

**The emotional implications of long-term meditative practices; effects on stress,  
anxiety and Reappraisal.**

**Simone Brennan**

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## **Abstract**

A lot of controversy exists regarding the possible cognitive benefits of meditation and advocates claiming MP are a free and self-regulated way to control a number of

psychological phenomenon which otherwise would be treated with medication. The present study took primary interest in the experience of stress and anxiety, 2 emotional states which are reliant, upon other things on our ability to regulate our emotional responses. An online survey recorded stress, anxiety and emotional regulation data from respondents (n=175) and grouped them into long-term (n=54), short-term (n=47) and non-meditators (n=74). Results suggested that long-term meditators had an improved ability to cognitively reappraise situations, furthermore the LT group showed significantly lower levels of stress, anxiety and perceived stress. Results support previous literature postulating the potential of meditation to provide protective cognitive benefits. Some practical implications of these findings may involve developing and implementing a meditation-based learning programme in schools and colleges in order to offset the negative effects of stress.

## Chapter 1. Introduction and Literature review

### Introduction

Demanding careers and lifestyles, intrusive media influence in addition to the emergence of an era of online social networking have dramatically changed the typical living conditions of western people over the past 50 years. The world health association reported a 15% rise in anxiety and stress disorders between 2005 and 2015 and these now encompass the most commonly diagnosed psychological conditions in the western world costing billions in healthcare each year (WHO, 2017) with some researchers postulating that these lifestyle changes are directly affecting this increase in stress/anxiety disorders (Chambers *et al*, 2016). It is because of this rise in cases each year that more scientific research is becoming focused on preventative/coping strategies rather than solely concentrating on treatment therapies and cures (Miller, Fletcher & Kabat-Zinn, 1995; Sedlmeier, 2012). The experience of stress and anxiety has been directly related to the ability of individuals to regulate their emotions (Joormann & Gotlib, 2010), with research showing meditation interventions having a positive effect on emotional regulation and in turn on the experience of stress and anxiety (Roemer, Williston & Rollins, 2015). This current paper hopes to provide an overview of meditation and its history in Psychological research in regards to its potential benefits in helping to control emotions such as stress and anxiety through the mechanism of emotional regulation.

## Literature Review

### Early research

Early research investigating the Neurophysical effects of meditation date to the 1960's, and typically included samples from societal groups for whom meditation was part of their cultural heritage; EEG studies gave researchers a physical picture of the brain during activities and a study by Anand *et al*, (1961) found the ability of Yogis and monks to deeply meditate actually affected the electrical activity of their brains with increased Alpha brain activity as well as the ability to alter the control ones' physiological responses to stressors. The Galvanic skin response, one of the most sensitive markers for emotional responses was employed in another study where meditating Yogis were found to enjoy a lower neurological and physical response to stressors (Orme-Johnson, 1973). Modern neuroimaging techniques provided a novel view of the meditating brain with MMR imaging being used to compare the cortical activation of non-meditators against those practicing long-term. Results found that meditators showed stronger activations in the rostral anterior cingulate cortex, a part of the cortex associated with attention and the processing of distracting events. Also found was a greater activation in the medial prefrontal cortex which is postulated to increase the ability of the emotional processing of meditators (Hölzel, 2007).

Throughout history many forms of meditative practices (MP) have been recorded, these variations haven woven themselves into multiple societies and span across history (Goleman & Schwartz, 1976; Orme-Johnson, 1973). By the 70's it was looking more likely that there was indeed something to the idea that meditation could

change the brain. An early researcher in the field used his studies to propose meditation as a 4<sup>th</sup> state of consciousness which could join sleep, wakefulness and dreaming as a psychological description of the human state. He had discovered physical differences in the physiology of meditators, significant enough to conclude that engaging in MP could result in the inhibition of the Autonomous nervous system and a dulling of the stress response in the body (Wallace, 1970). Goleman & Schwartz noted similar decreases in the biological response to stress in meditators, their study recorded patterns of physiological responses such as the decrease in oxygen consumption and a lowering or stabilization of blood pressure which suggests generalized sympathetic inhibition (1976). MP have become closely associated with the regulation of emotions, both from a physiological and behavioural level. Practicing meditation reduced both oxygen consumption and heart rate while increasing both skin resistance and Alfa brainwave activity which remained present even when not meditating, this relaxation of the autonomic nervous system seems to have the direct opposite effect of Cannon's 'fight or flight or freeze' response on the body and the evidence that these positive effects last even after the practice is complete is the premise for this paper which assumes those who have been practicing long-term will show greater abilities in ER and stress responses than those who have never meditated (Goleman & Schwartz, 1976; Anand *et al*, 1961).

### **Meditation defined**

While attempting to define meditation we must understand it as a multifaceted and subjective phenomenon, as an act it is intangible, so we rely on explanations which describe the state of the sensations and experiences described by practitioners as well as the effects or benefits felt. Orme-Johnson described MP as having “been shown to produce a physiologic state which is different from sleep, dreaming, hypnosis or waking” (1973, pg. 341). Maupin elaborates further, characterising MP as a self-regulated phenomenon which creates an intense state of relaxation *without* the loss of consciousness and concludes that MP may provide practitioners with a non-invasive method of reaching and working through internal stressors which they are not consciously aware of by providing a time of ‘self-immersion’ when other coping strategies are not working (Maupin, 1965). It is thought that through this mechanism of self-immersion and attention that the mind is being trained to reject distractions and think in present terms, regulating thought patterns and in turn the cognitive responses to stimuli.

