

The effects of mindfulness on high school students' vocabulary acquisition

by

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In Tarragona, June 6, 2021.

PLACE

MONTH

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Abstract

The use of mindfulness in school curriculums is a relatively new concept. Techniques to calm the mind and body can reduce the adverse effects of stress and increase students' ability to stay engaged, helping them stay on track academically and avoid behaviour problems. Most of the current research around this topic has been done through long-term studies using the eight-week Mindfulness-Based Stress Reduction Programme (MBSR) or MBI (Mindfulness-Based Intervention). This study focuses on how a short mindfulness exercise may affect high school students' vocabulary acquisition. After the mindfulness exercise, the students received a questionnaire about their experience. Furthermore, this study suggests some ways of implementing mindfulness in schools according to the available literature.

I completed my practicum at the Lestonnac High School in Tarragona with students aged 16-17 years old (61 students in total). For my experiment, I worked with two classes of the first of bachillerato. One class was the control group, and the other one the experimental group. Both classes did two vocabulary tests, and a short mindfulness exercise preceded them for the experimental group. The results of the second vocabulary test were statistically significant $P(T \leq t) \text{ two-tail} = 0.029288555$. The use of mindfulness increased students' rate of vocabulary acquisition.

Introduction, statement of research questions, and hypotheses

Mindfulness is the habitual process of training your mind to focus. The popularity of mindfulness is increasing as more people discover its many health benefits. Mindfulness has gained recognition not only with the general public but also in educational settings. This interest is based on the growing body of research documenting the benefits of mindfulness practices such as emotion regulation, improving attention, relieving distress, and cultivating well-being in both the general and clinical populations (Schonert-Reichl & Roeser, 2016, 4). Could mindfulness help students achieve the same positive outcomes, help them achieve better academic results, and improve their wellbeing? The present study focuses on the effects of mindfulness on high school students' vocabulary acquisition (academic results), on students' mental approach to acquiring new vocabulary, and reducing stress levels (wellbeing).

The first research question queries the effects of mindfulness on high school students' vocabulary acquisition. The first hypothesis states that the use of mindfulness will increase students' rate of vocabulary acquisition.

Secondly, the present study focuses on the effects of mindfulness on high school students' mental approach to acquiring new vocabulary and stress levels. The second hypothesis states that the use of mindfulness will help students feel calmer, concentrate better on learning new vocabulary and help reduce their stress levels.

The final part of this study suggests ways of implementing mindfulness into more schools according to the available literature. Moreover, it suggests two mindfulness programs that have been designed specifically for adolescents. Due to the limited scope and possibilities to conduct the experiment with more classes, this study was done with a limited sample of students (two first of bachillerato classes – 29 students in class A – experimental group and 32 students in class B – control group). The decision to choose a short experiment was taken

to avoid disturbing the regular classes because students had to cover many different topics to prepare for their exams.

Justification/Background/Objectives

There is no doubt that mindfulness has become increasingly popular in the past decade, both in the popular press and in the psychotherapy literature. This Buddhist concept founded about 2,600 years ago has reached the spotlight in mainstream psychotherapy today. While Buddhism is undoubtedly the original home of mindfulness, the early Desert Fathers of Christianity and Christian mystics such as St. Teresa of Avila emphasized mindful reflection as a way of communing with God. The attentional aspect of mindfulness developed in contemplative traditions goes by many names: *recollection* in Christianity, *zikr* in Islam, *Kavanah* in Judaism, and *samadhi* in Buddhism and Hinduism. Probably the most famous and frequently used definition of mindfulness is by John Kabat-Zinn:

“Mindfulness is the awareness that arises from paying attention, on purpose, in the present moment and non-judgmentally.” (Kabat-Zinn 1994, 4)

By focusing on the breath, the idea is to cultivate attention on the body and mind as it is, moment to moment, and help with pain, both physical and emotional. As described by David&Hayes (2012), mindfulness may bring us many benefits such as improved self-control, objectivity, tolerance, concentration, and mental clarity. The research on mindfulness has shown other services such as reduced rumination (Chambers et al., 2008), stress reduction, boosts to working memory (Jha et al. 2010), or improved focus (Moore&Malinowski, 2009).

Being mindfully present may be contrasted with:

...consciousness that is blunted or restricted in various ways. For example, rumination, absorption in the past, or fantasies and anxieties about the future. Mindfulness is also compromised when individuals behave compulsively or automatically, without awareness or attention to one's behavior.” (Brown and Ryan 2003, 823)

Most people experience challenges to find space for some peaceful and quiet time every day in their hectic lives. Mindfulness may provide people with many benefits, such as enhancing their ability to deal with everyday struggles, illness, stress, decreased depressive symptoms, or improve general health. Furthermore, mindfulness may help better brain functioning, increased immune function, increased attention and focus, increased awareness, lowered heart rate, decreased blood pressure, or an experience of being connected (Ackerman, 2020). The best part about a mindfulness practice is that it is free; gaining all the benefits can be as simple as closing one's eyes and being silent for a few minutes a day. One way to practice mindfulness is through meditation: sitting in a comfortable and upright posture, paying attention to the breath, noticing sensations in the body, and observing thoughts and emotions that may naturally rise to consciousness. But it may also be practiced through a body scan or engaging in mindful movements such as yoga, walking, or cooking. Different attitudes are related to mindfulness, such as being non-judgmental and allowing for self-compassion and the so-called beginner's mind. Absence of judgment refers to cultivating an impartial observation of internal and external experiences, without labeling thoughts, feelings, or sensations as good or bad, right or wrong, fair or unfair, and simply taking note of thoughts, feelings, or sensations in each moment. Self-compassion means cultivating love for oneself without self-blame or criticism. A beginners' mind intends to see things as new, as if for the first time, with a sense of fascination and curiosity (Mandolini, 2020).

