The Effects of Meditation on College Students in Relation to Academic Performance and Satisfaction of Participation in Higher level Education

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Abstract

The study aimed to investigate whether college students who practice meditation have higher academic performance, and satisfaction of participation in higher education, than college students who do not practice meditation at all. A cross-sectional design was employed. 156 participants partook in the research, by completing two questionnaires: The Self-Reported Academic Performance Questionnaire, and The Achievement Emotions Questionnaire. The results demonstrate that regular meditation is significantly associated with higher academic performance, and higher level of satisfaction of participation in higher level education. The regular meditative group scored significantly higher than the non-meditative group on all presented measures. These findings suggest that by engaging in regular meditation college students may significantly improve their academic performance, and experience in academic setting. College students and higher level institutions should consider the broader applications of these findings, as regular meditation may be a practical technique for college students to improve academically.

Introduction

Meditation practice is an ancient discipline which originated in India approximately 5000 BCE. The development of meditation techniques by ancient Buddhists was used for religious and spiritual traditions (Bishop, Lau, Shapiro, Carlson, Anderson, Carmody, & Devins, 2004; Black, 2011; Wallace & Benson, 1972). This discipline spread throughout the world and is currently used by modern society for health-related purposes (Bostock, Crosswell, Prather, & Steptoe, 2019; Chételat, Lutz, Arenaza-Urquijo, Collette, Klimecki, & Marchant, 2018). Meditation practice involves training the mind (Manocha, 2000). The mental state achieved by meditation allows the individual to become fully aware of the internal and external events existing in the present moment (Brown & Ryan, 2003). It involves adopting a non-judgmental attitude and openness to the experience (Bishop et al., 2004; Kabat-Zinn, 2003). This mental training aims to improve individual's health, behaviour, cognition as well as emotion regulation which may lead to major benefits in one's life (Kabat-Zinn, Lipworth, & Burney, 1985; Moore & Malinowski, 2009; Tan, Lo, & Macrae, 2014; Zeidan, Johnson, Diamond, David, & Goolkasian, 2010). Existing literature supports the idea that regular meditation practice promotes improvement in humans' health and quality of life (Chételat et al., 2018; Grossman, Niemann, Schmidt, & Walach, 2004; Tang, Posner, & Rothbart, 2014).

Health benefits of meditation were examined by scientific research and existing findings indicate an enormous amount of advantages to humankind by improving levels of well-being (Bostock et al., 2019; Galante, Galante, Bekkers, & Gallacher, 2014; Goyal et al., 2014), attention, self-regulation (Lutz, Slagter, Dunne, & Davidson, 2008; Tang, Ma, Wang, Fan, Feng, Lu, & Posner, 2007), academic performance, management of academic-related stress (Shapiro, Brown, & Astin, 2011), cognition; such as mood, verbal fluency, visual coding, and working

memory (Chiesa, Calati, & Serretti, 2011; Zeidan et al., 2010); and by reducing anxiety (Kang, Choi, & Ryu, 2009; Miller, Fletcher, & Kabat-Zinn, 1995), stress (Astin, 1997; Chiesa & Serretti, 2009; Marchand, 2012), blood pressure (Chiesa, 2009), various types of chronic pain (Chiesa & Serretti, 2011), alcohol and substance consumption (Bowen, Witkiewitz, Dillworth, Chawla, Simpson, Ostafin, & Marlatt, 2006; Tang, Tang, & Posner, 2016). The long list of benefits continuously expands by the growing interest of investigating meditation practice (Erbe & Lohrmann, 2015; Felver, Celis-de Hoyos, Tezanos, & Singh, 2016). Since the advantages of meditation are well known, researchers are now interested in how to promote meditation practice in society to resolve current societal problems (Napora, 2011; Waechter & Wekerle, 2015; Waters, 2011). Meditation practice has helped students to perform better academically, and improved their health through a variety of school based programs such as Social and Emotional Learning Program (Schonert-Reichl & Roeser, 2016), Breathing Awareness Meditation and LifeSkills Training Programs (Gregoski, Barnes, Tingen, Harshfield, & Treiber, 2011), Transcendental Meditation Program (Colbert, 2013), Maum Meditation Program (Yoo & Lee, 2013), and Mindfulness-Based Stress Reduction Program (Baer, Carmody, & Hunsinger, 2012).

Previous literature demonstrates how meditation practice enhances academic performance in students. Research conducted by Fiebert and Mead (1981) compared academic performance between meditative and non-meditative groups of students. Findings demonstrate that the meditation group scored significantly higher on examinations (Fiebert & Mead, 1981). Following these results, research conducted by Hall (1999) compared meditative and non-meditative groups. However, this time the groups were examined across the whole academic year. The results indicate that the cumulative grade point average is significantly higher for the

group of students who practiced meditation. Broader implications of these findings suggest that meditation practice can be advantageous to the education system (Hall, 1999).