More recently, Everly & Lating, describe MP as a state of relaxed attention, with a focus on the breath/body and the withdrawal of attention/judgement from thoughts, emotions and surroundings (2002). Walsh and Shapiro add that MP are “a family of self-regulation practices which focus on training attention and awareness in order to bring mental processes under greater voluntary control” (2006, p. 228). Although many different styles have developed, the mechanism of practice is analogous throughout and can be broadly described as a “nonlaborative, non-judgmental, present-centred awareness in which each thought, feeling or sensation

that arises in the attentional field is acknowledged and accepted as it is" (Bishop, 2004; as cited by Bloch et al 2016). It is accepted as part of each MP that attention will wander and universally the instructions are to accept the mind's direction, let it go and to simply guide the attention back to the target, whether this be to bodily sensations, breathing or a mantra (Bishop, 2002). This method of attention retrieval is arguably what accounts for what appears in research to be an increased capability to emotionally regulate in those who meditate. Accordingly, it is important to notice that since meditation involves a repeated practice of both self-regulation and attentional training that these are cardinal components of meditation and are enhanced as a result of long term MP. (Jensen, Vangkilde, Frojaer & Hasselbalch, 2012).

### **Meditation Styles**

Due to the complexity as a phenomenon, it is also important to briefly mention the various styles of MP that have developed over time. Transcendental meditation, one of the most widely used 'silent mantra' techniques and one of the most heavily researched in science, was popularised by the spiritual leader Maharishi Mahesh Yogi in the 1950's and 60's (Orme-Johnson, 1973; Koppel, 2008). Weidmann elaborates on the technique characterising it as deep meditation and describes 15-20 mins of silent repetition of a mantra, usually under the supervision of a practitioner, eyes closed and generally practiced in the lotus position, cross legged with palms facing upwards from the knees (1999). The practice originated from the religious practices of Buddhism and was what would eventually become adapted into the script of Meditation for the Western world, partly through the spread of Yoga (Prasad,

Varrey & Giovanni, 2016). Similarly, Zen and Vipassana meditation traditions which are components developed from Theravada and Mahayana Buddhism have a strong focus on present centred awareness with a guided concentration on the bodies experience at that moment (Mikulas, 2007; as cited by Watson, 2008) Vipassana meditation is primarily credited with creating a greater sense of awareness around bodily sensations in the experience of emotions and a greater coherence between the physical and subjective aspects of emotions. The method of action here is the continued attention being focused, and refocused onto the body and its sensations, experiencing the body as a whole, and complete entity (Sze, 2010). The most recent explosion of interest into MP is arguably around the practice of Mindfulness which grew from Vipassana techniques and is defined as the purposeful guiding of attention to both internal and external experiences; a person's cognitive states, emotions, urges and bodily sensations, which occur from moment-to-moment are mentally viewed and accepted with an open and non-judgemental attitude (Schreiner & Malcolm, 2008).

Although these are indeed distinct disciplines and have been developed quite separately from one another over the course of centuries, a common mechanism is repeated throughout the literature regardless of which form of MP is being studied, this can be broadly understood as a state of non-judgemental attention, and possibly more importantly, the guiding of attention back into the presence once the wandering has been noticed. This provides moments of pure awareness for practitioners, moments which occur naturally in each of us during the identification and conceptualisation of ideas/emotions throughout our day and so by practicing

meditation, we are thought to be developing our minds ability to remain in a state pure awareness longer, feeding into the idea that the meditators brain has become more able in dealing with high intensity emotional situations (Watson, 2008).

### **Psychology and Meditation**

Meditative practices (MP) have been used for centuries as techniques of reflection and relaxation with both physiological and emotional benefits being recorded (Menezes & Bizarro, 2015; Vaitl, 2005). The motivations for individuals choosing to engage in MP can be roughly divided into 2 distinct reasons; The first encompasses the goal of understanding oneself and the environment in which they live, to gain wisdom around their own lives and to broaden their consciousness. The second involves a goal of improved self-regulation, to overcome emotional and psychological problems and to gain a better understanding of the process by which we experience and respond to stimuli (Coleman, 2001). MP have been shown to reduce stress and anxiety (Goyal , 2014; Menezes & Bizarro, 2015), depressive feelings, ADHD symptoms and chronic pain (Zautra, 2008) while improving mood, emotional regulation an acceptance (Rahl, 2017), attention and feelings of self-worth (Galante *et al*, 2014). Literature from Hölzel (2007), among others, has proposed the idea from empirical research that long term MP could improve Emotional regulation (ER) and support a greater ability to self-regulate emotions. This idea, that the physicality's of the brains structure may be changed by behaviour is not unfounded, Modern Neuroscience research and the discovery of neural plasticity supports the idea that practice of a cognitive phenomenon may increase the efficacy of its behavioural representation, evident with the enlarged Anterior Cingulate Cortex found in

bilinguals, who continually use the area to select, or choose between words from 2 or more languages (Gasquoine, 2016) and the larger than average mapping areas found in the brains of London taxi drivers who have become famous for their impressive geographical knowledge of a city not unlike a maze consisting of thousands of small and cobbled, Victorian streets (Maguire, Woollett & Spiers, 2006). Neuroscientists now understand that the brain employs a 'use it or lose it' approach to its structures which then leads to the presumption that by the repeated and long-term practice of any cognitive exercise, such as meditation, one may alter not only our own subjective experience but the cognitive structure by which we think, feel, act and do, which suggests we could train our brain to process emotional responses in a healthier way (Bryck & Fisher, 2012) . These discoveries have led to a new fascination with MP, digressing from the historical perception of meditation as being clouded in mysticism and science is now beginning to accept the possibility that much of what is happening while we meditate is under researched and misunderstood.

