



### Research Article

## Predictors of Meditation Success: A Literature Review

Dawn Michele Kambolis\*

Department of Mind Body Medicine, Saybrook University, Oakland, CA, USA

### Abstract

Interventions based on meditation are of proven efficacy as an approach to address a wide range of physical and mental health concerns, but less is known about which factors contribute to the successful implementation of long-term practice. This review summarizes the literature to date to shed light on the experience of meditators and possible mechanisms or predictors of successful versus a lack of successful long-term meditation implementation. Seventeen published studies were identified by a comprehensive and detailed search of peer-reviewed literature. A variety of different methodologies were employed and the groups were arranged thematically. The studies were compared and contrasted according to research questions and findings. Three super ordinate themes arose including (a) factors related to the lived experience of the meditator are important to the success of long-term meditation; (b) there are various personality predictors of long-term meditation success and (c) adherence to a consistent meditation practice influences treatment outcomes. Given the many benefits of meditation interventions and emerging information about conditions for better uptake, greater research emphasis with respect to what motivates and helps ensure long-term adherence continues to be greatly warranted.

**Keywords:** Adherence; Homework and long-term meditation; LKM; Loving kindness meditation; MBSR; Meditation; Mindfulness; Mindfulness based stress reduction

Despite a wealth of research examining the effectiveness and neurobiological mechanisms of meditation approaches, there is limited information about the factors that may contribute to the successful implementation of long-term meditation practice. This literature review examines studies that explore the experiences of meditators with particular attention to those studies that investigate adherence to practice. The core purpose of this inquiry is to discover the key differences between successful long-term meditators and failed meditators with the aim to establish new insight into the larger field of mind-body medicine and mindfulness interventions in particular.

\*Corresponding author: Dawn Michele Kambolis, Department of Mind Body Medicine, Saybrook University, Oakland, CA, USA, Tel: +1 6046899116; E-mail: mmobile@shaw.ca

**Citation:** Kambolis DM (2017) Predictors of Meditation Success: A Literature Review. *J Altern Complement Integr Med* 3: 037.

**Received:** June 21, 2017; **Accepted:** September 06, 2017; **Published:** September 21, 2017

It is well established that meditation has shown promise in improving outcomes for a wide array of physical and mental health concerns in adults who regularly adhere to this ancient practice [1]. Meditation has been associated with improvements in individuals with high anxiety, lowered depression and anxiety symptoms for patients with bipolar disorder, and reduced rates of insomnia [2-4]. The physiological effects related to anti-aging management of chronic pain anti-stress, and improved cognitive outcomes for the aged are also well documented and more robust than the current body of research on its therapeutic role in mental health [5-7]. The benefits of meditation extend beyond treating physical and mental illness with a number of studies demonstrating the ways in which meditation enhances overall wellbeing, such as positive emotion, cognitive flexibility and attention and enhanced compassion and ethical awareness [8-10].

The neurobiological mechanisms of action have also been well investigated, suggesting the core reasons for its clinical effectiveness [11]. Studies have shown mindfulness to activate the areas associated with pain management, such as the orbit frontal and cingulate cortices reduce cortisol levels and improve neuroendocrine responses to psychosocial stress [12-14]. Lazar et al., tested the hypothesis that regular meditation practice is associated with differences in the structures in the brain and with magnetic resonance imaging determined the thickness of the cerebral cortex of experienced meditators to be significantly different than non-meditators (significance,  $p < 0.001$ ) [15]. It's important to note that this study is cross-sectional and it may be that long-term meditators had greater cortical mass in the first place, potentially contributing to greater motivation and perseverance in meditation. Many psychophysiological studies to date fail to determine whether adherence to meditation is specific to a person's psychological trait or the meditation approach itself. The literature to date also fails to answer whether long-term meditation carries a clear advantage over shorter meditation, and if so how. The present study is a step towards highlighting the link between meditation duration, home practice and potential benefits.

Despite the ambiguity in research in terms of the advantages of short-term versus long-term meditation, the benefits of meditation are well supported. Consequently, the importance of understanding key factors in successful implementation of meditation from a user and service provider perspective is receiving increasing attention. If we are to move towards a culture of greater understanding and acceptance of meditation as a key to mind-body health, then we need to focus greater scientific attention to the ways we can more easily implement this age-old approach to well-being. This article will provide a greater understanding of the clinical impact of dedicated long-term meditation practice, the potential attributes of successful-long term meditators, struggles of those attempting to adhere to meditation and factors that may contribute to successful long-term implementation of meditation techniques. It will also point out that it remains inconclusive as to who would be more prone to adhere to a long-term meditation effort.