Cambodia is a country facing many difficulties as a consequence of civil war. All schools had been closed between 1967 and 1975, which created a deficit of education. In 1994 Fergusson, Bonshek, and Boudigues implemented meditation practice into higher level institutions in order to help Cambodian students. The results illustrate a significant increase in educational outcomes such as intelligence, health, moral reasoning, and the overall grade point average. The findings must be considered with caution considering the extremely undeveloped nature of the Cambodia environment. However, the study provides evidence of educational benefits of meditation even in a disadvantaged country. It is strongly suggested that more research is needed to help students across the world (Fergusson et al., 1994).

The American Council of Learned Societies initiated a meditation practice program in 1997. The purpose was to promote this discipline among higher level students. The program resulted as a success among 75 universities (Sarath, 2003). Research conducted by Sarath (2003) implemented the meditation practice program into a four-year academic curriculum in the University of Michigan, School of Music. The students reported increased well-being, self-awareness, emotional regulation, as well as reduced stress and anxiety (Sarath, 2003). The Santa Clara University also integrated the meditation practice program into a counseling psychology curriculum. The program improved their therapy skills such as listening, empathy, and presence (Shapiro & Izett, 2008).

Meditation practice enhances concentration and attention which enables students to make a full use of the study time (Ramsburg & Youmans, 2014; Robinson, 2004). As Robinson explained through enhancing concentration and attention by meditation practice individuals can

fully experience the present moment, thus enter the deeper dimensions of learning including, mastery of essential academic content, solving complex problems or critical evaluation. The research conducted by Tang, Ma, Wang, Fan, Feng, Lu, and Posner (2007) reveals that even short-term meditation practice can have enormous benefits. The undergraduate student participants of the study practiced meditation for five days, where each session lasted 20 minutes. The findings demonstrate improved attention and self-regulation, as well as reduced stress, anxiety, depression, fatigue, and anger. The achieved results suggest a robust methodology, which can be replicated by future research to further investigate the benefits of meditation practice by using control and experimental methods. However, more non-experimental research is needed to simply observe the benefits of meditation in a real-life setting. The study conducted by Tang and colleagues (2007) did not measure direct brain changes. However, existing findings demonstrate that meditation has a direct impact on brain networks (Lazar, Kerr, Wasserman, Gray, Greve, Treadway, & Rauch, 2005; Vestergaard-Poulsen, Van Beek, Skewes, Bjarkam, Stubberup, Bertelsen, & Roepstorff, 2009).

Neuroscientific findings indicate that meditation modifies the structural and functional plasticity of neural networks in the brain (Fox, Nijeboer, Dixon, Floman, Ellamil, Rumak, & Christoff, 2014; Kang, Jo, Jung, Kim, Jung, Choi, & Kwon, 2012). Previous research demonstrates significant changes in the brains of individuals who practice meditation compared to the control group of individuals who do not participate in this discipline (Luders, Toga, Lepore, & Gaser, 2009; Tang, Hölzel, & Posner, 2015). The regions of the brain which undergo significant change reported by recent meta-analysis include the hippocampus (responsible for memory processes), the insula and sensory cortices (responsible for body awareness), the cingulate cortex (responsible for emotion regulation), and the prefrontal cortex (responsible for

higher level cognitive functions such as reappraisal or meta-awareness) (Boccia, Piccardi, & Guariglia, 2015; Hölzel, Ott, Hempel, Hackl, Wolf, Stark, & Vaitl, 2007; Tomasino, Fregona, Skrap, & Fabbro, 2013). A recent systematic review reveals that even eight-week meditation training may elicit the same brain responses as long-term meditation practice. The activation and connection between amygdala, hippocampus, and prefrontal cortex may illustrate a neural network activation induced by the eight-week meditation training leading to behavioural and emotional response improvement. These findings indicate that behavioural and emotional changes may be related to structural and functional changes in the brain induced by short-term meditation practice (Gotink, Meijboom, Vernooij, Smits, & Hunink, 2016).

Previous literature demonstrates that meditation practice improves academic performance in students with learning disabilities, attention deficit hyperactivity disorder, and anxiety. The findings also indicate improved social skills and attention, which reduces stress and anxiety (Beauchemin, Hutchins, & Patterson, 2008; Haydicky, Wiener, Badali, Milligan, & Ducharme, 2012). Meditation training provided to students suggests an improvement in the social, emotional, and behavioral challenges experienced by disadvantaged youth. Broader implications of these results suggest that meditation training may be provided in schools for disadvantaged students to help them improve academic performance, mental health, and well-being. However, more research is needed to identify further advantages of meditation practice, its practicalities and how to encourage the students to anticipate in this discipline (Beauchemin et al., 2008; Haydicky et al., 2012).