Many empirical studies looking at the effects of meditation were designed with Yogis and Monks, who had adopted the practices as part of their wider lifestyle (Orme-Johnson, 1973) others used intervention methods to test base rates of various variables before and after MP and have found positive effects on self-image and self-kindness (Boyle *et al*, 2017), improvement in emotional regulation and concentration (Menezes & Bizarro, 2015), and a reduction in stress and anxiety levels (Goldin et al, 2016; Hudaisa, 2014). Meta-analysis style research by Mcgee concluded meditation to benefit many psychological and psychosomatic problems such as addiction, chronic pain, suicidality, depression, and hypertension (2008).

## **Emotional regulation**

Individuals regulate their emotions in many ways, Menezes & Bizarro provide us an apt definition of ER as a 'cognitive modulator of internal arousal levels, and the dictator of an individual's emotional responses; they explain that ER systems contextualise our emotional demands and control the impulsiveness of responsive behaviours (2015). In describing the emotional effects of Mindfulness, Zautra et al claim it may "promote enhanced awareness of and change the meaning given to dysfunctional thoughts" (2008). By actively changing the story in the mind, and by choosing to remain in the present and in the positive, it is believed to support more beneficial cognitive patterns helping individuals deal with stressors in a self-regulated and person-centred way. Teper & Inzlicht also spent time defining MP in relation to emotional control systems and propose a dual mechanism of action comprised of an acceptance of emotional states and feelings, with the practitioner learning to both acknowledge these thoughts as they arise (attention) along with an effortless resistance against getting swept up in their associated emotions and to instead view the idea non-judgementally (acceptance);(2012). Our internal ER refers to the ways we process and react to environmental stimuli, it encompasses the processes of how and when we experience our emotions as well our expression and response to them (Ochsner & Gross, 2005). Dysregulation of our emotions can be "conceptualised as a combination of low ability to tolerate emotional-distress" and result in effects ranging from anxiety, aggression, depression, social and interpersonal problems (Westphal, Aldao & Jackson, 2017). Furthermore, dysregulation of emotions typically

characterizes mood and anxiety disorders, with sufferers being unable to change the story of their sadness and instead focusing on the negatives in life (Gross and Thompson, 2007).

Past research papers have uncovered positive effects amongst the various cognitive processes of executive control and MP, the most critical being what appears to be a heightened ability in meditators to supersede automatic behaviour by overcoming impulses and increase 'self-control', which is essential for processes like emotion regulation (ER) (Compton et al., 2008). A paper by Menezes & Bizarro studied the emotional regulation and trait anxiety levels of three groups, one given a 6 week focused meditation course, another a progressive relaxation technique course (a practice which focuses on the systematic relaxation of specific muscle groups in sessions) and a third control. Results showed that only the focused meditation group produced a significant change in their emotional regulation as well as noticeable improvement in trait anxiety (2015). Another 6-week intervention which used Mindfulness with cancer survivors reported significant increases in ER with higher levels of Reappraisal and lower levels of suppression after completion of the program. The authors noted an increase in the concept of 'Self kindness' and a decrease in both stress and depression markers (Boyle *et al*, 2017). The present study employed the use of the Emotional Regulation Questionnaire (ERQ) to shed light on two important aspects of ER processing; Cognitive Reappraisal and Expressive Suppression. While Expressive suppression relates to the minds ability to push away difficult or emotional thoughts, Cognitive reappraisal involves changing the trajectory of emotional responses and provided alternative ways of perceiving a situation (reducing stress)

(Boyle *et al*, 2017). It was suggested by Garland *et al* that a circular relationship exists between mindfulness and cognitive reappraisal: “positive reappraisal and mindfulness appear to serially and mutually enhance one another, creating the dynamics of an upward spiral” (2011, pp. 59). It is because of these definitions that the present paper concerns itself with the ability of meditators to cognitively reappraise ideas and thoughts, a skill which allows for a more adept and optimistic processing of difficult emotions. Previous work by Jermann *et al* (2009) has suggested a link between cognitive reappraisal and MP where a significant relationship was found between the use of positive reappraisal and dispositional mindfulness score.

### **Stress and anxiety**

The human stress response encompasses a spectrum of psychological and physiological activation patterns which are biologically programmed to help us avoid dangerous situations. Stress experienced acutely is a natural and unavoidable aspect of life, one which in many cases is beneficial. Long term exposure however, can create many negative consequences for the physical and mental health of individuals (Menezes & Bizarro, 2015). Symptoms of heightened stress responses include avoidance behaviours, muscle tension, sleep disturbances, digestive problems, lack of concentration and fatigue (American Psychiatric Association, 2013). The long-term experience of stress and anxiety has the potential to affect a person's physical and mental health, wellbeing, quality of relationships as well as their education and employment experience (Lazarus & Folkman, 1984; Prasad, Varrey & Giovanni, 2016; Rahl, 2017). Stress and anxiety disorders are now accounting for the most commonly diagnosed conditions each year and as such, the Psychiatric community has sought to

classify certain conditions based on the cluster of symptoms present in sufferers. The classification of these disorders now sits under a broad umbrella of conditions which includes acute stress disorder, post-traumatic Stress Disorder (PTSD), Adjustment disorders, and reactive attachment disorders (DSM-5, 2013). One possible reason for this growth in diagnosis may be the nature of the stress experience itself, we are exposed and must tolerate a certain level of stress in day to day life. The insidious nature of modern stressors may in some way normalise the experience to a point where people are now unaware when they are being exposed, some of these stimuli are now firmly implanted in our modern lives; handheld technologies for example have revolutionised our socialisation, communication is now instant, immutable and homogeneous, our circle of contacts has expanded far past a number that would make sense to our ancestors and these factors, along with freedom of travel and globalisation are arguably feeding directly into increased social demands and less intimate relationships (Andreassen, 2016).