### Method

Articles published from 2000-2017 were retrieved using PsycINFO, PubMed, MEDLINE, PsycEXTRA, PsycARTICLES, Mary Ann

Liebert, Publishers-Alternative and Complementary Therapies, Wiley Online Library and Google Scholar, for full-text articles in the English language. The search strategy included the following key search words: mindfulness, meditation, mindfulness based stress reduction, MBSR, loving kindness meditation, LKM, adherence, home work and long-term meditation. The following inclusion criteria were followed: (a) the study included a meditation intervention; (b) were published in peer-reviewed journals, conference proceedings or theses; (c) included adult participants only; (d) was original research; (e) research was published between 2008-2017 and (f) investigated the experience of meditators or adherence to meditation practice.

After screening criteria, the search netted 56 studies and of those 17 studies investigated the experience of meditators or adherence to meditation practice. Studies included heterogeneous and homogenous samples as warranted by study design and research focus and the bulk of the studies selected were published within the last five years. All studies were included whether they reported adherence or not. The data across these studies was synthesized using thematic tables with three primary themes emerging with similar content deemed important to the research topic. The themes were then checked against the original studies weighing the validity and reliability of each.

## Findings

### Definitions

Research studies varied in their definition of long-term meditators with only three studies clarifying the distinction at all. One study described their single long-term meditator as having practiced for over 40 years and approximately 20,000 hours cumulatively while another investigation deemed long-term practitioners as having practiced one to two times per week, but the duration of practice wasn't defined [16,17]. Another study by used more rigorous criteria for their definition of long-term meditator, including only those with a daily practice for more than 10 years [18]. While many studies investigated the factors that contributed to varying degrees of meditation success, a definition for failed meditation was not established within the literature. For the purposes of this literature review, meditation practice will be defined as techniques for paying attention to one's experiences in a nonjudgmental manner [18]. This definition captures a range of traditional and clinically defined meditation approaches described in the following section.

### Meditation techniques investigated

The meditation techniques used within the studies varied greatly with the bulk of studies investigating mindfulness based approaches such as Mindfulness Based Stress Reduction (MBSR) mindfulness based cognitive therapy, mindfulness based relapse prevention, mindful meditation and Loving Kindness Meditation (LKM) [6,8,17,19-26]. One study explored the impact of digital mindfulness based meditation applications and two studies looked at the impact of the combination of a wide variety of mindfulness approaches [27,28]. Only three studies looked at traditional meditation approaches such as Buddhist, Satipathana and Theravada Vipassana and Shamatha and Vipassana [16,18,29]. Regardless of whether the meditation approaches were presented within a modernized or manualized framework or a more traditional style, all the meditation approaches used some form of methodology drawing attention to the practice of paying attention or concentrating with purpose, on a moment-to-moment basis and most importantly, without judgment.

## Types of methodologies

A wide variety of research designs were used across all themes. Of those investigating the experience of the meditator, two research teams used phenomenological analysis, while other research teams utilized case study research, diary survey, narrative analysis, and semi-structured interviews using reasoned action approach [16,18,21,26-29]. Another five studies examined the role of various predictors of meditation success to better understand the range of variables that may influence outcome: conducted randomized control trials in a group-based treatment program, used a wait list control trial to explore uptake of LKM, while utilized survey research to investigate barriers to the inclusion of meditation in business environments [23,25]. Other designs used included prospective cohort design, mixed-methods and regression analysis [6,19,22]. The relationship between the amount of meditation practice and symptom change also emerged as a research theme with studies using primarily quantitative methods; secondary analysis, mediation analysis and randomized control trials all included [17,20,24].

## Three Core Themes

### Theme 1: The lived experience of the meditator is important to meditation success

The bulk of the literature search rendered studies that examined the experience of the meditator in order to better understand their perceived meaning and value. Going beyond the investigation of efficacy or neurobiological mechanisms of change, a recent Interpretive Phenomenological (IPA) study by examined the experience of six women who maintained a daily meditation practice for more than 10 years [18]. Daily meant every day for at least 20 minutes of closed eye insight meditation, with no more than five days missed per year [18]. Unlike all other studies included in this review, the researchers screening criteria for participants was rigorous and well-defined in that the nature, frequency and duration of the practice were all clearly stated. Data was gathered using semi-structured telephone interviews and through IPA analysis eight core themes arose: (a) participants valued consistent adherence to meditation; (b) the role of a teacher was important; (c) self-awareness was cultivated; (d) compassion and self-acceptance emerged; (e) heightened or transcendent experiences occurred; (f) a deepening of spirituality was perceived; (g) life purpose was described and (h) challenges were common to all [18]. This well-structured IPA study reveals a wealth of information on the lived experience of successful meditators, showing key themes that may act as motivators and challenges for those attempting to maintain adherence to a successful practice.

In another IPA study researchers examined participant experiences and perceptions of Meditation Awareness Training (MAT) with the aim of evaluating perceived acceptability and effectiveness [29]. A sample of seven females and three males participated in an 8-weeks MAT program encouraging the participant to consider concepts such as emptiness and impermanence. Participants attended 2-hours workshops weekly with one-to-one support sessions made available every four weeks [29]. Data was acquired via face-to-face interviews and analyzed following IPA guidelines with results showing four super ordinate themes: (a) growth in present moment awareness; (b) importance of teacher guidance; (c) increased sense of acceptance and personal well-being and (d) enjoyable group connection [29]. Here we see similar themes to the study by with the first three themes emerging consistently across both studies [18]. Both studies used a more traditional

meditation approach such as Vipassana and Buddhist meditation. Further research would do well to investigate whether there are additional benefits to be gained, and whether adherence is more successful for traditional practices [18,29].