Mindfulness, the ability to maintain one's attention in the present moment, has long been theoretically associated with success in higher education. Today, adolescents face an unprecedented amount of stress and anxiety – 25% of 13- to 18-year-old will experience an anxiety disorder, according to the Institutes of Mental Health (McCarthy, 2019).

Furthermore, between 2007 and 2012, anxiety disorders in adolescents went up by 20%, and admissions to the hospital for suicidal teenagers have doubled during the past decade (McCarthy, 2019). These statistics are alarming; bringing mindfulness into the classroom can reduce stress and anxiety, increased focus and self-regulation, and improved academic performance and sleep. Many students have problems with being present and keeping their attention on what is being taught. It is essential to teach them social-emotional skills.

Mindfulness activities are a simple, enjoyable way for everyone, from young children to older students, to learn these skills. Mindfulness is proven to transform our brains in a way that leads to better grades and coping skills (Waterford.org., 2019). The benefits of mindfulness extend to teachers, too. Teachers often feel overwhelmed and stressed; by practicing mindfulness, teachers can learn emotional regulation techniques that change how they view their jobs and interact with their students. Both their psychological health and classroom environment may improve by practicing mindfulness.

In terms of the curriculum, mindfulness is a part of social-emotional learning (SEL). Most schools focus only on academic instruction, but social-emotional development is also significant for students' success. There are many possibilities for implementing mindfulness into a classroom, such as mindfulness through breath, mindfulness through sensory experiences, mindfulness through guided imagery, or mindfulness through movement (Shardlow, 2015). Teachers know that children learn best when they feel comfortable, relaxed, and safe. A short mindfulness exercise may be included when the teacher notices that their students are not focused; they may incorporate it at the beginning of a class or between

two activities. Mindfulness sessions can be organized on a daily or weekly basis by different teachers. Variety in the exercises, along with varying lengths, can stop students from getting bored.

The present study focuses on the effects of a simple mindfulness exercise on high school students' vocabulary acquisition. The main objective of this study is to examine a link between mindfulness and its impact on vocabulary acquisition. It will also focus on the psychological effects of mindfulness on students and indicate possible ways of implementing mindfulness in more schools.

Literature review

Mindfulness and meditation psychological studies began in the 1950s and 1960s (Das, N. N., & Gastaut, H., 1955), (Bagchi, B. K., & Wenger, M. A., 1957) and (Anand, B. K., Chhina, G. S., & Singh, B., 1961). The first clinical studies were done by Benson et al. in the 1970s. Two synergistic lines of advancement have mainly driven the enormous progress in the field since the first studies. The first of these is the convergence of meditation research with the explosive growth of fundamental neuroscience in recent years. The second is the emergence of mindfulness meditation as the dominant paradigm for clinical research and application in the field (Loizzo, J., 2014). Meditation shares a common mechanism with psychotherapy and hypnosis; a critical study by Lutz et al. (2004) helped confirm a link between meditation and the most significant paradigm shift in modern neuroscience. The study showed that Tibetan-trained expert meditators could consciously induce electroencephalography (EEG) findings. These findings indicate increased learning and neural plasticity. According to Lutz's colleague Richard Davidson, this marked a turning point for meditation research, a landmark on the way to the new field he called "contemplative neuroscience." This finding reframed

meditation as a missing link in conscious self-regulation, connecting mental training on the one hand to the electrochemical processes of neuronal firing, epigenetic regulation of gene transcription, and new neural connectivity on the other.

William James (1890) was the first one who suggested that mindfulness may be beneficial to students. He wrote that: “The faculty of voluntarily bringing back a wandering attention, over and over again, is the very root of judgment, character, and will. An education which should improve this faculty would be the education par excellence.” (James 1890, p. 424) His books that influenced education the most were - 'Principles of Psychology,' 'Brief Course,' and 'Talks to Teachers.' James established fundamental educational theories such as introspection on a scientific basis and applied the spirit and psychology methods in teaching. Knowledge of psychology aids teachers in numerous ways. The mind-body interaction is one of the most critical presuppositions underlying James' educational psychology. He focused on the native resources of the child and how they could be incorporated into education (Baldwin, 1911).

One hundred years later, the concept of mindfulness was manualized for western audiences in a standardized eight-week program titled Mindfulness-Based Stress Reduction (MBSR). In the 1980s (Kabat-Zinn 1982), Mindfulness-Based Interventions (MBIs) have been widely in use for a variety of clinical and non-clinical purposes and have been associated with medium effect sizes for many psychological and physical symptoms, including stress, depression, anxiety, wellbeing, emotion regulation, and interpersonal behavior, with benefits extending to children and adolescents as well. MBSR uses a combination of mindfulness meditation, body awareness, yoga, and exploration of patterns of behavior, thinking, feeling, and action.

Professor emeritus Jon Kabat-Zinn, founder and former director of the Stress Reduction Clinic at the University of Massachusetts Medical Center, and the MBSR (Mindfulness-Based Stress Reduction) helped bring the practice of mindfulness and meditation into mainstream medicine. He demonstrated that practicing mindfulness can improve physical and

psychological symptoms and positive changes in health, attitudes, and behaviors. While MBSR has its roots in spiritual teachings, the program itself is secular. The MBSR program is described in detail in Kabat-Zinn's 1990 book *Full Catastrophe Living*. During the program, participants are asked to focus on informal practice and incorporate mindfulness into their daily routines. Focusing on the present is thought to heighten sensitivity to the environment and one's reactions to it, consequently enhancing self-management and coping. Mindfulness also provides an outlet from ruminating on the past or worrying about the future, and it breaks the cycle of these maladaptive cognitive processes.