Further findings illustrate the benefits of meditative practice for college students by improving levels of confidence in academic achievements (Paul, Elam, & Verhulst, 2007), learning effectiveness, attention, memory (Ching, Koo, Tsai, & Chen, 2015), academic

achievement motivation (Mirkamali, Khabare, Mazari, & FarhadiAmjad, 2015), overall academic achievements (Lin & Mai, 2018) emotional intelligence (Rosaen & Benn, 2006), sociability (Rosenstreich & Margalit, 2015), life satisfaction, quality of sleep (Dvořáková, Kishida, Li, Elavsky, Broderick, Agrusti, & Greenberg, 2017), quality of life, emotional well-being, academic performance (Thomas, Grey & Kindermann, 2017), performance in cognitive tasks (Saoji, Mohanty, & Vinchurkar, 2017), mental health, and resilience to academic related stress (Galante, Dufour, Vainre, Wagner, Stochl, Benton, & Jones, 2018); and by reducing levels of self-doubt, nervousness, concentration loss (Paul et al., 2007), feelings of loneliness (Rosenstreich & Margalit, 2015), stress, anxiety (Bamber & Schneider, 2016; Ratanasiripong, Park, Ratanasiripong, & Kathalae, 2015), depression, and alcohol consumption (Dvořáková et al., 2017).

The research investigating meditation practice and its benefits on students is expanding rapidly (Fergusson et al., 1994; Fiebert & Mead, 1981; Paul et al., 2007; Rosenstreich & Margalit, 2015; Thomas et al., 2017). However, as suggested by Haydicky et al. (2012) further research is needed to investigate the advantages and practicalities of meditation practice that affect college students. There is a greater amount of research investigating meditation benefits on primary and secondary students compered to college students. Present study identifies the disproportionate findings across educational levels and aims to investigate the advantages and practicalities of meditation on college students. Fergusson et al. (1994) suggested that more research is needed in this area as meditation significantly increases students' academic performance, and mental health. Previous research demonstrates association between meditation and overall quality of life in college students (Thomas et al., 2017). However, there is a gap in investigating the impact of meditation on students' enjoyment and engagement with college

specific activities such as classroom and test-related experience – that is, the experiences of students whilst partaking in college life. Tang et al. (2007) identifies an insufficient amount of non-experimental studies conducted to observe the positive effects of meditation in college students. Non-experimental studies observe the natural world, oppose to investigating experimentally set up environment. Therefore, non-experimental studies are more ecologically valid than experimental designs (Mann, 2003). Present study aims to add to the existing findings by conducting a non-experimental research investigating the academic performance, and the level of satisfaction of participation in higher level education based on the subjective answers of college students, and their meditation engagement. As predicted by the present study college students who meditate regularly or infrequently will have higher academic performance, and the level of satisfaction of participation in higher level education, than college students who do not practice meditation at all.

Methods

Participants

Recruitment of participants was conducted via convenience sampling. This type of non-probability sampling was chosen as it is not costly or time consuming, and participants are easy to access. Individuals were recruited and were able to participate in the study via internet. Online platforms such as Facebook and Instagram were used. Participation was voluntary with no rewards received. Inclusion criteria for participation in the study included studying in higher education, and being over 18 years old. There were no exclusion criteria beyond this. Ultimately, 156 individuals took part in the research, from 162 recommended to ensure statistical power. The number of participants has been established by an online sample size calculator called

ClinClanc.com. Statistical power was determined as 0.8. All participants were college students over 18 years old, recruited in Dublin. 156 participants were divided into three groups based on their level of engagement with meditation. The college students who meditate regularly (15 males, 17 females; mean age = 26.66; age range = 19-47), infrequently (4 males, 8 females; mean age = 25.17; age range = 18-43), and do not practice meditation at all (59 males, 53 females; mean age = 22.41; age range = 18-36).

Design

The study was conducted as a quantitative research on primary sources. Non-experimental research used a cross sectional design to compare three groups of college students. A between-groups design was used. Experimenter-selected independent variable was meditation practice. Three groups of college students were differentiated by their level of engagement with meditation. College students who meditate regularly, infrequently, and do not practice meditation at all. Dependent variables were academic performance, and satisfaction of participation in higher level education. Three groups of college student were compared based on their subjective answers on academic performance, and satisfaction of participation in higher level education.

Measures

The research was conducted via internet, using self-reported instruments. The study consisted of three sections; 1) The Self-Reported Academic Performance Questionnaire, 2) The Achievement Emotions Questionnaire, and 3) The Meditation Engagement Questions.

The Self-Reported Academic Performance Questionnaire: To measure the academic performance of college students the Self-Reported Academic Performance Questionnaire (Appendix A) was used (Asawa, Sen, Bhat, Tak, Sultane, & Mandal, 2017). The questionnaire includes seven close – ended questions, which inquire about college students' subjective answers

about their academic performance. The questionnaire provided a total score by adding up all the individual scores produced by participants. The minimum possible total score was 7, and the maximum possible total score was 24. Validity and reliability of the questionnaire was confirmed by previous research (Asawa et al., 2017), as well as a strong Cronbach's Alpha of 0.70.

