,

2000), and neuroscience theories (Dietrich, 2004). Interestingly, all these theories rely on

divergent and convergent thinking mechanisms (Runco, 2014). But before jumping into these

theories, it is important to discuss the most influential definitions of creativity and creative

thinking, remembering that each theory of creativity defines the construct somewhat differently.

One famous definition of creativity is the "standard definition" which states that

something is creative when it is both original and effective (Runco & Jaeger, 2012, p. 1). This

conception of creativity goes back to the 1940s and 1950s from the work of Stein (1953) and

Patrick (1937; 1935). Although this definition is old, it did not see much development until

recent years when Runco popularized it and others began applying it in their research. But in

understanding the definition, one must particularly know what is meant by the terms "original"

and "effective". Simply put, original is something new. But to be creative, something must not

only be new but effective. When researchers use the term "effective" to describe creativity, many

of them use the term "valuable" (Runco, 2014, p. 2). However, perhaps the most widely used

term to describe and define creativity under the "standard definition" is novel: something that is

both new, interesting, valuable, and effective in its function and/or purpose (Picciuto &

Carruthers, 2014; Sternberg, 2006; Runco, 2014). Some researchers have even called this the

"novel theory of creativity" because the term seems to capture so much of what we mean by

creativity and creative thinking (Sternberg, 2006; Leveque, 2011). Yet, despite its strong appeal

and wide application, there are other definitions of creativity gaining attention.

Another recent definition of creativity is the Componential definition championed by

Teresa Amabile (2012) of Harvard Business School. In this definition, creativity is "the

production of ideas or outcomes that are both novel and appropriate to some goal" (Amabile,

2012, p. 1). What is important about this definition is that Amabile not only builds on the idea of

creativity as novelty, but also incorporates goals and intentions into the definitions. Also of

importance is the fact that Amabile (2012) says there are "four [necessary] components" in any

"creative endeavor" –the first three of which are found "within the individual"—and the fourth is

outside in the environment (p. 3). The four components of this definitions are: "domain relevant

skills, creativity-relevant processes, and intrinsic task motivation" all of which are within the

individual; and the fourth component is the "social environment" in and through which

individuals work (Amabile, 2012, p. 3). Amabile's work is most often utilized in corporations

and business innovation workshops. Like most definitions of organizational creativity, Amabile's

definition and theory of creativity draws heavily on social psychology, and thus is one of the

principle social definitions of creativity (Klijn & Tomic, 2010). Amabile's Componential

Definitions of creativity is discussed widely in the literature (Rennick & McKay, 2018) and

many researchers are in the process of testing and validating her definition in labs and in the

workplace (Conti et al.,1996; Rennick & McKay, 2018). Amabile's definition of creativity is

certainly one of the most well-known within the creativity research community (Anderson et al.,

2014) and is increasingly becoming popular in the media and in schools (Munro, 2011). Part of

the reason why Amabile's Componential definition of creativity is influential is because other

researchers have refined it over the last three decades (Hill & Amabile, 1993; Amabile et al.,

2005; Amabile & Pratt, 2016). Like the standard definition, Amabile's Componential definition

is a theory with significant backing and is widely accepted (Wang & Nickerson, 2017).

Perhaps the most influential aspect of any definition and theory of creativity revolves

around the ideas of divergent and convergent thinking (Epstein et al., 2012; Runco, 2014). These

concepts are very pervasive in the scientific discussion of creativity and they have a long history

dating back to the mid 1950's. The psychologist J.P Guilford (1956) first coined these terms in

1956 when describing human intelligence. However, they are now most often utilized in

creativity research rather than in intelligence research field. In fact, divergent thinking and

convergent thinking are the principle measurement protocol in nearly all scientific study methods

on creativity (Cropley, 2000; Epstein et al., 2012; Cropley, 2019). Some researchers argue that

no definition or theory of creativity is complete without them or that a core aspect of creativity is

divergent thinking (Baer, 2014; Balkin, 1990). Convergent thinking, on the other hand, is the

process of giving the "correct answer" to a task that is believed to have one possible answer.

Convergent thinking is often used in assessing human intelligence and is widely used in multiple

choice tests and questionnaires. A key aspect of convergent thinking is that there is very little

creativity involved in the process and tasks designed to measure it. For instance, an American

history test may give you multiple choice question asking what year the Declaration of

Independence was signed. You either know the correct answer or you don't. There is only one

correct answer. Perhaps the best way to remember what convergent thinking means is to imagine

that you "converge" on or towards the correct answer.