The very first exercise in an eight-week Mindfulness-Based Stress Reduction (MBSR) course is to eat a raisin but to eat it as if you had never eaten a raisin before, your attention wholly absorbed in the activity from moment to moment: first looking at it, then turning it over in your fingers, smelling it, feeling it in your mouth, biting into it, tasting the flavor as it is released, chewing, feeling the impulse to swallow (Kabat-Zinn 1994, 27-29). Never has a little desiccated grape been such an experience! But we don't usually eat like this. Indeed, most of us are very rarely 'present' to what we do, as Kabat-Zinn explains:

...we may eat without really tasting, see without really seeing, hear without really hearing, touch without really feeling, and talk without really knowing what we are saying. (Kabat-Zinn 1994, 24)

Nowadays, researchers are making advances in providing helpful directions on using meditation and mindfulness exercises in classrooms. Mindfulness is originally a Buddhist practice and part of a more extensive spiritual and philosophical belief system. In western contexts, it may be best described as a meditation practice and an attitude that encourages individuals to deliberately pay attention to the present moment without judgment (Schmidt 2011). In the last two decades, research and discussions that suggest mindfulness exercises

are beneficial to children and adolescents have emerged (Burke, 2010; Garrison Institute, 2005; Zelazo & Lyons, 2005).

School-based mindfulness programs such as Mindful Schools, Learning to Breathe, or MindUp have already been implemented in many schools. In 2003, the UK government implemented a program called Every Child Matters, which has an objective for children to ‘Be Healthy,’ with a stated 2020 goal to ‘Enhance children and young people’s wellbeing.’ Some of the targets focus on mental, emotional, and behavioral health. Learning to Breathe (L2B) is a research-based mindfulness program specifically targeted to adolescents. It improves health and wellbeing, enhances emotion regulation, strengthens attention and performance, builds stress management skills, and supports prosocial behavior. Each lesson includes age-appropriate discussion, activities, and opportunities to practice mindfulness in a group setting. L2B has been researched in many settings, and it has been used with adolescents and adults. L2B has been recognized in the 2015 CASEL (Collaborative for Academic, Social, and Emotional Learning) Guide as meeting research criteria for effective SEL (social-emotional learning) programs.

Metz et al. (2013) conducted a study using the L2B, which assessed the effectiveness of a mindfulness-based program, Learning to BREATHE, on adolescent emotion regulation. Participants included 216 regular education public high school students with pretest and posttest data participating in the program or instruction-as-usual comparison condition. Program participants reported statistically lower levels of perceived stress and psychosomatic complaints and higher levels of efficacy in affective regulation. They also evidenced statistically significant gains in emotion regulation skills, including emotional awareness, access to regulation strategies, and emotional clarity. These findings provide promising evidence of the effectiveness of Learning to BREATHE on developing key social-emotional

learning skills.

Furthermore, Broderick & Jennings (2012) reviewed the contextual and neuropsychological challenges of the adolescent period with particular attention to the role that universal prevention can play in moderating the harmful effects of stress. The centrality of emotion regulation skills to long-term health and wellness suggests their importance in prevention and intervention efforts for youth. Mindfulness is an effective means of reducing stress and improving emotional balance in research with adults, although research on mindfulness with adolescents is limited. The authors present available data and describe one potentially effective program for adolescent mindfulness: Learning to BREATHE. Another program tailored for adolescents is called Stressed Teens, and Gina M. Biegel developed it in 2004. This program is based on the Mindfulness-Based Stress Reduction for Teens Program (MBSR-T). Both programs will be further reviewed in the discussion section.

Empirical research proving the benefits of mindfulness is only beginning to emerge, and more rigorous research is needed. The current research lacks indications of effects on specific groups of students. Previous MBIs for students have decreased perceived stress levels (e.g., Broderick and Metz 2009; Metz et al. 2013; Monshat et al. 2013). Two large randomized controlled trials with sample sizes of more than 500 students assessed the intervention effects on psychological distress and wellbeing during the examination period. Relative to the control groups, lower levels of distress were found among the participants who engaged in mindfulness lessons. Therefore, both studies suggested that mindfulness may boost resilience during stressful times (Galante et al., 2018; Kuyken et al., 2013).

According to Lyons & De Lange (2016), the current research suggests that even short-term mindfulness training may lead to changes in brain functioning and neuroanatomy.

Mindfulness training has been found to improve the brain's ability to selectively focus attention (Jha, Krompinger, & Baime, 2007; Napoli, Krech, & Holley, 2005), to increase the functional connectivity between brain regions (Kilpatrick et al., 2011) and to improve the brain's ability to process information efficiently. Furthermore, there is also evidence that mindfulness training reshapes the brain in regions responsible for learning and memory (Hölzel et al., 2010) and strengthening the physical connections to brain regions involved in self-control (Tang et al., 2010). This research (which has primarily been conducted with adults) has led to a growing interest in bringing mindfulness training into school settings (e.g., Shapiro et al., 2015; Zelazo & Lyons, 2012) to improve academic achievement. Furthermore, mindfulness necessitates minimal costs in terms of time and money; it is easy to justify the infusion of mindfulness training into schools. The effects of using mindfulness in a classroom might be increased focus and alertness. Students will be more interactive; it provides a refreshing break and increased awareness and understanding of one's feelings and emotions.

A 2015 study by Schonert-Reich looked at the effectiveness of a 12-week social and emotional learning program (SEL) that included mindfulness training. After analyzing measures, including behavioral assessments, cortisol levels, feedback from their peers regarding sociability, and academic scores of math grades, the results revealed dramatic differences. Compared to the students who learned the social responsibility program, those trained in mindfulness scored higher in math, had 24% more social behaviors, and were 20% less aggressive. The group trained in mindfulness excelled above the other group in attention, memory, emotional regulation, optimism, stress levels, mindfulness, and empathy.