The Achievement Emotions Questionnaire: To measure college students' level of satisfaction of participation in higher level education The Achievement Emotions Questionnaire (Appendix B) was used (Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011). The instrument measures various achievement emotions by students in academic settings. The questionnaire is organised into three sections assessing class related, learning related, and test related emotions. The class related emotion was rated by participants on how they felt in regard to class related enjoyment, hope, pride, anger, anxiety, shame, hopelessness, and boredom. The learning related emotion was rated by participants in regard to studying in terms of the same eight emotions. The test related emotion was rated by participants on how they felt in regard to test related enjoyment, hope, pride, relief, anger, anxiety, shame, and hopelessness. A 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = moderate; 4 = agree; 5 = strongly agree) was used to record item responses. Within each section the items were organised in three blocks assessing emotional experiences before, during, and after an encounter with the addressed academic setting (Pekrun, 2006). The questionnaire provided a total score by adding up all the individual scores produced by participants. The minimum possible score was 24, and the maximum possible score was 120. Validity and reliability of the questionnaire was confirmed by previous research (Pekrun et al., 2011), as well as a strong Cronbach's Alpha of 0.70.

The Meditation Engagement Questions: The meditation practice section included two close – ended questions (Appendix C). The first question inquires if students practice meditation

or not. If students engage in meditation the second question inquires how often (more than three times a week; once or twice a week; less than once a week). This section was used to establish which group an individual belongs to. Three groups differentiated by the level of engagement with meditation practice; college students who meditate regularly, infrequently, and do not practice meditation at all. Individuals who engaged in meditation practice more than three times a week, and once or twice a week were categorized into a regular meditation group. Individuals who engaged in meditation less than once a week were categorised into infrequent meditation group. Individuals who didn't engage in meditation were categorised into a group which does not practice meditation at all.

Procedure

The study was approved by the Ethics Committee, National College of Ireland. Study information (Appendix D) was provided, and informed consent (Appendix E) was required, via internet, before individuals participated in the study. Data was collected anonymously, and stored confidentially. All procedures were conducted in an ethical manner according to the PSI Ethical Guidelines for Research in Psychology, and the NCI Ethical Guidelines for Research with Human Participants.

Data set was collected via an online survey. Participants were required to provide demographic variables such as age and gender. Upon completion of demographic information, participants were instructed to complete two questionnaires.

The Self-Reported Academic Performance Questionnaire (Appendix A) was completed by participants to report their subjective answers of their academic performance (Asawa et al., 2017). Participants were instructed to answer the questions in relation to their last college experience.

The Achievement Emotions Questionnaire (Appendix B) was completed by participants to report their subjective answers regarding their level of satisfaction of participation in higher level education (Pekrun et al., 2011). Participants were instructed to answer the questions in relation to their last experience in college, and rate each emotion accordingly to how they felt.

Upon completion of the questionnaires, participants were asked to complete meditation practice section (Appendix C). This section was not mentioned at the beginning, as to avoid the risk of bias. Detailed explanation of why deception was used was provided to participants (Appendix F). Before submission of the answers debriefing information (Appendix G) was provided, including appreciation of participation in the research, brief description of the study, and contact details.

Results

Descriptive Statistics

Categorical variables used in the study were age and gender. Please see Table 1 for descriptive statistics of these variables.

Table 1: Descriptive statistics for all categorical variables

Variable	N	Frequencies (M/F)	Minimum	Maximum	Mean	Std. Deviation
Gender	156	78/78	4	5	4.5	.502
Age	156		18	47	23.49	4.97

Continuous variables used in the study were 1) academic performance and 2) achievement emotions. Please see Table 2 for descriptive statistics of these variables. Each variable is further broken down according to meditation frequency.

Table 2: Descriptive statistics for all continuous variables

Scale	Group	N	Minimum	Maximum	Mean	SD
Academic Performance	Regular Meditation	32	9	24	18.84	2.001
	Infrequent Meditation	12	12	22	17.83	2.5
	No Meditation	112	16	23	16.59	2.9
	Total	156	9	24	17.15	2.85
Achievement Emotions	Regular Meditation	32	207	360	279.19	39.57
	Infrequent Meditation	12	222	336	274.33	38.42
	No Meditation	112	157	347	250.85	37.21
	Total	156	157	360	258.47	39.5

Inferential Statistics

Self-Reported Academic Performance Questionnaire: A one-way between groups ANOVA was conducted to determine whether or not there is an association between level of engagement with meditation practice and academic performance. Participants were divided into three groups according to their level of engagement in meditation (college students who meditate regularly; meditate infrequently; and do not meditate at all).

Results demonstrate a statistically significant difference in level of academic performance depending on meditation frequency group F (2, 15) = 9.002, p = .001 (see table 3). The effect size indicated a medium difference in academic performance scores (eta squared = .11).

Post-hoc comparisons using the Tukey HSD test indicated that the mean score for college student who meditate regularly (M = 18.84, SD = 2.01) was significantly higher (p = .001) than college student who do not mediate at all (M = 16.59, SD = 2.90). There was no statistically significant difference (p = .52) in mean scores between college student who meditate regularly and infrequently (M = 17.83, SD = 2.5). There was also no statistically significant difference (p = .29) in mean scores between college students who meditate infrequently and do not meditate at all. See table 4 for post hoc comparison test for each group, and see figure 1 for a mean score of each group based on the self-reported academic performance questionnaire.