Divergent thinking is the opposite of convergent thinking: there are many possibilities and the more possibilities the better (Yi et al., 2015). For instance, in divergent thinking "test-takers are asked to generate as many of their own solutions as possible in response to a domain-general task" (An et al., 2016, p. 1), such as how many uses of a pen can they come up with in 30 seconds? Such tests are meant to measure creative thinking, ability, and creative cognitive factors (Dumas & Runco, 2018; An et al., 2016). Divergent thinking is thought to be the greatest predictor of creative ability (Silvia et al., 2008; McCrae, 1987; Runco & Acar, 2012). However, as Runco (2008) argues, "divergent thinking is not synonymous with creativity...and there is more to creativity than simply one's ability to think divergently" (p. 17). However, as mentioned before, divergent thinking is the most widely used, accepted, and validated method and measurement protocol in creativity research and as such creativity is strongly thought of in divergent thinking terms (Dumas & Runco, 2018). Hence, creativity is often so strongly wrapped up in divergent thinking terminology and research methods that at times it can be hard to separate the constructs (Runco & Acar, 2012). So, it seems uncontroversial to say that divergent thinking is an integral part of all current definitions and theories of creativity today.

Definitions of creativity stem from the theoretical and experimental elements of theories of creativity (Runco, 2014; Kozbelt et al., 2010). As mentioned before, there seems to be three broad camps within which most theories of creativity fall: social, cognitive, and neuroscience. Social theories tend to emphasize organizational and team factors of creative thinking and performance (Hill & Amabile, 1993) with an emphasis on how social interaction and environments play a role in the creative process (Simonton, 2000) and outcomes (Csikszentmihalyi & Sawyer, 2014). Most social creativity theories utilize terms such as novel, useful, and effective to characterize creativity, and rely on divergent thinking protocols to

measure "novelty" in creative tasks (Runco & Acar, 2012). As mentioned earlier, Amabile's (2012) Componential theory is one of the most popular social theories of creativity. But there is one other social theory of creativity that needs mentioning here. This theory is championed by Csikszentmihalyi, the famous "flow" psychologist.

In the early 1990's Csikszentmihalyi, together with his then graduate student, Keith Sawyer, now at the University of North Carolina Chapel Hill, created the systems theory of creativity. In this social theory of creativity, Csikszentmihalyi (1997) argues that creativity is "any act, idea, or product that changes an existing domain, or that transforms an existing domain into a new one" (p.28). Csikszentmihalyi believes that creativity is bound up in three social layers or levels which form a system. These levels he calls domains, fields, and individuals. For Csikszentmihalyi, a domain is "symbolic knowledge shared by a particular society or by humanity as a whole" such as fine arts. The field level is those who participate in the domain and generally control it, such as art teachers, art critics, established artists, etc. Lastly, the individual level describes those who enter the domain and employs the symbolic language and rules of that domain. All three of these levels are necessary for creativity to occur. What is important about Csikszentmihalyi's theory of creativity is that it is embedded within a social structure of rules (domains), but it also crosses the boundaries into another type of social creativity theory: expert creative performance. In this kind of theory, creativity is judged by experts in a specific domain (fine arts, i.e. painting) and is creative when it is performed with novelty within the context of that specific domain. For instance, a painter may not be thought of as creative outside of painting—his domain—but may be thought of as very creative among painter (s). This is an important insight because it gives boundaries to creativity when creative thinking is often thought to be "thinking outside of the box" or openness to things outside of one's domain. The

tendency to characterize creativity as the ability to "think outside of the box" is direct evidence

on how pervasive and influential divergent thinking has been on popular culture's view of

creativity. Therefore, we see that Csikszentmihalyi's conception of creativity seems to challenge

the divergent thinking paradigm of creativity.

A more recent investigation "domain specific creativity" seems to support

Csikszentmihalyi's view of creativity. Drew Boyd and Jacob Goldenberg (2013) lay out a

specific approach to creative and innovative thinking based solely in one's chosen domain. This

"inside the box" approach has seen a lot of popularity since its recent articulation, and others find

its "counter-intuitive" approach to creativity and innovation "immensely practical" and novel

(Weisberg, 2011, p. 62). Baer (2014) also seems to take this approach, saying that "domain

specific creativity" is one of the most objective measures "of how creative thinking occurs and is

evaluated" (p. 4). So, it seems there is evidence that perhaps divergent thinking may not be the

primary aspect of creativity but one among many.