Furthermore, Broderick & Metz (2016, 355) contributed one chapter to the Handbook of

mindfulness dedicated to adolescents. Adolescents face numerous challenges which may threaten their physical and emotional wellbeing, including increasing psychological, emotional, and behavioral autonomy from parents. They may also go through a period of self-consciousness about bodily changes (Rodriguez Tome et al., 1993), they may experience pressures of romantic relationships (Collins, 2003) or increased susceptibility to peer influence (Sim & Koh, 2003). Children nowadays may also be affected negatively by the extensive use of social media. Mindfulness, concentration, and stress-reduction tools can be essential components to positive youth development.

Many studies have shown positive effects of mindfulness on stress and anxiety reduction in students and the general population. According to Lyons & De Lange (2016, 273), the MBSR (Mindfulness-Based Stress Reduction) program has significant impacts on health and wellbeing. However, MBSR cannot be implemented in all schools because it is time-consuming (8 weeks long). Short-term mindfulness training (lasting from a few days to a few weeks) has been found to reduce stress (e.g., Shapiro, Astin, Bishop, & Cordova, 2005), alleviate mental health symptoms (Hofmann, Sawyer, Witt, & Oh, 2010; Teasdale et al., 2000), and increase subjective wellbeing (Carmody & Baer, 2008). The most practical benefit for educators is that there is also strong evidence that mindfulness training in healthy non-clinical populations improves self-regulation (Chiesa, Calati, & Serretti, 2011; Shapiro et al., 2015; Zelazo & Lyons, 2012), with associated changes observed in brain structure (Hölzel et al., 2011; Tang et al., 2010) and brain function (e.g., Goldin & Gross, 2010; Kozasa et al., 2012).

Furthermore, Lyons & De Lange (2016, 273) suggest that mindfulness training is an ideal intervention for improving self-regulation because it targets conscious control over one's attention, actions, and emotions. It also reduces automatic responses such as anger, fear, or value judgments that interfere with students' ability to pay attention and learn (Zelazo &

Lyons, 2012). Therefore, some form of mindfulness training may be helpful in any classroom.

According to Lyons & De Lange (2016, 277), further research suggests that mindfulness in children and adolescents may increase emotional wellbeing and decrease emotional distress (e.g., Biegel, Brown, Shapiro, & Schubert, 2009; Kuyken et al., 2013; Semple et al., 2010). Young children trained in mindfulness have been found to have fewer conflicts, anxiety, and stress (Sibinga et al., 2013).

The present study was inspired by a research article written by Ramsburg & Youmans (2014). They used three experimental studies; participants from three introductory psychology courses randomly received either brief meditation training or rest, listening to a class lecture, then took a post-lecture quiz that assessed students' knowledge of the lecture material. The results indicated that meditation improved students' retention of the information conveyed during the lecture in each of the three experiments.

Similar research has also been done at the high school level. Luong, Gouda & Bauer *et al.* (2019) explored mindfulness benefits for students and teachers in three German High Schools. Among students, group comparisons revealed significant improvements with small to medium effect sizes on self-reported mindfulness, perceived stress, anxiety, depression, self-regulation, and emotional competencies.

The effects of school-based mindfulness programs are in the early stages, but a lot of research has been done on adults, showing physiological and psychological benefits. Most research has been done using MBSR (Mindfulness-Based Stress Reduction) or other long-term programs. However, there is no research on how a short mindfulness session could affect students' vocabulary acquisition skills. Keeping students focused on the task is essential for creating a calm classroom and a healthy learning environment.

Methodology

This experiment focuses on the effects of mindfulness on high school students' vocabulary acquisition. Many studies have shown that the English language proficiency of second language students correlates with their vocabulary learning (Gu & Johnson, 1996; Kojic-Sabo & Lightbown, 1999). According to Gass (1999), learning a second language primarily means learning its vocabulary because vocabulary skills significantly contribute to almost all aspects of language proficiency. Nation (1995, 13) states that there is an assumption that all vocabulary should be learned in context. This assumption is not supported by research and by what successful learners do. Explicit, decontextualized study of vocabulary is an effective way of rapidly increasing learners' vocabulary size. The learning achieved this way can last for a very long time.

Furthermore, as Wang (2000, 15) stated, vocabulary learning and teaching research have followed two approaches: vocabulary can be learned implicitly and incidentally or taught explicitly and intentionally. There has been a long-running debate about which of these two methods of learning vocabulary is more important. Implicit learning of vocabulary is usually identified with Krashen's (1989) Input Hypothesis. The meaning of a new word is acquired unconsciously due to abstraction from repeated exposures in a range of activated contexts. However, it is essential to note that Krashen (1989) usually involves native speakers rather than second language learners.

Explicit teaching of vocabulary is based on a hypothesis that a certain amount of consciousness must be involved in vocabulary acquisition. A learner must notice the new vocabulary and use various strategies to try to infer its meaning in the context (Gass, 1999; Schmidt, 1990). There are benefits from applying cognitive strategies to consolidate newly encountered vocabulary, such as dictionary consulting, note-taking, and associational learning strategies such as a semantic approach and various mnemonic techniques. Students

usually benefit from explicit vocabulary instruction in combination with extensive reading. Vocabulary learning is an implicit skill acquisition; it is also an explicit knowledge acquisition process (Ellis, 1994). According to Wang (2000, 18), implicit and explicit learning approaches are complementary. While explicit teaching can be an excellent first introduction to a word, the context encountered in the subsequent reading can lead to new knowledge of its collocation, additional meanings, and other higher-level knowledge. Hunt & Beglar (2002, 260) argue that incidental learning of vocabulary may eventually account for a majority of advanced learner's vocabulary; however, intentional learning also significantly contributes to vocabulary development. Furthermore, Hunt & Beglar discuss the role of translation in vocabulary acquisition; translation has a necessary and valuable role in L2 learning but can hinder learners' progress. Advanced learners may benefit from using L2 definitions of words, as was the case in this experiment.