Achievement Emotions Questionnaire: A one-way between groups ANOVA was conducted to determine whether or not there is an association between level of engagement with meditation practice and satisfaction of participation in higher level education. Participants were divided into three groups according to their level of engagement in meditation (college students who meditate regularly; meditate infrequently; and do not meditate at all).

Results demonstrate a statistically significant difference in level of satisfaction of participation in higher level education depending on meditation frequency group F (2, 15) = 8.14, p = .001 (see table 3). The effect size indicated a medium difference in achievement emotions scores (eta squared = .10).

Post-hoc comparisons using the Tukey HSD test indicated that the mean score for college student who meditate regularly (M = 279.19, SD = 39.57) was significantly higher (p = .001) than college student who do not mediate at all (M = 250.85, SD = 37.21). There was no

statistically significant difference (p = .92) in mean scores between college student who meditate regularly and infrequently (M = 274.33, SD = 38.42). There was also no statistically significant difference (p = .11) in mean scores between college students who meditate infrequently and do not meditate at all. See table 5 for post hoc comparison test for each group, and see figure 2 for a mean score of each group based on the achievement emotions questionnaire.

Table 3: Inferential statistics for all continuous variables – One way between groups ANOVA

Scale	Mean	SD	F	p
Self-Reported Academic Performance Questionnaire	17.15	2.85	9.002	.001*
Achievement Emotions Questionnaire	258.47	39.5	8.14	.001*

Note: *p<.001 statistically significant.

Table 4: Post hoc comparison tests - Self-reported academic performance questionnaire – Statistical significance between each group

Groups	Regular Meditation	Infrequent Meditation	No Meditation
Regular Meditation		.52	.001*
Infrequent Meditation	.52		.29
No Meditation	.001*	.29	

Note: *p<.001 statistically significant.

Table 5: Post hoc comparison tests – Achievement emotions questionnaire – Statistical significance between each group

Groups	Regular Meditation	Infrequent Meditation	No Meditation
Regular Meditation		.92	.001*
Infrequent Meditation	.92		.11
No Meditation	.001*	.11	

Note: *p<.001 statistically significant.

Figure 1: Mean score for each group based on the self-reported academic performance questionnaire

Figure 2: Mean score for each group based on the achievement emotions questionnaire

Discussion

The present study investigated whether college students who practice meditation achieve higher academic performance, and higher level of satisfaction of participation in higher level education, than college students who do not practice meditation. College students were divided into three separate groups representative of their meditation engagement (regular, infrequent, and non-meditative). Based on the subjective answers of college students, findings of the research demonstrate that regular meditation is significantly associated with higher academic performance, and higher level of satisfaction of participation in higher level education. Regular meditators scored significantly higher than non-meditators on all presented measures. Furthermore, academic performance and achievement emotions measures were both of moderate

to high effect size. This indicates a large difference in scores between the regular meditative group, and non-meditative group.

Further findings demonstrate no significant difference between regular meditative group and infrequent meditative group, as well as no significant difference between infrequent meditative group and non-meditative group in academic performance, and satisfaction of participation in higher level education. The findings indicate that regular engagement in meditation practice may be necessary to achieve significantly higher academic performance, and satisfaction of participation in higher level education. However, regular meditative group scored higher than infrequent meditative group, and infrequent meditative group scored higher than non-meditative group, the findings had non-significant value.

The findings of the present study imply that regular meditation helps college students achieve higher academic performance. This means that by engaging in regular meditation practice college students can increase their overall performance in the academic setting. This finding is consistent with previous literature. As previous research demonstrates regular meditation is associated with improved academic performance (Fiebert et al., 1981; Pong, 2017; Thomas et al., 2017), in-class learning efficiency (Lin & Mai, 2018), grade point average (Carsello & Creaser, 1978; Hall, 1999), academic discipline (Bush, 2011), learning ability (Fergusson et al., 1994), attention, informational processing (Shapiro et al., 2011), and cognitive engagement in academic setting (Napora, 2013). The vast amount of research in line with the present findings illustrate enormous benefits of regular meditation practice on college students which enhances academic performance.

Additionally, previous literature illustrates that meditation practice is an effective way to relax. Previous findings demonstrate that meditation induces a hypometabolic state of body, and

a tranquil but alert state of mind (Jevning, Wallace, & Beidebach, 1992). Rutishauser, Ross, Mamelak, and Schuman (2010) study suggests that a relaxed state of mind may facilitate greater opportunities for learning. Based on the electroencephalogram (EEG) electrodes to record the electrical activity in the brain, the researchers of the 2010 study found that participants' learning, and memory recall was higher when in a relaxed state of mind. These research findings are consistent with the results of the present study, which imply that meditation enables college students to achieve a relaxed state of mind, which increases their academic performance.