Other types of creativity theories are the cognitive and neuroscience. These are discussed

together because there is a lot of similarities and interplay between research methods and how

they are measured (Zabelina & Robinson, 2010). Most cognitive theories of creativity seek to

understand how the brain creates, understands, and elicits creative thinking patterns (Jung et al.,

2013, Bink & Marsh, 2000). In addition, divergent thinking is a key element in how cognitive

theories of creative thinking are described and understood (Sweller, 2009). Recent findings

suggest that individuals who were judged to be "creative" were found to have "greater automatic

processing" which means they had greater ability to maintain "defocused attention" and form

"looser associations" than others (Zabelina & Robinson, 2010, p. 1-2). Similar findings were

shown from meditative and mindfulness practices (Zedelius & Schooler, 2015; Colzato et al.,

2012). The ability to form looser associations and maintain defused focus is strongly correlated with increased divergent thinking (Jung et al., 2013). Cognitive views of creativity are most often related to brain mechanism such as memory (Ward & Finke, 1995), attention (Zabelina et al., 2016; Memmert, 2006) and problem-solving (Lumsdaine & Lumsdaine, 1994). All of these have been shown to be crucial to creative thinking (Dacey, 1989).

From a neuroscience perspective, defused and loose associations and other proposed creativity brain functions are studied via brain waves. One important study points to the fact that "prior evidence regarding the relationship between creativity and brain wave patterns" are "inconsistent" with each other (Li et al., 2016, p. 1). They suggest that "one possible reason might be that the means of selecting creative individual in the past has varied in each study" and therefore, sampling is a crucial issue in creative research (Li et al., 2016, p. 1). To overcome some of these issues, Li et al., (2016) gave participants an "open-ended creativity test" rather than many of the standard "closed-ended tests" (p. 2). In the study, they found that the "alpha brain waves" were strongly correlated "to larger variability in EEG dynamics between alpha and beta waves when performing either open-ended or closed-ended creativity tasks" (Li et al., 2016, p. 3). In short, "creative potential" as assessed via brain waves in participants is best explained by the nature of the creative task itself, which "induces" or engages the brain waves appropriate for the task. This is an important finding because it points to the fact that perhaps the best form of creativity tests and measurement protocols are those which are domain and task specific.

Another influential neuroscience perspective on creativity is offered by Dietrich (2004) where he argues that very little creative research has been conducted within an unified "neuroscientific, cognitive, and psychological framework" which "integrates the findings from these disciplines to express a full picture of creative potential, creative thinking, and creative

theories" (p. 2). Dietrich's goal in his paper is to construct a framework for creativity that will integrate all the science perspectives into one, to better understand what creativity is and what it is not. Dietrich (2004) admits that his proposed framework "is tentative" but he hopes that his work will encourage others "to refine it through rigorous testing" (p. 14). Dietrich's (2004) conclusion to his paper succinctly outlines his creativity framework. Dietrich (2004) argues that

> creativity results from the factorial combination of four kinds of mechanisms. Neural computation that generates novelty can occur during two modes of thought (deliberate and spontaneous) and for two types of information (emotional and cognitive). Regardless of how novelty is generated initially, circuits in the prefrontal cortex perform the computation that transforms the novelty into creative behavior. To that end, prefrontal circuits are involved in making novelty fully conscious, evaluating its appropriateness, and ultimately implementing its creative expression (p. 13).

Other researchers support Dietrich's conclusion here (Carlsson et al., 2005) and (Jung et al., 2013). However, other studies point to the deactivation of the default network and its role in creative thinking and function. One such study found that participants who deactivated the "default network" for 15 mins before being asked to perform a divergent thinking creativity test scored 27% higher than the control group (Beaty et al., 2014). This is an important finding because it suggests that resting, day-dreaming, meditation, and mindfulness may all enhance creative potential and creative thinking since all of these activities have been shown to deactivate the default mode network (Berkovich-Ohana et al., 2012; Brewer et al., 2011; Domhoff & Fox, 2015; Raichle et al., 2001). Across the neuroscience and creativity research community, the deactivation of the default mode network is increasingly becoming more important in

understanding creativity. For instance, in a recent scientific reviews of creativity neuroscience research conducted by Mullen Raymond (2017), concludes that

> A growing body of evidence suggests that divergent thinking is related to regions associated with internally directed attention and spontaneous cognition, indicating a deactivating functional link to the Default Mode Network (DMN) (p. 8).