Two narrative studies explored the distinct internal story of clients participating in various forms of meditation. The first study by Stelter encouraged three participants to meditate daily while taking part in two or three-hour blocks of an eight or six-week meditation course [28]. It's worth noting, the meditation exercises varied greatly and ranged from mindful daily activity to body scanning to imagery [28]. Body scanning included a process whereby participants learned to become aware of different body parts and imagery included an invitation to imagine oneself in a solidly placed mountain [28]. Researchers conducted three interviews for each participant in the beginning, middle and end of the course with a focus on discovering the felt experience during specific situations throughout meditation. The embodied changes, descriptions of what happens and how change emerges during meditation is worth noting here in that while all three participants expressed an internal story of positive effect and well-being, moving through rumination and elevated worry was a key challenge throughout the meditation process [28].

In a second narrative study, researchers used content analysis of diary entries to explore the internal story of older adults with chronic low back pain [26]. Twenty-seven adults over the age of 65 participated in weekly MBSR in a group setting for 90 minutes' duration. The meditation interventions varied from body scanning to walking meditation to sitting practice [26]. Diary entries were assessed using two experienced coders and rendered six primary themes; (a) pain reduction was experienced; (b) perception of focused-attention increased; (c) sleep improved; (d) sense of well-being improved; (e) barriers to meditation emerged and (f) through experience meditation became easier [26]. The most promising effect described by the participants was a global sense of well-being during and after meditation with improved mood and quality of life [26]. Many of the themes reinforce previous IPA studies showing the potential natural rewards that may promote consistent practice as well as the barriers to consistency, such as sleepiness and difficulty finding time in the day to practice [18,26,28,29].

Another study by used the analysis of meditation diaries to investigate the experience of participants of a clinical trial of MBSR [21]. Eight adults with chronic pain related distress that were part of a larger randomized clinical trial, participated in eight weekly 2-2.5 hour sessions led by a certified MBSR instructor with 10 years' experience [21]. Unique to this study was the use of a two-part method that included grounded theory and close-ended coding [21]. It is the first study of its kind to assess the ways in which participants' descriptions of their experience changes over the duration of a meditation program. The reported results are particularly rich in that they reveal themes that may inform the process of meditation courses to best ensure supportive structures are in place [21]. For example, all participants described distress at some point in the course with several participants experiencing a spike in reactivity (negative reactionary thoughts, emotions and behaviors) midway through the course, followed by an improvement in re-perception (the experience of non-judgment and non-reactivity). Over time participants described their inner experience with greater clarity and detail, and expressed improved affect and a more observing stance to their lived experience. They also focused strongly on their somatic experiences as a way of breaking the

rumination link [21]. Based on the researchers' findings it may be that encouraging greater attention to the deep somatic internal sensations and additional support during a midway spike may encourage meditation success. However, randomized clinical trials are needed to more fully understand the way in which MBSR illicit changes in the ways participants relate to their own experience.

Understanding the phenomenological nature of meditation is arguably a key in discovering the motivators and factors that help ensure consistency of practice. In a recent case study of a long-term meditator of traditional meditation researchers investigated the inner lived experience of a man with 40 years and 20,000 hours of meditative practice [16]. This presented a unique opportunity in that most studies have included participants with less than 10 years of practice or much less. Data from five semi-structured interviews yielded seven categories of states of being that shifted throughout the participant's meditation process [16]. The stages included a sense of; (a) differentiation between the internal and external; (b) sense of time weakens; (c) the ability to locate oneself in space lessens; (d) sense of self dissolves; (e) the need for control lessens; (f) sense of ownership weakens; (g) the sense of being with one's body lessens; (h) proprioception weakens and (i) the touching-touched (sense of boundary between one's body and the world) structure weakens [16]. While the study is limited to one subject the results are novel in that they provide insight into the basic structures achieved with consistent long-term practice. With replicated studies and consistent findings, practitioners may develop the information needed to help new meditators better understand when they are achieving the core states that meditating elicits.

Digital media meditation applications are fast becoming an important user interface for the general public and those in clinical treatment, making meditation guidance and implementation potentially easier and more accessible. A study by Laurie and Blandford [27] recently made a noteworthy contribution to the current research literature using a reasoned action approach investigating the use of technology based mindfulness meditation techniques. Researchers conducted semi-structured interviews with 16 participants ranging in age from 25-38 [27]. The study was informed by an autoethnography conducted by one of the authors over the course of 30 days and involved the application of 30-40 days of the popular mindfulness application Headspace [27]. Researchers concluded that the success of the application of mindfulness approaches were associated with user expectations of outcomes, perceptions of time availability, belief systems, and affective states and lifestyles [27]. When participants perceived the application to be effective, exhibited a positive attitude towards mindfulness, had realistic expectations and positive social influences, they were more enabled to use the digital intervention [27]. While this study is limited to digital meditation applications it lines up with previous studies showing that people's beliefs, affective states and lifestyles should be factored in when designing, implementing and designing a successful, and easily implemented meditation program.