Furthermore, the findings of the present study imply that regular meditation practice increases the level of satisfaction of participation in higher education. This means that a regular engagement with meditation can improve college students' emotional response towards being in an academic institute. This finding suggests that college students who meditate regularly are significantly happier to be in an academic setting. The Emotional Achievements Questionnaire measured college students' emotions in three different academic settings. These included emotions related to being in class, studying for college outside class, and tests. Each of these was further broken down relating to an emotion before, during, and after the encounter, giving a total of nine subscales. The results show that regular meditative group scored significantly higher than infrequent and non-meditative group on each of these subscales. These findings indicate how regular meditation practice may enhance academic experience by increasing the emotional attitude towards academic settings. Consistent with previous literature which also demonstrates that regular meditation among college students increased well-being (Carmody & Baer, 2008; Galante et al., 2014), mental stability (Fergusson et al., 1994), happiness, positivity, personal satisfaction, and self-confidence (Prasad, Varrey, & Sisti, 2016). Previous findings also suggest that well-being of college students improve their academic performance (Pong, 2017). This

finding is highly related to the results of the present study; As by regular meditation college students may achieve improved satisfaction of academic experience, and academic performance. However, Pong (2017) study indicates that improved well-being increases academic performance, suggesting that a higher level of satisfaction of participation in higher education may additionally increase academic performance.

The findings of the present study are important because they provide initial support for regular meditation practice which may enhance the academic performance and experience of college students in higher education. While these findings are well established by previous literature, this is the first study to investigate the association between regular meditation practice with the students' enjoyment and engagement with college specific activities such as classroom and test-related experience – that is, the experiences of students whilst partaking in college life. Previous literature mainly focused on the well-being (Galante et al., 2014), and the quality of life of college students (Thomas et al., 2017). However, the present study aimed to further investigate the well-being of college students specific to the academic related experiences. Furthermore, the findings of the present study highlight the importance of regular meditation practice. Infrequent meditation does not provide significant improvements in college students' academic performance, and satisfaction of participation in higher education. This finding is consistent with previous literature which demonstrates that regular meditation significantly improves work performance compared to the infrequent meditation (Petchsawang, & Duchon, 2012). However, the present study illustrates this finding relatively to college students within the academic setting.

Considering broader implications of these findings, it may be beneficial to include meditation practice to the educational system. Results of the present study, in line with previous

literature, illustrate how college students can significantly increase their academic performance, and the level of satisfaction of participation in higher education. By increasing these two factors college students may find themselves in greater odds of achieving higher academic results. The findings of the present study support Astin (1984) theory of student involvement. The theory has been developed on longitudinal research (Astin, 1975), which imply its reliability. According to Astin (1984) theory, greater physical, and psychological involvement into academic experience can lead to greater learning achievements. The main focus of the theory includes students' active participation, and the impact of the institution. This suggests that a combination of higher academic performance, and higher level of satisfaction of educational environment contributes to higher education achievements.

Meditation practice has been examined by many researchers throughout the years to demonstrate improvements in college students' quality of life and well-being, leading to increased academic achievements and performance (Fergusson et al., 1994; Thomas et al., 2017). Practical implications of the present study findings, consistent with previous research, imply that meditation practice may be beneficial to include into higher level education curriculum. Previous literature demonstrates how introduction of meditation practice into courses in higher education increased academic performance, motivation, and well-being of college students (Bush, 2011). Meditation practice program has been initiated by the American Council of Learned Societies (1997) among 75 universities (Sarath, 2003). For example, the University of Michigan, School of Music students reported increased well-being, and self-awareness; Also, the Santa Clara University students reported improved academic performance (Shapiro & Izett, 2008). The success of the meditation practice program suggests practical benefits of meditation in college students. Meditation practice has an increasing effect on health promotion in academic settings

(Holland, 2006). Integrating meditation into higher education can significantly enhance college students' academic performance and experience, leading to greater achievements.

The recommendations for future research include integrating meditation practice into higher educational settings to investigate whether college students improve their academic achievements when participating in regular meditation, and to investigate their willingness to attend to the meditation practices. Integrating meditation into higher educational curriculum may help college students create time for regular meditation and encourage by the involvement of their peers. Previous research highlighted the significance of peer groups in academic development (Tierney & Colyar, 2005). Peer connections are an important source of social support (Azmitia & Cooper, 2001). Future research may investigate if the meditation frequency increases among college students when introduced in the educational curriculum, and whether peer support has a positive effect on the engagement with meditation practice in the academic setting. However, integration of meditation practice into educational curriculum should not be reserved for higher education. Such curriculum may also be beneficial across different educational settings including primary and secondary schools. Future research should also investigate whether these suggestions and future findings apply across all educational platforms.

Future research should consider replicating the present study with a larger sample size of college students so as to increase statistical power. Given that the present study was a dissertation research for a final year psychology course, there was insufficient time to acquire the necessary number of participants. To ensure the statistical power of 0.8 there should be 162 participants in the study, but only 156 participants actually partook in the research. As such the present study was underpowered by 6 participants. It might thus be useful for future studies to consider engaging larger sample size of college students as to achieve more reliable results.