The present experiment uses explicit vocabulary teaching. Students were shown a set of vocabulary with the corresponding definitions, and they were asked to learn them. They were not allowed to take notes to avoid being able to use them during the vocabulary tests.

Students were asked to learn vocabulary from a word list with L2 translations provided.

Word lists are one of the most prevalent means of learning vocabulary. This technique is by no means the most effective. However, the primary purpose of this experiment was not to teach vocabulary but to focus on the role of mindfulness in vocabulary acquisition.

A short questionnaire followed the second vocabulary test. It was only completed by the experimental group to test the second research question and gain insight into the effects of mindfulness on high school students' mental approach to acquiring new vocabulary. Most of the questions were Likert scale questions with five available options. The Likert scale is a universal method of collecting data; therefore, they are easily understood. The responses are easily quantifiable and subjective to computation mathematical analysis.

The experiment was repeated twice with two different sets of vocabulary. Please find the detailed explanation of the experiment below.

Stage one:

Control group

1. Students in the control group were presented with a set of vocabulary 10 English words and their definitions; they were given 5 minutes to learn them.

It takes about 50 seconds – 1 minute to remember a new word; students were be given 5 minutes to learn ten challenging words. However, in this exercise, they did not have to memorize the words; they had to match them with their definitions.

2. Students were given a 5-minute vocabulary test; they had to match the newly learned words with their definitions. This test was done via Kahoot; students had 30 seconds to choose the correct answer from four options for each word. I decided to use Kahoot because, based on my experience with the two classes, students enjoy learning through this platform, and they are motivated to do well. Another advantage of this platform is the immediate access to the results of each player.

Here is a link to the first Kahoot test: <https://create.kahoot.it/share/vocabulary-test-1/c11df547-97ea-4a4d-a8dc-3258750f1f63>

For vocabulary set number 1, please see Appendix 1.

The two sets of words were matched in terms of frequency (according to the Corpus of Contemporary American English – COCA) – all of the words appear in the first 1,000 least frequently used words. The reason for choosing words that are not frequently used was to avoid students' prerequisite knowledge which could affect the study results. The words were also matched by morphophonological length; the words were chosen from a list of 300 most

difficult SAT (Scholastic Aptitude Test) words. The study did not use other factors such as the age of acquisition or imageability due to the unavailability of data.

Experimental group

1. Students in the experimental group did a simple five-minute mindfulness exercise before learning the second set of vocabulary.

The mindfulness exercise I used was five minutes long and is available at [5-Minute Meditation - Headspace](#). Headspace is a well-known English American company specializing in meditation; it was established in 2010. It was founded by Richard Pierson and Andy Puddicombe (a former Buddhist monk). This mindfulness exercise allows us to reconnect with awareness and feel present; we should feel a little bit calmer and carry that calmness and mindfulness into whatever we are doing. I decided to choose this exercise because Headspace is a well-known meditation app; the meditations are easy to understand and follow. I used a pre-narrated meditation to achieve the same conditions for both parts of the experiment.

Please see the transcript of the mindfulness exercise in Appendix 2.

2. After this mindfulness exercise, students were given 5 minutes to learn the same set of vocabulary as the control group (English words and their definitions).
3. Students were given a 5-minute vocabulary test; they had to match the newly learned words with their definitions. For this test, I also used Kahoot; students had 30 seconds to choose the correct answer from four options.

Stage two

The same procedure was repeated two weeks later with a second set of vocabulary. As I have previously mentioned, the two sets of words were matched in terms of frequency (according

to the Corpus of Contemporary American English – COCA) – all of the words appear in the first 1,000 least frequently used words.

For vocabulary set number 2, please see Appendix 3.

Here is a link to the second vocabulary test: <https://create.kahoot.it/share/vocabulary-test-2/cff3ad9d-a1a3-45be-aeff-64f3288aaea0>

Stage three

After completing the vocabulary test, students in the experimental group were asked to complete a short questionnaire using Google Forms which assessed their experience with the mindfulness practice. The questionnaire used a combination of Likert scales and open-ended questions.

Please rate the following statements on a scale of 1-5 (1 – Strongly agree, 2 – Agree, 3 – Neutral, 4 – Disagree, 5 – Strongly disagree)

1. I felt calmer after completing this mindfulness exercise.
2. I felt more relaxed after completing this exercise.
3. I was able to notice the sensations in my body during this exercise.
4. I will recommend this exercise to my friends/family.
5. I will try a similar exercise again in the future.
6. I think that doing mindfulness exercises regularly could help improve my academic results.
7. I would be interested in trying other mindfulness exercises such as a body scan, yoga, or other guided meditations.
8. I would like mindfulness exercises to be included regularly in classes.

Open-ended question

9. Please write down any further comments or observations.

Subjects

The subjects of this study were two classes of the first of bachillerato students at the Lestonnac high school in Tarragona. A total of 61 students (Class 1 – the control group – 32 students) and (Class 2 – the experimental group – 29 students) participated in this study. The students were native Spanish speakers. The group was homogenous, and their level of English was B2. The study complied with human subjects' ethics protocols. Participants' anonymity was preserved, and students' parents or legal guardians signed consent forms. Please find the consent form in Appendix 4.

Data collection instruments and techniques

This experimental study used a combination of quantitative and qualitative data. The quantitative data were based on the results of the vocabulary tests, which were done via Kahoot. Quantitative data are more accessible to interpret than qualitative data, and they are replicable, which is essential for research. They can also be generalized to a more significant population with larger samples. An independent samples T-TEST was used to interpret the results of the two groups in this study. Qualitative data were based on the short questionnaire answers from the experimental group which received the mindfulness exercise; this questionnaire was completed in Google Forms. As I have mentioned before, most of the questionnaire was based on Likert scale questions. Likert scales are easily understood, and the responses are quantifiable; they are a quick, inexpensive, and efficient method for data collection. The main disadvantage of the Likert scales is that the population's attitudes for one particular item, in reality, exist on a vast, multi-dimensional continuum. Likert scales only offer five to seven options to choose from; therefore, they may fail to measure the proper attitudes of respondents (LaMarca, 2011).