Finally, understanding the experiential challenges associated with meditation is key to addressing a lack of adherence or attrition in meditation programs. One study addressed this question by using maximum variability sampling of male meditators [30]. The study is unique in that it investigates a male population with the theory that they may face difficulties with emotion dis-regulation due to the impact of cultural norms inhibiting emotionality [30]. The 30 participants were recruited using a purposive maximum variation sampling

strategy and inclusion criteria included that participants at least 18 years old and were currently practicing meditation of some form [30]. The sample included both clinical and non-clinical populations and the practices ranged in approach. Semi-structured interviews were conducted yielding four main problems; (a) meditation was difficult to learn and put into practice; (b) dis-regulation in the form of troubling thoughts and emotions arose that were hard to manage; (c) meditation exacerbated symptoms of anxiety and/or depression and (d) meditation was linked with psychotic episodes [30]. While few studies have investigated possible deleterious effects of meditation, this study uncovered multiple psychological issues that may be underplayed in the research to date. The reported concerns warrant considerable attention and further investigation into the cost-benefit analysis for high-risk patients and guidelines for particular practices appropriate for specific conditions [30]. Finally, relating to the question of which conditions contribute to a successful meditation practice versus failed meditation, it will be important to uncover protocols for home practice given the potential risks and challenges.

### **Theme 2: Personality factors are predictors of meditation success**

Four studies explicitly reported that certain personality variables predicted successful adherence to a meditation technique. A team of researchers led by Barkan et al., [19] recently published one of its kind study investigating the relationship between the Big Five personality dimensions and use of mindfulness techniques. A community sample of 100 adults underwent an 8-week manualized Mindfulness-Based Stress Reduction (MBSR) program where they completed weekly practice logs during intervention and a survey at 6-months follow-up [19]. The researchers reported personality dimensions of openness and agreeableness were predictors of greater adherence to MBSR use both during and after intervention in a homogeneous group [19]. The strength of this study lies in the fact that it is one of the first to investigate individual preferences in the use of specific MBSR techniques and serves as a scientific springboard for other researchers to examine ways meditation can be tailored to various segments of the population. Other supporting evidence suggests meditation may enhance openness to experience, one of the personality dimension of the big five model, thus shaping one's desire to maintain the meditation regime [31].

Similarly, in a survey study of 209 business students, highlighted the role of participant attitudes and values in the applications of meditation [25]. With a view to address barriers to the inclusion of meditation in business environments, the authors assessed the participants' attitudes based on seven statements. The themes that emerged emphasized the importance of the way in which meditation is framed; how it was presented, the perceived contextual legitimacy and participant's sense of efficacy all influenced openness to its application [25]. Openness to new experience, a core dimension of the big five model, was viewed as a key factor in meditation acceptance.

In a mixed methods study using focus groups, case stories and health-related questionnaires, the impact of sociodemographic status on MBSR effectiveness for participants with chronic pain was recently investigated [6]. While older age stood out as a clear predictor of better pain management, four themes were suggested to enhance effectiveness: being oneself, lessons learned, continuity and permanence were all deemed to be conditions for success [6]. Personality qualities linked to extraversion (positive focus and knowing that you are not alone) and agreeableness (acceptance of chronicity) was identified as potential factors in meditation uptake. While this study was

limited to chronic pain sufferers, it also highlights the need for broader investigation matching specific intervention to participant needs.

In a randomized control trial of adults with a history of suicidal depression, mindfulness-based cognitive therapy was implemented to assess factors associated with attrition [23]. Identified a relationship between those who were likely to consistently participate in mindfulness classes versus those who did not remain in class; those participants who were not currently on antidepressant treatment, were younger, showed lower levels of problem solving deterioration post mood change and those deemed to have higher depressive rumination, cognitive reactivity and brooding were found to have more difficulty engaging [23]. Qualities related to the personality variable emotional stability was shown to factor in significantly as a determinant of participants consistent involvement in mindfulness classes. The authors offer their observation that if mindfulness teachers are able to offer pre-class interviews with detailed discussions outlining the rationale for treatment, realistic outcomes and strategies for managing heightened emotional reactions, personality characteristics of motivation and persistence can be enhanced. The findings also illuminate a recommendation consistent across all four studies within this theme; further exploration of factors associated with attrition and acquisition of meditation skills is key to understanding meditation adherence. This study is a particularly important in that it is one of only a few to not only assess predictive factors of attrition in mindfulness-based cognitive therapy, but it also addresses risk processes affecting engagement.