The current research is interested in a dual manner in both the stress levels of participants from two perspectives, the DASS 21 was employed as a reliable and tested method of scoring populations on their Stress, Anxiety and Depression levels (Lovibond & Lovibond, 1995) with average numbers being available for comparison. Furthermore, the Perceived stress scale (Cohen & Williamson, 1988) was used to compare the perceived level of stress encountered by those taking part in the study, this is a non-diagnostic tool meaning no cut-offs are used, instead scores are compared between the sample participants to assess differences between the defined groups.

## Theory of Meditation

Wallace and Shapiro suggest strong comparisons between Buddhism and western Psychological ideals surrounding mental health, in their paper, they argue through the lens of Buddhist teachings that their own model of well-being assumes that mental suffering can in large be attributed to imbalances of the internally constituted mind. They proposition 4 strategies for cultivating mental balance through MP as: conative balance, the setting of goals and intentions which precedes the other 3 and includes the primary choice to begin self-improving-and meditating, Attentional balance which describes sustained voluntary attention, cultivated by the practice of mindful breathing or bodily awareness. Following this, cognitive balance describes a calm and clear involvement in present experiences, as they arise and finally, affective balance which causes a reduction in emotional apathy, the appearance of inappropriate emotions and promote healthy emotional responses to stimuli (2006). Similar findings were found by Rosenberg *et al* who after implementing a 3 month meditation intervention found that intensive MP resulted in enhanced sympathetic concern for, and reduced aversion to, the suffering of others when compared to a control group (2015). These areas of increased activation, along with the previously discussed literature on neural plasticity is leading researchers to suggest that long term MP could in fact change the topography of the brain and may influence our behavioural responses in a semi-permanent way.

While Cognitive control was once asserted to be the analogous factor for the benefits of MP to be adopted, a paper by Prakash, Hussain & Schirda (2015) argue that the efficacy of our ER systems was in fact much more important in the experience

of beneficial results from MP. They identified the mediating factor between mindfulness and perceived stress for example, with the two scores being dependant on one another – as emotional regulation, low ER would result in little benefits from MP and vice versa. This would suggest that a circular relationship exists between the experience of benefits gained from MP and one's own ER systems, one can lend itself, or hinder the other. Long term MP has been suggested to influence our ER by creating a detached sense of awareness around the bodies response to stress and is thought to interrupt the tendency to automatically react to stimuli, giving practitioners an increased behavioural flexibility (Bishop *et al.* 2004, pg. 229-240). In his study with Orme-Johnson talk about ER from a physiological viewpoint and used the Galvanic skin response (GSR) to test the responses of meditators and non-meditators to stressor stimuli concluding that Meditators were significantly more able to control their physiological responses (1973). While an increasing body of literature supports the idea that meditation may produce both physiological and behavioural changes, many studies designed around intervention styles failed to employ a control group but only a meditation group for which tests were taken before and after an extended period of meditation. Such designs have low internal validity because other potential confounding factors cannot be controlled (Sedlmeier & Renkewitz, 2007).

## **Rationale**

While many MP have been researched in literature, most studies include either specific samples of meditators ie. Yogis/Buddhists or focus on only one style of meditation and test their effect through intervention methods. This study instead is using previous research on the benefits of MP in controlling emotions, stress and

anxiety to postulate that the simple practice of long-term MP will have an effect on the experience of these negative emotions both in frequency and intensity. For this reason, the survey was open to all people practicing various forms of meditation and it is postulated that the truly important mechanism of attention and acceptance, present in most styles, will produce a wide picture of cognitive benefits rather than a specific snapshot associated with only one style. Non-meditators (NM) will be primary compared to those practicing over 5 years with the middle cohort being used to investigate if an upward trajectory exists between years meditating and progressions of ER and the experience of stress. From past papers using MP as an intervention we can see that results may be testable from only 6 weeks practice, as it was outside the scope or aim of this study to test intense exposure to MP a more than generous time limit of 4 years would be used as the cut off to make it into the long-term group. With such a weight of empirical research pointing to tangible and effective cognitive benefits resulting from MP it is the aim of the researcher to group individuals together based on their time spent meditating and to consider that perhaps this group of long term meditators may have provided themselves with a universal benefit from their practices.

## Hypothesis

**H1:** Those who have meditated longer than 4 years will score lower in anxiety than those who have never meditated

**H2:** Those who have meditated longer than 4 years will score lower in stress than those who have never meditated

**H3:** Those who have meditated longer than 4 years will score lower in Perceived stress than those who have never meditated

**H4:** Those who have meditated longer than 4 years will score higher Cognitive reappraisal than those who have never meditated

**H5:** As years in meditation increases, the perception, and experience of stress will decrease.

## Chapter 2: Methodology and Methods

### Methodology

With the goal to investigate whether long term MP provided practitioners with protective cognitive benefits, participants were invited to complete an online survey, shared through Facebook and online forums and comprising of 3 psychological scales testing stress and anxiety, emotional regulation and finally levels of perceived stress. The survey was constructed through Google forms, which is free and accessible and posted on social media websites. This paper collected data from individuals practicing many forms of meditation. We grouped the sample based on time practicing rather than the style used. Furthermore, a short demographic questionnaire preceded these scales collecting information on age and gender as well as the years spent practicing meditation (See Appendix A for the complete survey). Of great interest to the current study was the experience of stress and its relation to MP, for this reason a dual approach to measure stress was employed with both the perceived experience of stress (PSS) and DASS21 being used to produce a rounded picture of the participants experience of stress. The anxiety of participants was also assessed through the DASS21 as well as the ability to control emotions, of particular importance to the investigator was the score of cognitive reappraisal which was assessed through the emotional regulation questionnaire (ERQ).