Statistical analysis

The table in Appendix 7 presents the statistical analysis after the first stage of the experiment. The experimental group did a meditation exercise before learning the vocabulary and doing the test, and the control group only learned the vocabulary and completed the test. Students were shown the vocabulary on a projector, and the tests were done via Kahoot. The independent samples T-test assuming unequal variances was used because the variances between the two groups were not equal. As shown in the table, there were 29 students in the experimental group and 32 students in the control group.

To analyse the results of the two groups, I used an independent samples T-test which was done in Microsoft Excel. The independent t-test is an inferential statistical test determining whether there is a statistically significant difference between the means in two unrelated groups. The output indicates that the mean for the Experimental group is 81.72414 and for the Control group 73.4375. The $P(T \leq t)$ two-tail value is significant for the statistical analysis. Because the p-value (0.249342) is more than the standard significance level of 0.05, the null hypothesis cannot be rejected. Even though the means in the two groups are different and the experimental group performed better, the results are not statistically significant.

The table in Appendix 8 presents the statistical analysis after the second stage of the experiment, which was done two weeks later. The exact number of students as in the first part completed this experiment (29 students in the experimental group and 32 students in the control group).

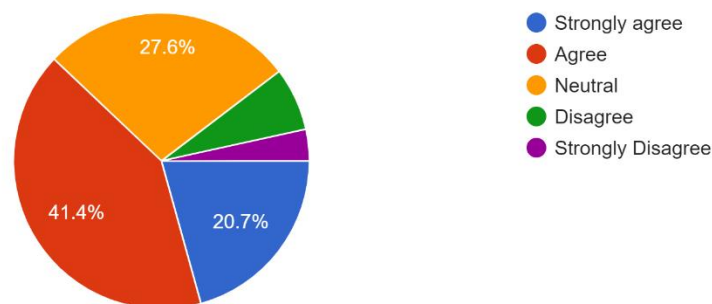
This independent samples T-test was done in the same way as in the first part of the experiment. The output indicates that the mean for the Experimental group is 83.10344828 and for the Control group 68.125. The $P(T \leq t)$ two-tail for this test is 0.029288555, which is

smaller than the standard significance level of 0.05. Therefore, the null hypothesis can be rejected.

In the following part of the statistical analysis, the questionnaire, which was given to the experimental group after completion of the second vocabulary test, is presented. Twenty-nine students completed this questionnaire via Google Forms. The questionnaire was designed to gain more information about students' experience with the mindfulness exercise and to test the second hypothesis – 'The use of mindfulness will help students feel calmer and concentrate better on learning new vocabulary.' Results from the questionnaire are represented in pie charts.

1. I felt calmer after completing this mindfulness exercise.

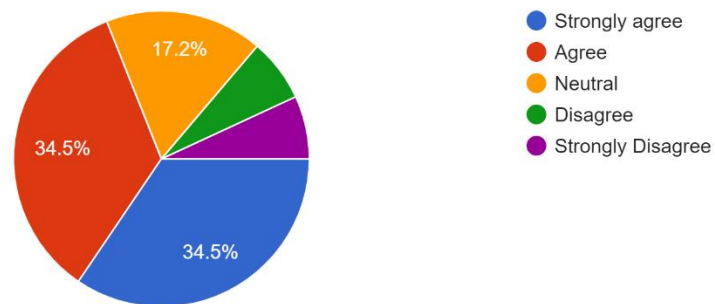
29 responses



According to the first graph, 62.1% of students chose either 'agree' or 'strongly agree' that they felt calmer after completing the mindfulness exercise. From my observation, after the mindfulness exercise, most of the students seemed a lot calmer and relaxed.

2. I felt more relaxed after completing this exercise.

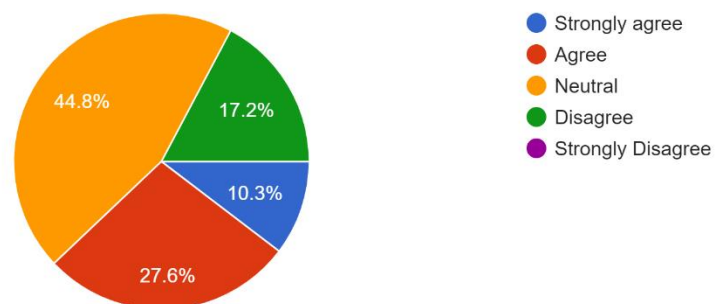
29 responses



The second graph confirms the findings of the first one. 69% of students felt calmer after completing the mindfulness exercise.

3. I was able to notice the sensations in my body during this exercise.

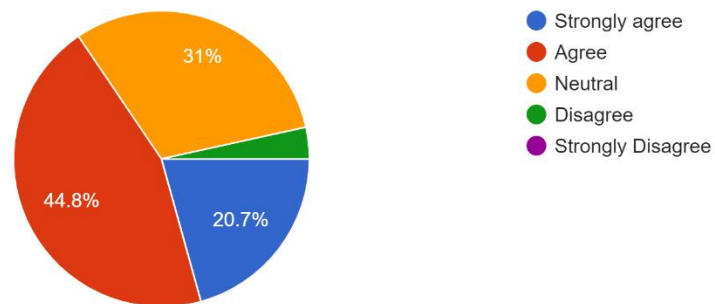
29 responses



The third graph shows that 37.9% of students noticed the sensations in their bodies during the exercise. For some of them, this was the first time doing a mindfulness exercise, so these findings are not surprising.