### **Theme 3: Adherence to a consistent meditation practice influences treatment outcomes**

Mentioned in four studies, this theme hones the link between amount of meditation practice and symptom reduction. Going beyond the well-established connection between mindfulness and well-being for those with chronic pain, used a randomized control design to assess the role of home practice in MBCT on relapse of symptoms of depression [20]. This study is one of only a handful of empirical studies exploring the association between formal and informal meditation home practice and therapeutic outcomes [20]. The 99 participants included patients that had experienced at least three episodes of major depression and at least 80 percent were reported to have a suicidal episode. During the seven treatment weeks of the study participants completed self-reported ratings of home practice and recurrence of major depression was assessed before and after treatment. Results indicate a significant positive relationship between the mean amount of daily home-practice and clinical outcome with those engaging in meditation at least three days per week almost half as likely to experience relapse [20].

In a recent study using secondary analysis 93 participants were randomized to receive Mindfulness-Based Relapse Prevention (MBRP) to assess the relationship between treatment enactment and substance use outcomes [24]. Alcohol and Drug (AOD) use, substance craving, and amount of home mindfulness practice were measured at baseline, post-treatment and at two and four month's follow-up [24]. Overall participation MBRP was not only linked with a significantly meaningful increase in home practice, but home practice was associated with significant reduction in AOD craving and use. Researchers noted a decline in home practice at both follow-up periods and encouraged protocols to target the post-treatment decline [24].

Another first of its kind study was recently conducted comparing changes in bodily pain, psychological symptoms and Health-Related

Quality of Life (HRQoL) [22]. Researchers garnered 133 chronic pain patients in a longitudinal investigation derived from a larger prospective cohort study where an 8-week MBSR was taught six times per year [22]. To note is the fact that while instructor qualifications were reported as long-term meditators, the authors did not define what they deemed a long-term meditator to be [22]. Paired t tests were used to determine pre-and post-test changes in pain across various conditions and revealed significant differences in outcomes across chronic pain conditions [22]. Greater home meditation practice was also associated with better outcomes on measures of psychological distress, self-rated health and summarization symptoms [22]. The relationship between greater home practice and pain and other quality of life scales was unremarkable.

In a study using mediation analysis of data from questionnaires, researchers examined the relationship between long-term mindfulness meditation practice and a wide range of psychological qualities thought to be associated with mindfulness [17]. Long-term meditators were defined as individuals engaged in a regular practice of at least once or twice per week; however, it is not reported how long participants had been practicing at this level of consistency [17]. Demographically similar non-meditators had never practiced meditation regularly. Researchers reported long-term meditators to be more mindful in daily life, have higher levels of reflection, self-compassion

and well-being and were lower on maladaptive symptoms such as rumination, thought suppression, cognitive failure and emotion dysregulation [17]. The findings contributed further to the current literature in that they address the role of the potential mechanisms that may contribute to successful application of a meditation practice or the psychological factors that may emerge as a result [17]. Further research is warranted to determine a directional relationship.

Finally, there is little yet known on whether the skills learned in meditation training is maintained over the long term. In a wait-list control study, investigated whether participants continued a consistent meditation practice after a Loving Kindness Meditation intervention (LKM) [8]. At 15-month follow-up a significant number of participants continued a regular practice with ongoing LKM predicting the perception of positive affect and internal resources [8]. The researchers reported that baseline internal resources were not significant predictors of who would continue meditation and who would not, however participants with higher levels of positive emotion and rapid positive emotional response to intervention were more likely to continue meditation long term [8].

### Literature Review Theme Table

The following thematic table (Table 1).

Author's/ Authors' Names	Form of meditation and duration		Design	Sample size			Measure of success	Themes related to meditation success versus failure
Ataria Y et al., [16]	Satipathana and Theravada Vipassana	20,000 hours of meditation over 40 years	Case study	1 male	English speaking	Living in Israel	Ability to introspect upon ones experience during meditation and produce subtle changes in consciousness under experimental conditions	Long term meditators may achieve unique states of consciousness
Barkan T et al., [19]	Mindfulness based stress reduction	Duration 8 weeks: 7 weekly 2-hour sessions and 1 7-hour intensive session	Mixed method with regression analysis and self-reported journals	100 older adults	62% women 97% white 86% college education or higher Ages 64-91	Living in US	Higher likelihood of using MBSR techniques at 6 month follow-up	Openness and agreeableness predicts better outcomes
Cohn MA et al., [8]	Loving Kindness Meditation	6 60-minute group sessions over a 7-week period 20 minutes meditation 20 minutes check-in on progress 20 minutes instruction	1 year follow up survey of randomized control trial	95 adults from an original study sample of 139 participants (45 from experimental groups and 50 from a waitlist control group)	Mean age 41 years 81.1% Caucasian 6.3% Asian 9.5% South Asian 77.9% bachelors degree or higher	Living in US	Long lasting positive emotion skills, enduring capacity to increase personal resources even if they stopped meditating	Greater positive emotion may be a predictor of meditation outcomes
Crane C et al., [20]	Mindfulness based cognitive therapy	8 weekly 2-hour group treatment sessions 6 2-hour follow-up classes 6 weeks and 6 months post-treatment Classes included meditation training with sustained attention on body and breath and depersonalized perspective	Randomized control trial	108 adults with at least 3 episodes of major depression but in remission	94% Caucasian 70% Female Mean age 43.86	Living in UK	Lower hazard of relapse	Greater amount of home practise decreases relapse to depression