However, the same review (Raymond, 2017) also points out that "creativity cannot be localized to a single part of the brain due to its implicit and multifaceted nature" and that "creativity requires the activation of different areas involving both hemispheres of the brain"— not just the right hemisphere as often discussed in pop culture (p. 9). In summary, there is still a lot of work to be done in order to understand creative potential, creative thinking, and the functions, mechanisms, and brain networks that contribute to creativity. Creativity as both a cognitive and neural process is extremely complex and very little is known and agreed upon within the scientific community. What can be concluded with some confidence is that cognitive and neuroscientific approaches to creativity are making progress in broadening our concepts and understanding of creativity. Also, within the cognitive and neuroscientific literature on creativity, they seem to support the fact that divergent thinking is the core of most contemporary thought and theories on creativity and certainly in how creativity is measured and tested today.

Enhancing Creative Thinking with Open Awareness Meditation Practice

Interest in mindfulness and its role in creativity is beginning to surge (Carson, 2014). Recent studies have shown there is a positive link between mindfulness practice and creative thinking (Colzato et al., 2012; Horan, 2009; Müller et al., 2016; Lebuda et al., 2016; Orme Johnson & Granieri, 1977; Cowger & Torrance, 1982). Some of these studies date back to the 1970's, but it wasn't until the early 2000s that many researchers became interested in investigating mindfulness' role in creativity (Penman, 2015). Part of the reason why researchers

are becoming interested in mindfulness and its ability to enhance creativity and thinking is, as

Müller et al., (2016) explains "because of its robust effects on cognitive processes" (p. 1).

Mindfulness has been shown in numerous studies to affect cognitive processing, which is

strongly linked to creative thinking (Ostafin & Kassman, 2012; Hodgins & Adair, 2010; Strick,

van Noorden, Ritskes, de Ruiter, & Dijksterhuis, 2012; Moore & Malinowski, 2009).

Additionally, other studies have demonstrated a more direct link between meditation and

creativity (Horan, 2009; Colzato et al., 2012; Orme Johnson & Granieri, 1977; Cowger &

Torrance, 1982). Additionally, mindfulness has been shown to influence how we regulate our

attention (Davidson & Goleman, 1977; MacLean et al., 2010; Moore & Malinowski, 2009), and

is positively related to cognitive control (Moore & Malinowski, 2009). Mindfulness is also

shown to reduce habitual responses (Wenk-Sormaz, 2005). From these findings, many

researchers are now investigating how mindfulness practice can enhance creative and innovative

thinking. More recent research confirms many of the findings from earlier studies that initially

established the link between creativity and mindfulness practice (Kudesia, 2015; Lebuda et al.,

2016; Müller et al., 2016; Brendel et al., 2016; Berkovich-Ohana et al., 2017; Agnoli et al., 2018;

Shamas & Maker, 2018; Byrne & Thatchenkery, 2019). Yet, there have been some issues that

have arisen such as contradictory findings between newer and older studies (Colzato et al., 2012;

Müller et al., 2016) and possible mistakes in methods and measurement protocols in some of the

earlier studies (Orme-Johnson & Granieri, 1977; Orme-Johnson et al.,1977; Ball, 1980; Cowger,

1974; Domino, 1977).

     Colzato et al., (2012) address some of these concerns in their landmark study on

creativity and types of mindfulness practice. Colzato et al., (2012) state that "some studies found

evidence for a strong positive impact of meditation practice on creativity" while "others found

only a weak association or no effect at all" (p. 7). However, as the researchers explain, these contradictory findings are most likely due to "methodological" differences "across these studies" particularly in areas such as "sample characteristics and type of meditation" (p.7). Hence, the researchers conclude, it is difficult to determine whether these studies "were actually assessing the same construct and processes" (p. 7).

In other words, differences between findings seem to stem from two sources. First, from a general lack of understanding of contemplative traditions, history, and practice. Second, from "methodological" issues such as how samples are selected (Colzato et al., 2012, p. 7). The contemplative research field in general has suffered from these kinds of issues (Lazar, 2005; Bergomi et al., 2013) and recent scholarship has called attention to this and suggests ways to fix these methodological problems (Goleman & Davidson, 2018; Chiesa, 2013). Despite possible methodological issues that have been discussed in early studies, the field is continuing to experience growth.