4. I will recommend this exercise to my friends/family.

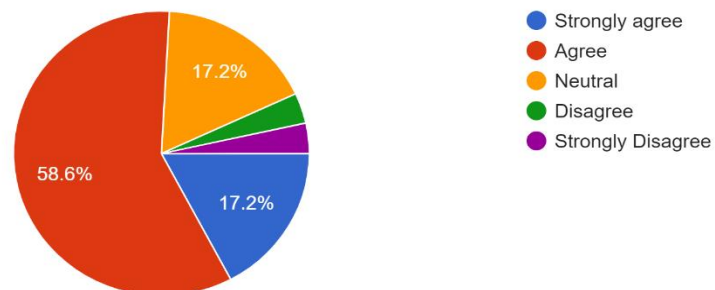
29 responses



65.5% of the students want to recommend this exercise to their friends and family. This finding shows that they found the exercise beneficial not only for themselves but also that it might help other people.

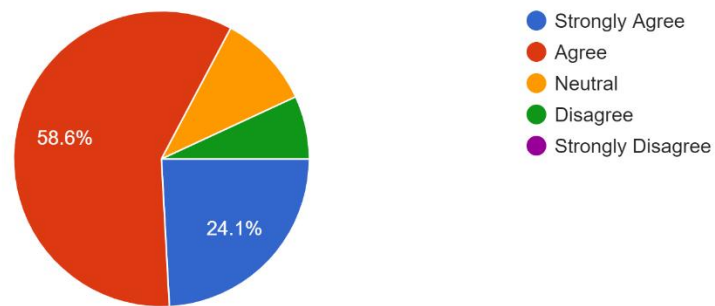
5. I will try a similar exercise again in the future.

29 responses



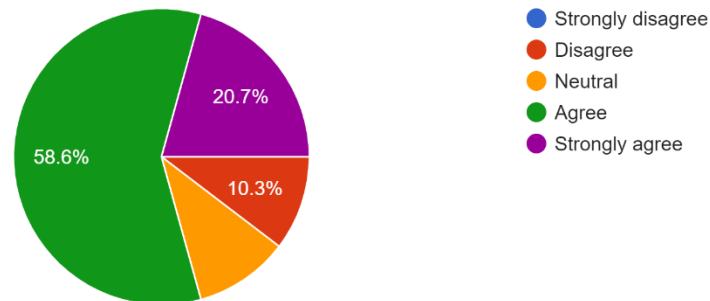
75.8% of the students want to try a similar exercise in the future. This result shows that the students express an open attitude towards a learning methodology that includes strategies from other disciplines.

6. I think that doing mindfulness exercises regularly could help me improve my academic results.
29 responses



For this question, 82.7% of students answered that they think regular mindfulness exercises could help them improve their academic results.

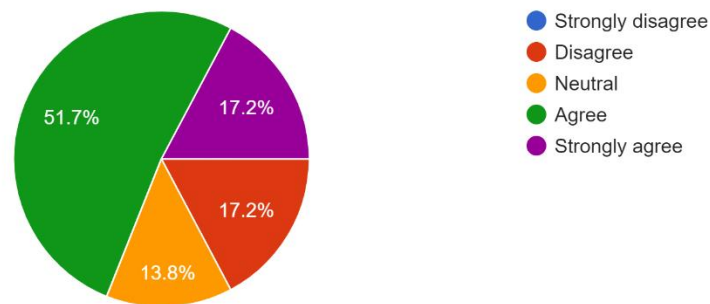
7. I would be interested in trying other mindfulness exercises such as a body scan, yoga or other guided meditations.
29 responses



For this question, 79.3% of students answered that they would be interested in other mindfulness exercises such as a body scan, yoga, or other guided meditations.

8. I would like mindfulness exercises to be included regularly in classes.

29 responses



For this question, 68.9% of the students answered that they would like mindfulness exercises to be included regularly in classes.

The final questions asked students to write any further comments or observations. 13 students responded. Most of the responses were positive such as: 'I liked this activity a lot.' or 'I think it can be longer next time.' Some students suggested that they would prefer to be in a calmer environment.

Results

The study examined the effects of a mindfulness exercise on high school students' vocabulary acquisition. Two classes of 61 students in total at the Lestonnac high school in Tarragona were the subjects of this study.

Even though the first independent samples T-test results showed the difference between the two groups as not statistically significant, it is interesting to note that it took the control group 8 minutes to complete the vocabulary test compared to the experimental group that needed 4 minutes. Furthermore, five students in the control group did not finish the test; everyone finished in the experimental group. When analyzing the results for individual questions, the scores in the experimental group were not lower than 69% for each question, and one

question even got 100% correct answers. The control group results for individual questions were lower than the experimental group. 59% was the lowest score, and 84% was the highest. For detailed results, please see Appendix 5.

After the second vocabulary test, the independent samples T-test showed the difference between the control and experimental groups as statistically significant. This may be because students in the experimental group were already familiar with the mindfulness exercise.

Furthermore, it took the experimental group only 4 minutes to complete the test compared to the control group, which needed 9 minutes. Seven students in the control group did not finish the test; everyone finished in the experimental group. When analyzing the individual questions, the scores in the experimental group were not lower than 66% for questions, and one question even got 100% correct answers. The control group results for individual questions were lower than the experimental group. 58% was the lowest score, and 73% was the highest. For detailed results, please see Appendix 6.

Finally, the questionnaire, which was given to the experimental group after completing the second set of vocabulary, provided exciting results. All the graphs are provided in the statistical analysis section. Students' experience with this short mindfulness session seems to be mainly positive. There was a big difference in students' attention and focus on the exercise between the experimental and the control group. From my observation, after the mindfulness exercise, the experimental group seemed a lot more relaxed and calmer, which is confirmed through the results of the questionnaire. Most of the students in the control group were not able to fully concentrate on the task. The questionnaire confirms that over 60% of the students in the experimental group felt more relaxed and calmer after completing the mindfulness exercise. Over 60% of the students want to recommend this exercise to their friends or family, and over 75% are willing to try similar exercises in the future.