## **Method**

### **Research Design**

A cross sectional, survey design was employed in this study, online snowball sampling was used, and open meditation forums and Facebook pages were used to target those with interest in MP. Three groups will be analysed at the same time-period using an online survey, comprised of three psychological questionnaires which was shared to social media sites. The independent variable was identified as the time spent practicing meditation with the dependent variables encompassing the stress, anxiety, perceived stress and emotional regulation scores. Moreover, a short demographic questionnaire collected information on age, gender and years spent meditating. Participants were invited to share the style of meditation practiced although this information for the most part was highly subjective and was discarded as irrelevant.

### **Participants**

Data was collected from 175 individuals (mean age 38.2 years, s.d.: 13.1years) of this sample, non- meditators (n=74) were identified as those with no previous experience, those practicing meditation between 1 month and 4 years were (n= 47) we identified as short-term meditators. Long-term meditators were organised as those who had been meditating for 4 years or longer (n=54). To collect information from long term meditators, the primary investigator used social media to identify meditation pages and forums which were open to the public. The survey was posted

on a number of these sites with a brief description of the aims of research. Although location data was not collected, participants were welcomed to get in contact through Facebook with any questions, because of this many people from as far away as India and California advised that they would be passing the survey on to friends and family who were heavily involved in MP.

## **Procedures**

### **Recruitment and Ethical considerations**

The initial research and data collection did not commence until after receiving ethical approval from the ethics committee at DBS. Participation was unrestricted save for being required to be over 18 and have internet access. Those indicating they are under 18 on the first page of the study were redirected to the debrief sheet and thanked for their interest. The survey was made available online to reduce pressure on participants to respond. Although no obvious ethical considerations were apparent, it is understood that adverse reactions to questions is a possibility for respondents. For this reason, the debrief sheet was constructed to direct participants towards resources and help centres for Anxiety and depression with free call numbers should they feel concerned about any of the topics covered. Anonymity was addressed at the beginning of the survey confirming that no identifying information would be collected and as a result once the survey was submitted there was no way to recall information. Participants were required to give formal consent to participation with a full description of the research aims being provided before commencing the survey ensuring no deception was incurred.

## **Measures**

The battery of test used in the present study encompassed a straightforward demographic scale with age and gender, years meditating as well as the type of meditation practiced, if known. Access to the internet was necessary to take part but no other equipment was needed. The Psychological scales used are as follows;

### **Emotion Regulation Questionnaire**

The Emotion Regulation Questionnaire (ERQ) is a 10-item questionnaire including statements such as; “when I want to feel more positive emotion (such as joy or amusement), I change what I’m thinking about”. It is scored across a 7-point scale from 1= strongly disagree, 4 = neutral to 7 = strongly agree, with no reversals. It is designed to assess individual differences in the habitual use of two emotion regulation strategies: Cognitive Reappraisal and Expressive Suppression, the former of which is associated with greater positive mood, social functioning and psychological well-being. Reappraisal Items: 1, 3, 5, 7, 8, 10; Suppression Items: 2, 4, 6, 9, with a request from the author to refrain from changing the order of the questions asked. The alpha reliabilities averaged .79 for Reappraisal and .73 for Suppression (Gross, & John, 2003).

### **Perceived Stress scale**

Perceived Stress scale (PSS) measures are widely used scale which measures the perceived level of stress in an individual’s life (Cohen, & Williamson,

1988). The ten-item scale was designed to tap into how unpredictable, uncontrollable and overloaded respondents experienced their lives to be, each item was rated on a five-point Likert-type scale (0 = never to 4 = very often), questions included "In the last month, how often have you felt that things were going your way?". PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. A short 4 item scale can be made from questions 2, 4, 5 and 10 of the PSS 10 item scale. Satisfactory Cronbach's alpha values was found (0.82).

#### **DASS-21**

DASS-21 (Lovibond & Lovibond, 1995), comprises of 21 questions, a shortened version of the original 41 item DASS by selecting the 21 highest loading items. The present model is comprised of three sub-scales, each of which contains 7 items: The Depression sub-scale measures hopelessness, dysphoria, self-deprecation, inertia, anhedonia and lack of interest/involvement. The Anxiety scale assesses skeletal muscle effects, autonomic arousal, situational anxiety and subjective experience of anxious arousal while the Stress scale looks at levels of chronic, non-specific arousal. It assesses nervous arousal, tension, agitation, impatience, difficulty relaxing and negative affect (Tran, Tran & Fisher, 2013). Scores range from 0, "Did not apply to me at all," to 4, "Applied to me very much, or most of the time. Scores of the smaller scale must be multiplied by 2, so that they can be compared to the DASS normative data and to other published DASS data. This questionnaire possesses

adequate construct validity, with reliability of the scales being .88 for Depression, .82 for Anxiety, .90 for Stress, and .93 for the Total scale (Henry & Crawford, 2005). The DASS-21 has no direct implications in classifying populations and instead is based on a dimensional categorisation of psychological disorders.