Crane C et al., [20]	Mindfulness based cognitive therapy	8 sessions over 9 weeks including an all day practise session (length of weekly session not stated)	Randomized control trial	68 adults	Treatment (n=33) Waitlist (n=36) 1 past episode of major depression and a history of active suicidal ideation or attempt, but well asymptomatic at trial entry 26 men 42 women Mean age 42 years 80% had post-secondary training or education	Living in UK	Remaining in the trial without drop out	High cognitive reactivity, depressive rumination and brooding may inhibit response to meditation
Grow JC et al., [24]	Mindfulness based relapse prevention	8 weekly 2-hour sessions	Randomized control trial	93 adults (18-70) with substance use disorders with completed inpatient treatment within two weeks of study	64.5% male Mean age 40.84 63.4 Caucasian 22.6 African American	Living in US	Greater home practise and less alcohol and other drug craving	Greater home practise decreased AOD use and craving
Kerr, CE et al., [21]	Mindfulness based stress reduction	8 weekly 2-2.5 hour sessions and one full day session	Qualitative: Grounded Theory with close ended coding	7 adults (5 completed)	All women Mean age 31 5 Caucasian 2 Hispanic 1 Asian American	Living in US	Exploratory study on participants ability to describe experience of MBSR	Somatic experiences may break rumination link, distress occurs during meditation, spikes in dis-regulation midway through meditation course was followed by improvement in re-perception
Laurie & Blandford [27]	Digital mindfulness application	Self-directed over 30-40 days	Qualitative: Semi-structured interview	16 adults	Ages 25-38 Mean age 32.5 5males 11 females All working full-time	Living in UK	Exploratory study to examine enabling factors and barriers to mobile-based mindfulness intervention	Expectations, perceptions of time availability, people's beliefs, affective states and lifestyles may affect uptake of meditation.
Lykins ELB & Baer RA (2009) [17]	Mindfulness meditation	Meditators: 1-2 sessions per week minimum 96% Buddhist based meditation 72% 21-45 minutes duration each session 19% 1-20 minutes 10% 45 minutes or more	Correlational study with mediation analysis	182 adult meditators 78 Nonmeditators	Mean age 49.6 28% male 94% Caucasian 71% mental health professional Mean education 19 years 78 adult non-meditators Mean age 43.2 36% male 90% Caucasian 47% mental health professional Mean education 18.4 years	Primarily US based	Mindfulness as a predictor of well-being, reflection, self-compassion, emotional intelligence, and openness to experience	There may be a relationship between long-term meditation and psychological adjustment. With long term practise rumination of new meditators may decrease.
Lomas T et al., [30]	Primarily mindfulness, six element and metta bhavana (loving kindness meditation)		Qualitative: In-depth interviews	Ages 18 and older	27 Caucasian 1 Mixed British & 2 Asian 16 College Education or higher 12 Professional Community sample 23 over 5 years meditation experience	Living in London	Impact of meditation on men's wellbeing	Meditation was difficult to learn, difficult to practise, was associated with troubling thoughts and emotions and exacerbated mental health symptoms
Miller SH & Green S [25]	non-required		Survey	209 adults	2.9% males 56.7% MBA candidates 49.8% full-time employed 25.3 part-time employed	Living in US	Values about meditation effect integration	How meditation is framed, presented, perceived contextual legitimacy and participants sense of efficacy influenced openness
Morone NE et al., [26]	Mindfulness Based Stress Reduction	8 90-minute sessions	Qualitative study: Grounded Theory	27 older adults with low back pain	65 years or older English speaking Primarily male and Caucasian	Living in US	Investigative study on effects of mindfulness meditation on older adults	Barriers to consistency may include sleepiness and difficulty finding time in the day to practice