Additionally, all participants were recruited in Dublin City. Future research should consider to replicate the present study to recruit participants from various cities and countries. External validity is important in research as it determines the generalization of the findings from a sample population to a larger population. The larger and wider recruited sample population provides more generalizable findings (Lucas, 2003). Further limitations include the use of cross-sectional design. As, this type of design observes the participants at a single point in time, which does not provide the direction of causality as a temporal sequence cannot be determined. Cross-sectional design can be affected by various types of biases. These include a response bias, which indicates that participants may respond untruthfully or inaccurately to a survey questions; a recall bias, which suggests that participants may have difficulties with accuracy or completeness of the past memories that can automatically influence their survey responses; and a social desirability bias, which refers to a tendency of responding to a survey in a manner that would be considered favorably by others (Levin, 2006). Despite the limitations of cross-sectional design, it was considered appropriate for this study due to it being neither costly nor time consuming. However, future research should consider replicating this study as a longitudinal design. This would allow observation of participants across different points in time, which enables the observation of individual differences, the inferral of causality, and the ability to determine variable patterns over time, ensuring validity (Busato, Prins, Elshout, & Hamaker, 1998; Wunsch, Russo, & Mouchart, 2010).

Furthermore, the limitations of the present study include the use of a survey which is a self-reported instrument. While self-reported measures provided valuable insight into research on meditation (Lemay, Hoolahan, & Buchanan, 2019; Oman, Shapiro, Thoresen, Plante, & Flinders, 2008; Paul et al., 2007), these measures may be prone to bias, social desirability effects, or

experimenter demand (Fisher & Katz, 2000). Thus, making it more difficult to examine the true effects and the underlying mechanisms. However, despite the fact that the present study relied on self-reported measures; Strong Cronbach's Alpha of 0.70 has been identified for both measures. Also, these surveys have been scientifically developed, and used in multiple research articles (Asawa et al., 2007; Pekrun, 2006; Pekrun et al., 2011), making them significantly valid and reliable instruments. Survey research is a type of descriptive research, which enables an in-depth analysis of the investigated topic. The high level of detail provided by descriptive research is exceptionally valuable (Grimes, & Schulz, 2002; Walker, 2005). Additionally, non-experimental research provides benefits of investigating and observing the natural environment; there is none or minimal attempt to manipulate variables of interest in the study (Johnson, 2001). Whereas, experimental studies may interfere with the normal response and function of participants by the application of treatment or experimentation (Walker, 2005). Despite the benefits of non-experimental research, there is an insufficient amount of observing the real-world effects of meditation in college students (Tang et al., 2007). The present study identified this, and therefore conducted non-experimental research to observe the effects of meditation on college students' academic performance, and satisfaction of participation in higher education. However, future research should consider conducting more non-experimental studies, so as to observe the effects that regular meditation may have on college students.

Conclusion

The findings of the present study highlight the importance of regular meditation practice. As implied by the present study infrequent meditation practice does not provide significant results for college students' academic performance, and satisfaction of participation in higher education. Therefore, regular meditation should be emphasised across educational platforms. As

by engaging in regular meditation college students can significantly improve their academic performance, and experience within the academic setting. Higher level institutions should consider the practical applications of these findings in order to engage college students in regular meditation. It is suggested by the present study, and previous literature that higher educational platforms engage in an application of scientifically investigated ways to improve students' academic performance, and experience within the academic setting, which can ultimately lead to improved academic achievements (Sarath, 2003; Shapiro & Izett, 2008). These findings may be recognized as a practical technique or discipline for college students to improve academically.

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Appendices

Appendix A

Self-Reported Academic Performance Questionnaire

▪ Please answer the questions in relation to your last college experience.	
Self-Assessment as a Student	
1. Excellent	
2. Good	
3. Fair	
4. Poor	
Academic Performance	
1. Excellent	
2. Good	
3. Fair	
4. Poor	
Attentiveness in Lecture	
1. Excellent	
2. Good	
3. Fair	
4. Poor	
Energetic Feeling While Doing College Work	
1. No, never	
2. Yes, sometimes	
3. Yes, frequently	
Anxious Feeling in Everyday Life	
1. No, never	
2. Yes, sometimes	
3. Yes, frequently	
Stressed Feeling in Everyday Life	
1. No, never	
2. Yes, sometimes	
3. Yes, frequently	
Depressed Feeling in Everyday Life	
1. No, never	
2. Yes, sometimes	
3. Yes, frequently	

Appendix B

Achievement Emotions Questionnaire

This section of the questionnaire will require you to rate your emotions in relation to how you felt before the class has started, during the class, and after the class has finished. Please think of your last class experience in college and rate each emotion accordingly to how you felt.

Class Related Emotions	**Before**					**During**					**After**				
1. Enjoyment	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
2. Hope	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
3. Pride	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4. Anger	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
5. Anxiety	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6. Shame	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
7. Hopelessness	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
8. Boredom	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

This section of the questionnaire will require you to rate your emotions in relation to how you felt before you have started studying, during studying and after you have finished studying. Please think of your last experience when you were studying (outside of classroom) and rate each emotion accordingly to how you felt.