## **Chapter 3: Results**

### **Statistical Analysis**

Four Independent sample t-test were used to compare Stress, Perceived stress, Anxiety and emotional regulation scores between meditators and Non-Meditators (Practicing = 0years) and Long-term meditators (practicing >4years). The depressive subset in the DASS21 will be ignored as we are focused on stress and anxiety management alone. In line with Psychological research parameters, .05 was the established cut-off for our statistical analysis, probability values of <.05 are considered to be significant and to reject the null hypothesis. While a significant result in data analysis will reject the null hypothesis, it is important to recognise this does not infer Psychological significance and simply highlights the research proposal as the more likely option in explaining the result.

### **Descriptive Statistics**

All statistics were computed on SPSS 22 for Windows. The total number of respondents was (N=175) were grouped according to the time spent engaging in MP. The mean scores of long-term meditators (n= 54) were compared against non-meditators (n=74) on their DASS21 stress and anxiety scores as well as their PSS score and cognitive reappraisal. An independent samples T-test was used on all 4 IV (stress, anxiety, PSS and Reappraisal scores) with results outlined below. A Linear regression was also employed to investigate whether years meditating (DV) could predict a reduction in the experience of stress via the DASS21 stress IV.

### Hypothesis Model 1 - Stress and Perceived Stress

An independent samples t-test found that there was a statistically significant difference between the stress scores of long-term meditators ( $M = 13.39$ ,  $SD = 7.86$ ) and non-meditators ( $M = 10.04$ ,  $SD = 9.42$ ) ( $t(122.52) = 5.78$ ,  $p = .000$ ,  $CI (95\%) 6.87 \rightarrow 14.03$ ). Therefore, the null can be rejected. Equal variances were not assumed according to Levenes test probability value (See table 1).

Furthermore, An independent samples t-test found that there was a statistically significant difference between the perceived stress score of long-term meditators ( $M = 13.39$ ,  $SD = 7.86$ ) and non-meditators ( $M = 21.96$ ,  $SD = 8.41$ ) ( $t(126) = 5.85$ ,  $p = .000$ ,  $CI (95\%) 5.67 \rightarrow 11.47$ ). Therefore, the null can be rejected. Equal variances were assumed according to Levenes test probability value. (See table 1).

Using a simple linear regression, it was found that the amount of years spent meditating significantly predicted the stress scores in respondents ( $F(1,13) = 194.16$ ,  $p < .001$ ,  $R^2 = .93$ ) (Price,  $\beta = -.968$ ,  $p < .001$ ,  $CI (95\%) -14.91 \rightarrow -10.47$ ). The regression test suggests that for each extra year of meditation practiced, the average stress score is predicted to decrease by between .595 and .295 (at the 95% confidence level)

### **Hypothesis Model 2 - Anxiety**

An independent samples t-test found that there was a statistically significant difference between anxiety levels of long-term meditators ( $M = 5.19$ ,  $SD = 7.20$ ) and non-meditators ( $M = 11.11$ ,  $SD = 9.58$ ) ( $t(125.8) = 3.99$ ,  $p = .000$ ,  $CI (95\%) 2.99 \rightarrow 8.86$ ). Therefore, the null can be rejected. Equal variances were not assumed according to Levenes test probability value and a one-tailed p-value is reported due to the strong prediction of this effect (See table 1)..

### **Hypothesis Model 3 - Cognitive Reappraisal**

An independent samples t-test found that there was a statistically significant difference between reappraisal ability of long-term meditators ( $M = 31.37$ ,  $SD = 8.91$ ) and non-meditators ( $M = 28.38$ ,  $SD = 7.26$ ) ( $t(126) = -2.09$ ,  $p = .019$ ,  $CI (95\%) -5.82 \rightarrow -0.16$ ). Therefore, the null can be rejected. Equal variances were assumed according to Levenes test probability value (See table 1).

**Table 1.**

*Independent samples T-test table for Stress, Perceived stress, Emotional regulation and Cognitive reappraisal*

Variable	Meditators		Non- meditators		T	P
	M	SD	M	SD		
Stress	10.04	9.42	20.49	10.95	5.78	.000
Anxiety	5.19	7.20	11.11	9.58	3.99	.000
PSS	13.39	7.86	21.96	8.41	5.92	.000
Cognitive Reappraisal	31.37	8.91	28.38	7.26	-2.1	.02

## Discussion and Future directions

As previously discussed by Coleman, it can be deduced that the reasons individuals engage in MP as one of self-exploration, self-improvement or a combination of both (2001), it is therefore vital that all studies which look for cognitive benefits from MP are aware of the shared variance between the participation in MP, but also the drives behind that act. This is to say that a person who has researched and dedicated themselves to MP for any length of time as shown a heightened awareness of themselves, and a want to improve themselves by themselves. In such as study as this the phenomenon of shared variance must also be acknowledged, it is safe to extrapolate that Meditation is often used by those who are sensitive to, and at least somewhat aware of their own Psychological functions and needs. These people who have made the decision to meditate for an extended time have actively chose this 'beneficially portrayed practice and in theory may then be more likely to engage in more self-preservation or self-care techniques. This concept was evident in the results from the PSS which showed meditators not only scored lower in stress but they perceived their own stress to be lower than the non-meditating groups.

While Meditation could never be described as a preventative or curative method for the experience of stress, let alone the associated disorders, it has now been suggested in many varying situations that it may, at the very least, provide a buffering effect against the functional ramifications of stress with a higher score in trait mindfulness correlating with a reduction in the experience of negative effects after exposure to stressful stimuli (de Frias, & Whyne, 2014). The results from the current research fall in line with previous findings that MP would appear to buffer the effects

of both stress and anxiety. Especially interesting was the results from the regression that for each year spent meditating could result in approx. -.5 score in stress displays according to the DASS21 (Lovibond & Lovibond, 1995). Moreover, it is hoped by the primary investigator that at a base level, individuals may view the results from the regression especially, as an invitation into the world of meditation and decide to include it into their day to day lives. This has exciting implications when considered in relation to the education of children, in therapeutic or hospital settings, in businesses and almost every aspect of life. As modern life becomes busier and technology continues to weave into the fabric of everyday life it is promising that a routine of regular MP may help buffer the attentional demands it creates.