After initial studies investigated the role of mindfulness in creativity in the late 1970's into the 1980's, research on the subject seemed to slow. Perhaps because, as previously suggested by Colzato et al., (2012) contradictory findings among studies may have pushed researchers toward other interests. Yet, in 2009, Horan published a much-cited study entitled *The Neuropsychological Connection Between Creativity and Meditation* where he investigated the role of contemplative practices on creativity. In this study, Horan (2009) reviews the literature on brain waves, from alpha to gamma waves, and provides evidence that meditation practices and creativity "cause similar, and in some cases, the same brain wave patterns to occur" (p. 7). In this influential article, Horan (2009) compares creativity brain wave activity to that of different meditation practices from various traditions. At the end of his article, Horan (2009, p.15) offers

11 "insights" into what his comparison of creativity and meditation brain wave patterns reveal.

To analyze all 11 of these insights is beyond the scope of this review, but several of them

deserve mention here. Horan's (2009) first insight is worth quoting directly:

> Mindfulness Meditation (MM) supports creative thinking (particularly incubation and
>
> illumination phases), even in novices, by inducing broad, open awareness in a state of
>
> low cortical arousal (e.g., increased low-alpha) enhancing sensitivity, reducing
>
> habituation to external (and perhaps internal) stimuli, increasing cognitive performance
>
> on complex problems and supporting novelty-seeking (p. 15).

This insight is interesting because the "open awareness" or "open monitoring" mentioned

here seems to be the most consistent link found among studies between mindfulness practice and

enhancing creative thinking (Colzato et al., 2012; Horan 2009; Kudesia, 2015; Lebuda et al.,

2016; Müller et al., 2016; Brendel et al., 2016; Berkovich-Ohana et al., 2017; Agnoli et al., 2018;

Shama & Maker, 2018; Byrne & Thatchenkery, 2019). Nearly every study that investigates

mindfulness or any contemplative practice finds some positive relationship between open

monitoring (OM) meditation practices and enhanced creative ability.

Returning to Horan (2009), he offers other insights that support the link between

mindfulness and creativity when he says, "mindfulness meditation promotes cognitive flexibility

due to its transcendent, detached witnessing effect. Strong associative thinking habits are

suppressed allowing for the generation of new ideas" (p. 15).

On the other hand, Horan (2009) does offer an important insight that is somewhat

controversial and a subject of much debate among researchers today (Penman, 2015; Carson et

al., 2014; Hyland et al., 2015; Shamas & Maker, 2018) when he states his third insight: "there is

no evidence to support MM as a specific creative problem-solving mechanism" (p. 16). Horan

(2009) makes a closing statement that "what is not yet evident is meditation's capacity to proactively address problems in a creative manner" (p. 17). This statement is also a subject of disagreement among researchers as there seems to be supporting evidence on both sides of the issue (Carson et al., 2014; Shamas & Maker, 2018). Yet, Horan also makes another closing statement saying "what is clear is that meditation and creativity share many of the same cognitive functions and brain wave patterns. In short, meditation practice is strongly correlated with creative thinking" (p. 17). This statement has drawn a lot of attention because recent research confirms it, but the evidence is still not conclusive (Carson & Langer, 2006; Baas et al., 2008; Nijstad et al., 2010).

Another landmark study that investigates the link between mindfulness and creativity was conducted by Colzato et al., (2012, p. 1), who "investigated the impact of focused-attention (FA) meditation and open-monitoring (OM) meditation on creativity tasks tapping into convergent and divergent thinking". This study is important because it demonstrates clearly that open-monitoring (OM) meditation "induces a control state that promotes divergent thinking" and that focused-attention (FA) meditation "does not sustain convergent thinking" (Colzato et al., 2012, p. 7). This study seems to be one of the first that clearly articulates how different aspects of mindfulness practice (OM and FA) relate to creative thinking. Müller et al., (2016) carried this project further and found similar results that confirmed Colzato's et al., 2012 earlier findings. However, Müller et al., (2016) also found that **"**the absence of a significant effect of OM meditation on cognitive flexibility partly contradicts previous research by Colzato et al., (2012) which investigated the positive effects of open monitoring on cognitive flexibility" (p. 8). In other words, Müller et al., (2016) findings matched most of the previous work of Colzato et al., (2012), with some slight differences.

As of 2016, there had been a great deal of research assessing the impact of mindfulness practice on creative thinking. Lebuda et al., (2016) conducted a "multilevel meta-analysis of 89 correlations obtained from 20 samples in studies published between 1977 and 2015" (p. 1). Lebuda et al., (2016) found that the literature "demonstrates a statistically significant" correlation between mindfulness and creativity" (p. 7). "This effect" they continue, "was moderated by the type of mindfulness, being significantly lower in case of the awareness aspect of mindfulness, than in the case of the open-monitoring aspect" (Lebuda et al., 2016, p. 8). In other words, the review seems to confirm that open-monitoring mindfulness practice has a strong effect on creative and innovative thinking.