Learning Related Emotions	**Before**					**During**					**After**				
1. Enjoyment	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
2. Hope	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
3. Pride	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4. Anger	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
5. Anxiety	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6. Shame	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
7. Hopelessness	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
8. Boredom	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

This section of the questionnaire will require you to rate your emotions in relation to how you felt before the exam has started, during the exam, and after the exam has finished. Please think of your last exam experience in college, and rate each emotion accordingly to how you felt.

Test Emotions	**Before**					**During**					**After**				
1. Enjoyment	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
2. Hope	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
3. Pride	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4. Relief	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
5. Anger	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6. Anxiety	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
7. Shame	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
8. Hopelessness	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Note: 1 = Strongly Disagree; 2 = Disagree; 3 = Moderate; 4 = Agree; 5 = Strongly Agree

Appendix C

Meditation Practice Questions

The last section of the questionnaire was not mentioned at the beginning, as to avoid the risk of bias. Which means that I did not want you to feel influenced and to affect the reliability of your answers. It is important that you responded to the previous questions without thinking that you may have answer them differently based on the fact if you practice meditation or not. I wanted to avoid influencing your responses based on the meditation component of the questionnaire. This is why I did not mention the meditation practice questions at the beginning.

If you do not understand or seek further clarification, please use the contact details below.

Researcher: Paulina Ziolkowska

Email: x17425102@student.ncirl.ie

Supervisor: April Hargreaves

Email: april.hargreaves@ncirl.ie

**Please answer the questions in relation to the last year.

Do you practice meditation?

- Yes
- No

How often do you practice meditation?

- More than three times a week
- Once or twice a week
- Less than once a week

Appendix D

Study Information

Academic Performance & Satisfaction of Participation in Higher level Education by College Students

Participation Information

You are being invited to take part in a research study conducted by Paulina Ziolkowska as a final year psychology undergraduate project. Please take the time to read the information below before deciding whether to take part.

What is the study about?

The aim of the study is to investigate the level of satisfaction of participation in higher level education and the academic performance based on the subjective answers of college students.

Who Can Participate?

Participants taking part in the study must be over 18 years old, college students.

What Does Taking Part Involve?

Recruited participants will be asked to complete two questionnaires. It should take approximately 5 minutes to complete all sections. However, there will be no time limit, participants can take as much time as needed. Submitted answers will be saved and compared to provide results relating to the research question.

Do you have to partake?

Participation in the study is voluntary. You have a right to withdraw at any time during the study without any consequences. Simply withdraw from the study by pressing the exit button on the right-hand corner. Please note you will be unable to withdraw your data from

the study after submitting the answers, as collection of data is anonymous. Individual responses cannot be identified.

Will taking part be confidential?

Participation in the study is anonymous. You will not be asked to provide your name, and IP address will not be stored. Questionnaire responses will be unidentifiable and confidential. Data set will be stored securely in a password protected computer. Only the researcher and their supervisor will have access to the data. Data set will be stored for secondary analysis.

What are the possible risks or benefits of taking part?

There is a minor possible risk that some questions may cause negative self-evaluation or distress. If you experience this at any time during the study you can exit the questionnaire. If the symptoms continue you can contact the researcher, their supervisor or support services (provided in the contact information section) for further support and help.

The benefits of taking part include contribution to the knowledge regarding college students. The results of the study may find a possibility to increase the level of satisfaction of participation into a higher level institution, as well as the academic performance.

What will happen to the results of the study?

The results of the study will be used as part of my final year undergraduate project, submitted through National College of Ireland. The final year project may be publicized and presented at a congress.

Contact Information

Please do not hesitate to contact if you do not understand any part of the information sheet, you would like to know any further information or you need additional help.

Researcher: Paulina Ziolkowska

Email: x17425102@student.ncirl.ie

Supervisor: April Hargreaves

Email: april.hargreaves@ncirl.ie

Helplines:

Samaritans: 116 123

Niteline: 1800 793 793

Appendix E

Informed Consent

Please tick the box below to confirm:

You are over 18 years old college student.

You agree to take part voluntarily.

You read and understood the information sheet.

*

☐ I agree

Appendix F

Debriefing Information

Thank you for taking the time to participate in the study. You can now submit your responses. Please note you will not be able to withdraw after the submission as data collected is anonymous. Data set collected will be used to investigate if there is a difference in academic performance and the level of satisfaction of participation in higher level education, between college students who meditate and college students who do not practice meditation.

Please do not hesitate to contact if you have any questions or you feel you have been negatively affected by the questionnaire, as we are here to help. You can contact the researcher, the supervisor or additional freephone helplines using the contact details below:

Researcher: Paulina Ziolkowska

Email: x17425102@student.ncirl.ie

Supervisor: April Hargreaves

Email: april.hargreaves@ncirl.ie

Helplines:

Samaritans: 116 123

Niteline: 1800 793 793