Petersen M & La Cour P [6]	Mindfulness based stress reduction	8 2.5-hour sessions with 20 min break 1 4.5-hour session 40 minutes daily home practise	Mixed methods: questionnaire, focus group interviews and case studies	58 adults in outpatient mental health program	All were English speaking	Living in Denmark	Describe and predict who would benefit from MBSR	Older age and stable living conditions may predict better outcomes.
Rosenzweig S et al., [22]	Mindfulness based stress reduction	8 week	Correlational study: Prospective cohort design	133 adults with chronic pain	Ages 23-78 Mean age 49.8 84% women 93% Caucasian 54% actively working or students	Living in USA	Assess measures of bodily pain and psychological symptoms and factors associated with compliance of home practise	Increased home meditation was associated with improvement on several outcomes for chronic pain patients.
Shaner L et al., [18]	Shamatha & Vipassana	Practiced meditation for over 10 years – minimum of 20 minutes per day	Interpretive phenomenological analysis	6 Participants	Female	Living in USA	Exploration of the lived experience of long-term meditators	Challenges included leg pain, unusual sensations, drowsiness, boredom, agitation, fear, resistance, and discouragement, lack of concentration, dullness and trying too hard.
Shonin E et al., [29]	Meditation awareness training of Buddhist tradition	8 week 2-hour sessions	Interpretive phenomenological analysis	10 adults	7 female 3 male Ages 20-42 Mean age 30.1 70% Caucasian	Living in UK	Exploration of the acceptability and effectiveness of meditation	MAT participants reported improved psychological well being. Traditional course design and group support were important to participants.
Stelter R [28]	Variety of meditation approaches	6-8 weeks	Qualitative: narrative inquiry	3 adults with mild mental health symptoms	2 female 1 male	Living in Denmark	Unfold the lived experiences of participants during mindfulness meditation training	Rumination and elevated worry was a described challenge throughout the meditation process

**Table 1:** Explains the primary themes and concepts that the literature review shown above has brought forward.

## Discussion and Conclusion

In this review, I aimed to identify literature investigating the variables that may contribute to meditation success, further underscoring why some people cannot successfully incorporate mindfulness practice into their lives despite a need or desire to do so. Research suggests that while researchers are well on their way to identifying factors that may influence the success of a consistent meditation practice, there is little yet known about what works for whom and why. The literature search conducted for this review revealed several noteworthy themes suggesting that the lived experience of the meditator is key to establishing factors that contribute to uptake of meditation approaches, specific personality factors are likely to contribute to the success of long-term implementation of meditation or failure thereof and consistent long-term practice of meditation is likely to be associated with better clinical outcomes [6,8,16-25,27-30]. While all researchers agree that use of mindfulness techniques are important to mind-body health many of the reviewed studies noted that further investigation is needed to clarify which variables result in a good match between specific intervention and the patient’s needs and the patient mechanisms that account for outcome and consistency of use [8,6,19,27].

While the body of literature points to a strong link between long-term meditation practice and positive outcomes, several limitations must be noted. First, all scientific studies relied on self-report measures to greater or lesser degrees and while some measures used may have good support for reliability and validity, methods utilizing self-report may be subject to demand effects and biases [17]. The ways in which experienced versus inexperienced meditators interpret or view questions or constructs may also differ rendering the self-re-

port format potentially invalid. Also, many studies did not reveal details about the style of meditation, degree of participants’ previous meditation exposure or experience of the facilitators. Inconsistencies exist within the reviewed articles with regards to time periods of meditation application used, samples used and methodology. No replication studies were garnered and many studies employed bias sampling techniques that likely limit the generalizability of finding. Inconsistent terminology regarding meditation and long-term meditators is used throughout the literature, which negatively impacts the ability to integrate the literature. Finally, none of the studies garnered in the search investigated the differences between the conditions of long-term successful meditators and failed meditators.

So, while the evidence gives reasonable hope that the benefits of successful implementation of long-term meditation are quantifiable there is a significant gap in the literature specific to understanding the difference between those who respond well and those who fail to put mediation into consistent practice. First-line strategy to help practitioners and individuals better understand the conditions for meditation success will rely heavily on further research findings and replication studies confirming the conditions for success.

## References

1. Khoury B, Sharma M, Rush SE, Fournier C (2015) Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *J Psychosom Res* 78: 519-528.
2. Orme-Johnson DW, Barnes VA (2014). Effects of the transcendental meditation technique on trait anxiety: A meta-analysis of randomized controlled trials. *J Altern Complement Med* 20: 330-341.