The associated benefit of MP is arguably its effect on the enhanced control of one's emotions, evident in both healthy and clinical samples. Interestingly and perhaps vital information in understanding the effect of MP is understanding its differing effects between these 2 groups; while healthy samples showed the greatest effect sizes in the improvement of negative affect in the experience of distress and anxiety (Sedlmeier, 2012), while clinical samples showed the greatest effects in the reduction of anxiety and depressive symptoms (Goyal *et al*, 2014; Hudaib, 2014).

It is hoped that through this investigation, psychologists, educators, parents and individuals may consider MP as an accessible and generalised method of cognitive protection. To understand that the experience of stress and anxiety is not unavoidable but can be managed better by a simple means of time spent on the self and by a training of cognitive impulses. and understand them as relying less on the

structure of the meditation practiced, but rather on the time spent engaging in the self-reflective and mindful habits to provide protective cognitive benefits.

### **Strengths and Limitations**

Several limitations were identified in the present study. While this paper enquired as to how long participants had practiced Meditation, it was not asked how often or how long the MP occurred on average. This limits the credibility of results as variance between time spend meditating and intensity of meditation is known to directly affect the associated benefits (Jensen, Vangkilde, Frojaer & Hasselbalch, 2012).

Participants were not asked if they were regularly engaged in other cognitive interventions or relaxation techniques, so the present research fails inform us of a subjective picture of the practices of each group and to identify possible factors which may also decrease stress levels or cause increases in reappraisal. The lifestyle of participants also went unexamined, diet, drug and alcohol intake and work load as well as social factors such as level of family situation/support could indeed have a confounding effect. Moreover, an additional limitation is that all participants who had agreed to participate had access to Facebook, so the findings would not generalizable to individuals with no social media presence. It was also considered by the primary researcher that because self-report measures were used only at one point in time that daily occurrences, outside the control of a study such as this, could influence the responses to a certain extent. A limitation of the self-report method was identified; participants responses may be inaccurate due to lack of self-awareness, or indeed difficulties in conveying emotional experiences in this clinical way.

While the design of this study accomplished the objective at hand, the primary investigator identified certain aspects of the design which could be improved upon for the success of future research. Instead of asking participants to state their meditation experience in years, a likert scale may be preferred to easily group by years meditating, while limiting the grouping of the sample population, this would decrease the errors found in this space and make analysis easier -this is also assuming that a law of diminishing returns exists where the cognitive benefits of meditation experience must plateau at a certain point. While these limitations do exist, it is also true that the design lent itself well towards the goal at hand. It was not an aim to investigate whether a specific form of meditation produced a change in ER and emotions but if the broad practice and mechanism of action could alone be responsible for many of the benefits that are reported from MP. It is hoped that this paper may add to the body of work on meditation and provide a base for future research in the field. Some other strengths of the research included a substantial, international sample (n=175) which may be generalised to a larger population, the sample also included participants of varying ages and gender.

## **Conclusion**

This research paper set out to examine the effects of long-term meditation on stress and anxiety levels, as well as the ability of meditators to regulate their emotions, specifically Cognitive reappraisal. This research is made relevant by the discourse found in some previously mentioned papers and by the modern interest in self-care and meditation specifically. Results were in line with previous research

which examined many styles of meditating, both stress and anxiety scores were significantly lower than the non-meditating population and the ability to cognitively reappraise also appears to be heightened. This paper found significant results within linear regressions and independent t-tests. Interestingly, this paper suggests that for each year spent meditating a correlating reduction in the experience of stress may occur. This paper has served as an addition to findings which may be compared to papers in an international context.

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## Appendices

### Appendix 1 - Online Survey

My name is Simone Brennan and I am conducting research in the Department of Psychology that explores the possible psychological implications of meditation. This research is being conducted as part of my studies and will be submitted for examination.

You are invited to take part in this study and participation involves completing and returning the attached anonymous survey. While the survey asks some questions that might cause some minor negative feelings, it has been used widely in research. If any of the questions do raise difficult feelings for you, contact information for support services are included on the final page.

Participation is completely voluntary, and you are not obliged to take part. Participation is anonymous and confidential. Thus, responses cannot be attributed to any one participant. For this reason, it will not be possible to withdraw from participation after the questionnaire has been collected.

The questionnaires will be securely stored and data from the questionnaires will be stored on a password protected computer.