More recent research has confirmed these findings about OM practices, showing that OM mindfulness is strongly related to the ability to switch perspectives (Carson & Langer, 2006; Feldman et al., 2007), that it improves working memory (Chiesa, Calati, & Serretti, 2011), and also promotes one's capacity to respond in a non-habitual way (Moore & Malinowski, 2009). Additionally, overcoming the fear of judgement is conducive to creativity (Baas et al., 2008; Nijstad et al., 2010) and mindfulness has been shown to reduce such fear (Carson & Langer, 2006). Mindfulness and "mind wandering" also seem to improve creative outcomes (Zedelius & Schooler, 2015, p. 2). Importantly, the most recent research available today has confirmed these and other findings (Müller et al., 2016; Brendel et al., 2016; Berkovich-Ohana et al., 2017; Agnoli et al., 2018; Shama & Maker, 2018; Byrne & Thatchenkery, 2019). From this evidence it seems that mindfulness is both indirectly and directly associated with creative thinking (Davis, 2009) and to creative achievement (Langer, 2014). Lastly, mindfulness has been shown to have a positive effect on creative thinking regardless of how long someone has practiced mindfulness (Jedrczak, Beresford, & Clements, 1985), which means that even minimal

or short mindfulness sessions can enhance creative ability (Ding et al., 2014). This evidence

points to a strong connection between mindfulness practice and enhancing creative thinking.

Walking as a Method of Enhancing Creative Thinking

Walking has long been practiced as a way to increase creativity and cognitive function.

Since ancient times, walking was thought to improve one's ability to think clearly and to

improve creative problem-solving (Solnit, R., 2014). Anecdotal evidence that walking improves

creative, cognitive, and problem-solving functioning is seen in the lives of great thinkers such as

Aristotle, Beethoven, Wordsworth, Tchaikovsky, Kant, Nietzsche, Dickens, Darwin, Thoreau,

Kierkegaard, Freud, Einstein, Gödel, to name but a few. All of these men had a daily walking

habit. Additionally, each of these men attribute walking with improving their creative and

problem-solving ability. For instance, Nietzsche famously wrote, "all truly great thoughts are

conceived by walking" (Ferrer, D. F., & Nietzsche, F, 1997, p.17). Both Beethoven and

Tchaikovsky made walking a regular part of practicing their craft of composing. In fact, nearly

all of these figures said that they could not do their work without walking. Writers such as Soren

Kierkegaard and others have long known of the benefits of walking to improve their craft and

creative ability. As far back as Cicero, writers regularly went on walks in order to work through

a creative problem or to gain insight into their work. Regarding the benefits of walking,

Kierkegaard gives this advice:

> Above all, do not lose your desire to walk. Every day I walk myself into a state of well-
>
> being & walk away from every illness. I have walked myself into my best thoughts, and I
>
> know of no thought so burdensome that one cannot walk away from it. But by sitting still,
>
> and the more one sits still, the closer one comes to feeling ill. Thus, if one just keeps on
>
> walking, everything will be all right. (Minshull, D., 2019, p. 19)

This anecdotal evidence is fascinating, but is there any scientific evidence that supports the idea that walking can improve creative thinking? In 2012 an important study came out that linked hiking as a way to increase cognitive and creative ability (Atchley et al., 2012). Fifty-six adults, ages ranging from 18-36, with average age being 28 were randomly divided into 8 hiking groups. The groups had no contact with each other. The participants were tested pre and post hiking with a standard set of creativity battery tests. The results were impressive. The authors of the paper show that spending time completely immersed in nature without the use of technology "increases performance on a creativity, problem-solving task by a full 50% in a group of naive hikers" (Atchley et al., 2012, p. 3). This is a robust finding. But it is important to note that participants in this study were hiking or walking and not simply camping or engaging in leisure time. They were active—walking and hiking through most of the day. This study demonstrates that there is a correlation between the activity of walking with higher cognitive functioning, particularly higher creative problem-solving skills. However, as the researchers note

> A limitation of the current research is the inability to determine if the effects are due to an increased exposure to nature, a decreased exposure to technology, or to other factors associated with spending three days immersed in nature (Atchley et al., 2012, p. 5).