3. Perich T, Manicavasagar V, Mitchell PB, Ball JR, Hadzi-Pavlovic D (2012) A randomized controlled trial of mindfulness-based cognitive therapy for bipolar disorder. *Acta Psychiatr Scand* 127: 333-343.
4. Ong JC, Manber R, Segal Z, Xia Y, Shapiro S, et al. (2014) A Randomized Controlled Trial of Mindfulness Meditation for Chronic Insomnia. *Sleep* 37: 1553-1563.
5. Jacobs TL, Epel ES, Lin J, Blackburn EH, Wolkowitz OM, et al. (2011) Intensive meditation training, immune cell telomerase activity, and psychological mediators. *Psychoneuroendocrinology* 36: 664-681.
6. Petersen M, la Cour P (2016) Mindfulness--what works for whom? Referral, feasibility, and user perspectives regarding patients with mixed chronic pain. *J Altern Complement Med* 22: 298-305.
7. Zeidan F, Martucci KT, Kraft RA, McHaffie JG, Coghill RC (2014) Neural correlates of mindfulness meditation-related anxiety relief. *Soc Cogn Affect Neurosci* 9: 751-759.
8. Cohn MA, Fredrickson BL (2010) In search of durable positive psychology interventions: Predictors and consequences of long-term positive behavior change. *J Posit Psychol* 5: 355-366.
9. Moore A, Malinowski P (2009) Meditation, mindfulness and cognitive flexibility. *Consciousness and Cognition* 18: 176-186.
10. Ozawa-de Silva BR, Dodson-Lavelle B, Raison CL, Negi LT, Silva BRO (2012) Compassion and ethics: Scientific and practical approaches to the cultivation of compassion as a foundation for ethical subjectivity and well-being. *Journal of Healthcare, Science & the Humanities* 2: 145-161.
11. Rubia K (2009) The neurobiology of meditation and its clinical effectiveness in psychiatric disorders. *Biol Psychol* 82: 1-11.
12. Zeidan F, Emerson NM, Farris SR, Ray JN, Jung Y, et al. (2015) Mindfulness meditation-based pain relief employs different neural mechanisms than placebo and sham mindfulness meditation-induced analgesia. *J Neurosci* 35: 15307-15325.
13. Tang YY, Ma Y, Wang J, Fan Y, Feng S, et al. (2007) Short-term meditation training improves attention and self-regulation. *Proc Natl Acad Sci USA* 104: 17152-17156.
14. Pace TWW, Negi LT, Adame DD, Cole SP, Sivilli TI, et al. (2009) Effect of compassion meditation on neuroendocrine, innate immune and behavioral responses to psychosocial stress. *Psychoneuroendocrinology* 34: 87-98.
15. Lazar SW, Kerr CE, Wasserman RH, Gray JR, Greve DN, et al. (2005) Meditation experience is associated with increased cortical thickness. *Neuroreport* 16: 1893-1897.
16. Ataria Y, Dor-Ziderman Y, Berkovich-Ohana A (2015) How does it feel to lack a sense of boundaries? A case study of a long-term mindfulness meditator. *Conscious Cogn* 37: 133-147.
17. Lykins ELB, Baer RA (2009) Psychological functioning in a sample of long-term practitioners of mindfulness meditation. *Journal of Cognitive Psychotherapy* 23: 226-241.
18. Shaner L, Kelly L, Rockwell D, Curtis D (2017) Calm Abiding - The Lived Experience of the Practice of Long-Term Meditation. *Journal of Humanistic Psychology* 57: 98-121.
19. Barkan T, Hoerger M, Gallegos AM, Turiano NA, Duberstein PR, et al. (2016) Personality predicts utilization of mindfulness-based stress reduction during and post-intervention in a community sample of older adults. *J Altern Complement Med* 22: 390-395.
20. Crane C, Crane RS, Eames C, Fennell MJ, Silverton S, et al. (2014) The effects of amount of home meditation practice in Mindfulness Based Cognitive Therapy on hazard of relapse to depression in the Staying Well after Depression Trial. *Behav Res Ther* 63: 17-24.
21. Kerr CE, Josyula K, Littenberg R (2011) Developing an observing attitude: an analysis of meditation diaries in an MBSR clinical trial. *Clin Psychol Psychother* 18: 80-93.
22. Rosenzweig S, Greeson JM, Reibel DK, Green JS, Jasser SA, et al. (2010) Mindfulness-based stress reduction for chronic pain conditions: Variation in treatment outcomes and role of home meditation practice. *J Psychosom Res* 68: 29-36.
23. Crane C, Williams JMG (2010) Factors associated with attrition from Mindfulness-Based Cognitive Therapy in patients with a history of suicidal depression. *Mindfulness (NY)* 1: 10-20.
24. Grow JC, Collins SE, Harrop EN, Marlatt GA (2015) Enactment of home practice following mindfulness-based relapse prevention and its association with substance-use outcomes. *Addict Behav* 40: 16-20.
25. Miller SH, Green S (2012) Incorporating meditation as a professional skill within the business curriculum: theory, attitudes and application. *Global Journal of Management Research* 12: 1-7.
26. Morone NE, Lynch CS, Greco CM, Tindle HA, Weiner DK (2008) "I felt like a new person." The effects of mindfulness meditation on older adults with chronic pain: Qualitative narrative analysis of diary entries. *J Pain* 9: 841-848.
27. Laurie J, Blandford A (2016) Making time for mindfulness. *International Journal of Medical Informatics* 96: 38-50.
28. Stelter R (2009) Experiencing mindfulness meditation-a client narrative perspective. *Int J Qual Stud Health Well-being* 4: 145-158.
29. Shonin E, Van Gordon W, Griffiths MD (2013) Meditation Awareness Training (MAT) for improved psychological well-being: A qualitative examination of participant experiences. *J Relig Health* 53: 849-863.
30. Lomas T, Cartwright T, Edginton T, Ridge D (2014) A qualitative analysis of experiential challenges associated with meditation practice. *Mindfulness* 6: 848-860.
31. Pokorski M, Suchorzynska A (2017) Psychobehavioral Effects of Meditation. *Adv Exp Med Biol*.