**It is important that you understand that by completing and submitting the questionnaire that you are consenting to participate in the study.**

Should you require any further information about the research, please contact

Simone Brennan, [REDACTED]

My supervisor Rosie Reis is can be contacted at [REDACTED]

**Thank you for taking the time to complete this survey.**

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## Appendix 2 - Demographic questionnaire

Please answer the following questions

Gender:

Male

Female

Other

Age in years \_\_\_\_\_

Years spent meditating (Indicate NA if you have ever meditated) \_\_\_\_\_

Type of meditation practiced (If known) \_\_\_\_\_

### Appendix 3 – Emotional regulation questionnaire

\*\*\*PLEASE NOTE IF USING A MOBILE, YOU MAY NEED TO SCROLL ACROSS TO SEE ALL AVAILABLE ANSWERS\*\*\*

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree

1. \_\_\_\_ When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.
  2. \_\_\_\_ I keep my emotions to myself.
  3. \_\_\_\_ When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.
  4. \_\_\_\_ When I am feeling positive emotions, I am careful not to express them.
- Self Report Measures for Love and Compassion Research: Personal Growth and Positive Emotions
5. \_\_\_\_ When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
  6. \_\_\_\_ I control my emotions by not expressing them.
  7. \_\_\_\_ When I want to feel more positive emotion, I change the way I'm thinking about the situation.
  8. \_\_\_\_ I control my emotions by changing the way I think about the situation I'm in.
  9. \_\_\_\_ When I am feeling negative emotions, I make sure not to express them.
  10. \_\_\_\_ When I want to feel less negative emotion, I change the way I'm thinking about the situation.

#### Appendix 4 - Perceived Stress scale

The following questions ask about your feelings and thoughts during THE PAST MONTH. In each question, you will be asked HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are small differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the exact number of times you felt a particular way, but tell me the answer that in general seems the best.

For each statement, please tell me if you have had these thoughts or feelings: never, almost never, sometimes, fairly often, or very often. (Read all answer choices each time)

	Never	Almost Never	Sometimes	Fairly Often	Very Often
B.1. In the past month, how often have you been upset because of something that happened unexpectedly?					
B.2. In the past month, how often have you felt unable to control the important things in your life?					
B.3. In the past month, how often have you felt nervous or stressed?					
B.4. In the past month, how often have you felt confident about your ability to handle personal problems?					
B.5. In the past month, how often have you felt that things were going your way?					
B.6. In the past month, how often have you found that you could not cope with all the things you had to do?					
B.7. In the past month, how often have you been able to control irritations in your life?					
B.8. In the past month, how often have you felt that you were on top of things?					
B.9. In the past month, how often have you been angry because of things that happened that were outside of your control?					
B.10. In the past month, how often have you felt that difficulties were piling up so high that you could not overcome them?					

## Appendix 5 - DASS21

### DASS21

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement

applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree or a good part of time

3 Applied to me very much or most of the time

1 (s) I found it hard to wind down 0 1 2 3

2 (a) I was aware of dryness of my mouth 0 1 2 3

3 (d) I couldn't seem to experience any positive feeling at all 0 1 2 3

4 (a) I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion) 0 1 2 3

5 (d) I found it difficult to work up the initiative to do things 0 1 2 3

6 (s) I tended to over-react to situations 0 1 2 3

7 (a) I experienced trembling (e.g. in the hands) 0 1 2 3

8 (s) I felt that I was using a lot of nervous energy 0 1 2 3

9 (a) I was worried about situations in which I might panic and make a fool of myself 0 1 2 3

10 (d) I felt that I had nothing to look forward to 0 1 2 3

11 (s) I found myself getting agitated 0 1 2 3

12 (s) I found it difficult to relax 0 1 2 3

13 (d) I felt down-hearted and blue 0 1 2 3

14 (s) I was intolerant of anything that kept me from getting on with what I

was doing 0 1 2 3

15 (a) I felt I was close to panic 0 1 2 3

16 (d) I was unable to become enthusiastic about anything 0 1 2 3

17 (d) I felt I wasn't worth much as a person 0 1 2 3

18 (s) I felt that I was rather touchy 0 1 2 3

19 (a) I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat) 0 1 2 3

20 (a) I felt scared without any good reason 0 1 2 3

21 (d) I felt that life was meaningless 0 1 2 3

## Appendix 6 - DASS21

### You are finished! But before you go...

#### Questions of research:

This study is concerned with the possible psychological benefits associated with long term meditation. Previous studies have found that meditating can affect many processes such as the ability to cope with strong emotions, attention, self-perception and more.

We expect to find that long term meditators, those practicing over 5 years will have greater levels of emotional regulation and in turn a lower score in stress and anxiety symptoms.

We are also interested in the influence of the meditation on the perception of stress in the individuals lives, how often one feels out of control or overloaded.

If you are interested in finding out more about meditation and mindfulness please contact:

Project timeline:

<http://meditateinireland.com/>

<http://tm-ireland.org/>

#### Why is this important to study?

The increase in stress and anxiety related illnesses is increasing faster than any other mental health issue around the globe. Our fast paced, technological lives move faster than our psychological processes and as a result we the psyche can become overwhelmed and experience negative effects such as stress and anxiety symptoms. The most common treatment for stress/anxiety related diagnosis is pharmaceuticals followed by counselling services. If, like some researchers have suggested that meditation and mindfulness can positively affect the experience of these symptoms then we feel it is vital to provide psychology with evidence based research. A therapy which is free, and can be done in any setting, for as little as 10 minutes could revolutionise the treatment of these conditions and benefit millions globally. The questions of how and why meditation may help these conditions are still very much open to psychological research.

In this study, you were asked to complete 3 questionnaires, the first scored your emotional regulation or your natural tendency to process and control your emotions. The second looked at your perceived levels of stress and the third tested your stress and anxiety levels. If any aspect of this study has cause you distress, or you would like to find out more information on managing stress and anxiety I would implore you to contact one of the many services available. I have listed some below.

[www.aware.ie](http://www.aware.ie)

[www.samaritans.org](http://www.samaritans.org) or free-call from Ireland on 116123

<https://www.helpguide.org/articles/stress/stress-management.htm>

#### What if I want to know more?

If you have concerns about your rights as a participant in this experiment, please contact myself, Simone Brennan on [10122247@mydbs.ie](mailto:10122247@mydbs.ie)