So, it may be difficult to isolate if it was nature, hiking, or no access to technology that was the primary cause for the increase in creative problem-solving. However, when this evidence is joined with a long history of anecdotal evidence stemming across cultures and creative disciplines, it gains greater credibility. In 2015 this research was replicated by other researchers (Ferraro, 2015). In other words, this study and the anecdotal evidences of creative professionals throughout history and the world, give us confidence that walking actually does improve one's creative thinking.

More recent findings increase our confidence in walking as a method to enhance creative thinking. A landmark study in 2014 was conducted at Stanford. This important study did four experiments with different configurations of walking indoor, outdoor, sitting, and walking speed. These four experiments were utilized to better understand the effects of walking speed, walking environment, and the length of time walking had on creative thinking ability. The findings match up with the anecdotal evidence and the hiking study. The authors explain

> Walking substantially enhanced creativity by two different measures. For the three alternate uses studies, 81%, 88%, and 100% of participants were more creative walking than sitting. 100% of those who walked outside generated at least one novel high-quality analogy compared with 50% of those seated inside (Oppezzo, M., & Schwartz, 2014, p. 6).

Additionally, The authors of the study also help to strengthen the findings of the hiking study when they say, "while research indicates that being outdoors has many cognitive benefits, walking has a very specific benefit—the improvement of creativity" (Oppezzo, M., & Schwartz, 2014, p. 4). This study demonstrates that walking increases creative thinking, although many mechanisms may be at play. There may be many other simple activities that increase creativity such as knitting (Smith, 2016), swimming (Evans, 1996), exercise (Colzato et al., 2013), and playing an instrument (Gibson et al., 2009), but walking and mindfulness practice combined together may have a more robust effect on creative thinking than any of these activities separately. Also, walking and mindfulness practice have long been intertwined in the Buddhist tradition of walking meditations. This is significant because open-monitoring or open awareness mindfulness practice coupled with walking may serve as a much-needed creativity boost in the

hectic lives of many modern individuals. Gratefully, going out for a mindful stroll is a simple practice that all people can incorporate into their lives.

Discussion

This documentary spans six weeks of time and features eight individuals who work in different creative industries. Three men and five women participated in the documentary. Each individual practiced walking open awareness meditation for twenty minutes each day during the six weeks. Special effort was made for diversity among participants regarding gender, race, and cultural background. Two of the female subjects are South Korean, another is African American, and two are Caucasian. All three males are Caucasian. The age range among all participants were twenty-six to fifty. Additionally, each participant works in different creative industries. For example, the domains that they work in are musician (harpist), music composer, fine artist (painter), theater director, actor, entrepreneur, writer, and engineer. Fascinatingly, several of the individuals dabbled in one or more creative industry. For instance, the engineer was also a painter; the painter was also a writer; and the actor was also a motivational speaker. However, during this documentary only discussed how walking open awareness practice effected their primary creative domain or craft.

The documentary is organized around three interviews of each person. The purpose of the first interview is to get a basic sketch of that person, their experience previous with mindfulness and their creative industry. The second interview takes place at the halfway point or after three weeks of doing the walking meditation practice. The goal with the second interview was to see what they had to report about their experience and how they felt it was going. Interview one and two represent the first half of the documentary or the first forty-five minutes. But the third and final interview takes place after doing six weeks of walking open awareness meditation practice.

This interview encompasses the second half of the documentary, approximately forty-five

minutes of time. This third interview is the largest section of the documentary and covers the

most important aspects of the documentary, namely what the participants learned from doing the

walking meditation practice.

Filming the documentary and interviewing these individuals was a wonderful learning

experience. Having never done interviewing or a film project before, this was new territory for

me. Not only did I learn a great deal of film production skills, but I also learned a great deal from

doing the walking meditation practice myself and from the experience of the participants doing

the practice. Some of the major themes that stood out from interviewing these individuals is how

surprised they were at the calming and relaxation effect the meditative walks had on them.

Another prominent theme among all participants was they felted the practice was worth the time

they dedicated to it, even if at times it was hard to express a direct benefit for doing the practice

after each session. But in nearly every case, the participants reported that the benefits for doing

the walking meditation were multifaceted. Not only did many of them feel that their creativity

increased—particularly in the area of what most of them called "creative flow" or the flow of

creative ideas—but that nearly all of them expressed surprise at how beneficial the walks were in

their lives as a whole or in areas outside of their work. For instance, several individuals said that

the walks became a time for them to reflect on the direction their life was going and gave them

the opportunity to actively assess whether they were happy about that direction.

Additionally, most of the participants believed they would not get much benefit from this

practice at the beginning, but at the end of the six weeks, nearly all of them said that engaging in

the walking meditation practice was incredibly beneficial to them. Most of them were surprised

by how much they enjoyed the practice. In terms of implementation of the practice, it was

interesting that those who lived in more rural areas seemed to have more difficulty "carving out time" to do the practice each day while those who lived in the city said implementing the practice was very easy. Perhaps this is due to the dominate mode of travel among these individuals. For instance, those who live in rural areas tend to spend more time driving while those in the cities spend more time walking as a mode of transportation. So, something that did not occur to me when designing this study is that this practice may be very well suited for individuals who live in urban environments.

One common theme that participants discussed was the fact that they highly preferred to do their walking meditation outdoors, particularly in nature if possible. However, many of the participants ended up doing some of their walking meditation inside due to weather or other scheduling factors. The most common indoor place they did their walks was on a treadmill or on the stairs. I think it is interesting to see where people go to do this practice while indoors.

Also, some participants enjoyed walking in the company of other people, while others preferred to be alone when they did the practice. Interestingly, those who worked in creative professions that tend to collaborate with others seemed to be more likely to enjoy doing the practice with others. For instance, the theater director, actor, and engineer often collaborate with other creative professionals and these were the individuals who seemed to enjoy doing the practice with other people. However, they did say that they enjoyed doing the practice solo as well, but that it was fun to "mix it up" and invite others to come along with them. But those participants who engage in solo creative industries such as the musician (harpist), music composer, writer, and painter all highly preferred to do the practice alone. They said they specifically found time that they could do the practice when others were not around.

Additionally, nearly all participants said that it was much easier to practice being open and aware to new experiences when they were outside rather then indoors. Perhaps this is because we may be conditioned to think and behave a certain way indoors while outdoors there is a larger number of possible experiences that can occur. Whatever the case may be, it was an interesting theme that most participants reported.

Another interesting aspect of the documentary and interviewing these individuals is the time of day that they choose to do the practice. It seemed that half of the participants preferred to do the practice after dark and the other half preferred the morning. However, most of the participants reported that they were forced, due to scheduling, to change the time of day that they did their practice. But the thing that remained constant was their preference of when or what time of day they did their walking meditation.

I also did the practice along with the participants. I also found similar benefits for doing the walking open awareness practice—and I also experienced similar surprises. After studying the scientific research in depth and designing this project, I had expected that this practice would enhance my creative thinking—particularly divergent thinking. But I did not anticipant that this practice would have equal benefits to my life in other areas such as a feeling of satisfaction and fulfillment after doing the practice. Many of the participants reported a similar feeling of fulfillment and satisfaction after doing the practice each day.

One common experience among the participants was that they found it difficult to gage what was causing their increased creative thinking. That is, most of the participants reported that it was difficult for them to gage whether it was the walking, meditation, or both that increased their creative thinking. These experiences seem to line up with research that demonstrates that individuals often have a hard time subjectively determining if they are being creative or not

(Silvia et al., 2012). Additionally, many participants reported greater levels of self-awareness, particularly in their thinking habits, and less stress. Both of these reports line up with previous research findings about contemplative practices in general (Keng et al., 2011). However, it is interesting that studies on walking do not seem to report greater levels of self-awareness of thoughts and thought patterns nor less stress among subjects who walk. Perhaps these are benefits that are linked more closely with contemplative practices rather than walking; but reports from this documentary are unable to establish whether this is the case or not. It is simply an interesting pattern observed during the course of this project.

One hope I had in producing this documentary was to inspire creativity and mindfulness researchers. For instance, one potential benefit of this documentary is that it may help to reveal a gap in the scientific literature on walking, creativity, and meditation. The gap in the literature seems to be that researchers have not yet combined walking with open awareness meditation in their studies of creativity. So perhaps this documentary will inspire researchers to conduct controlled experiments that utilize a walking opening awareness meditation practice—similar to how this documentary utilized these practices. In other words, perhaps this documentary will act as a springboard for further scientific exploration of the topics of mindfulness, walking, and creativity. But the ultimate hope in production this documentary is to inspire people to try this practice for themselves and see if they are benefited from practicing it in their lives. If the experience of the documentary participants is any guide, then engaging in walking open awareness meditation will benefit those who practice it regularly.

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