Furthermore, over 80% of students think that regular mindfulness exercises could help them improve their academic results. Almost 80% of students would like to try more mindfulness exercises such as a body scan, yoga, or other guided meditations. And almost 70% would like to have them included regularly in classes. The questionnaire results confirm the second hypothesis that mindfulness would help students feel calmer and concentrate better on learning new vocabulary. Furthermore, bachillerato students may have a lot of stress from exams, university applications, or social pressures in their lives. Mindfulness exercises might help them to better cope with stress in everyday life.

Discussion

The first research question – the effects of mindfulness on vocabulary acquisition

This experimental Master's Thesis focused on the effects of mindfulness on high school students' vocabulary acquisition. The first research question was the following - What are the effects of mindfulness on high school students' vocabulary acquisition?

The first hypothesis speculated that mindfulness would increase the rate of vocabulary acquisition for high school students.

The first part of the experiment revealed better results in the vocabulary test for the experimental group (who meditated) than in the control group. The experimental group achieved 81.7% correct answers and the control group 73.4%, but the results were not statistically significant. In the first part of the experiment, '*Vocabulary set 1*' was used (please see Appendix 1). However, in the second vocabulary test, the experimental group had better results than the control group, and this time the difference was statistically significant. The experimental group achieved 83.1% of correct answers, and the control group 68.1%. Therefore, we can conclude that the use of mindfulness may increase high school students' rate of vocabulary acquisition. This small-scale study could be considered as a starting point

and an inspiration for further research in this area. It would be interesting to see whether this experiment would be successful with other classes in different environments (for example, younger students in different socio-economic contexts).

The differences between the first and second vocabulary tests are noteworthy. In my opinion, the second time, students were already familiar with the mindfulness exercise, and therefore they were able to focus better. Moreover, they were aware of the format of the vocabulary test. It would be interesting to see how the results would evolve if we could repeat the experiment a few more times. The experimental group finished both vocabulary tests twice faster than the control group (4 minutes – experimental group, 8 minutes control group).

This experiment was inspired by Ramsburg & Youmans' (2014, 438) study on university students, which concluded that students who meditated before a lecture performed better on a post-lecture assessment. They determined that brief periods of meditation may improve students' retention. The meditation session lasted 6 minutes, showing that meditation could be realistically administered before a higher-education classroom lecture without disrupting the learning environment. The present study was designed on a similar basis, but it focused on the connection between mindfulness and vocabulary acquisition. Moreover, similarly to Ramsburg & Youmans' (2014) study, it used a short mindfulness exercise. The difference between these two mindfulness exercises used is that Ramsburg & Youmans' (2014) study used a Zen Buddhist counting method. In this method, the practitioner sits with a straight back and counts his or her breaths, usually from 'one' to 'ten' and back to 'one,' repetitively. If the practitioner loses count at any time, he or she is instructed to return to 'one' and continue the breath-counting cycle. The present study used a pre-narrated five-minute meditation by Headspace. In my opinion, the Zen Buddhist counting method would not have been as effective for high school students as a pre-narrated mindfulness exercise.

Not many studies have been done on the effects of mindfulness on high school students. One

of the few was written by Luong, Gouda & Bauer *et al.* (2019). It explored mindfulness benefits for students and teachers in three German High Schools. Among students, group comparisons revealed significant improvements with small to medium effect sizes on self-reported mindfulness, perceived stress, anxiety, depression, self-regulation, and emotional competencies. By contrast, teachers showed a significant improvement in medium effect size only on self-reported mindfulness. The difference between the mindfulness effects on teachers and students is interesting. Luong, Gouda & Bauer *et al.* (2019, 2698) suppose that this could be explained in terms of different developmental stages and life realities faced by the two populations. The adolescent population was more susceptible to the intervention. They are at an age where habits, attitudes, or coping strategies are still being shaped. Teachers can be reasonably assumed to have stable and clearly defined characteristics and skillsets that are more difficult to impact. It would have been interesting to include a mindfulness exercise for teachers in my study, but I did not get a chance to do it due to the Covid-19 restrictions. However, the study done by Luong, Gouda & Bauer *et al.* (2019) gave me confidence that mindfulness could significantly affect high school students.

A chapter in the *Handbook of Mindfulness* by Lyons & De Lange (2016) called ‘Mindfulness Matters in the Classroom: The Effects of Mindfulness Training on Brain Development and Behavior in Children and Adolescents’ suggests that even short-term mindfulness training may lead to changes in brain functioning and neuroanatomy. Furthermore, research with adults has shown that mindfulness training improves performance on measures of working memory (e.g., Jha et al., 2010; Mrazek, Franklin, Phillips, Baird, & Schooler, 2013). A study by Flook et al. (2010) found that parents reported improvement in their children’s working memory after mindfulness training in elementary school students. Working memory is the ability to keep in mind and manipulate information (Baddeley, 1992). The classic example of working memory is attempting to keep in mind a phone number before writing it down.

Research shows that working memory is a better predictor of school achievement than IQ (Alloway & Alloway, 2010). Working memory also influences how well students can solve various academic problems (e.g., Passolunghi & Siegel 2004; Swanson & Sachse-Lee, 2001). Mindfulness exercises could be a great tool to improve students' working memory. Furthermore, according to Lyons & De Lange (2016, 274), mindfulness exercises positively affect students' attention which is fundamental to learning. Students need to ignore irrelevant distractions such as text messages from friends or noise from their classmates to maintain focus on their classwork. Students who can focus better will also likely do better in exams. The present experiment proved that students who meditated and were in a more focused state of mind performed better in the vocabulary tests.

The second research question – the effects of mindfulness on students' mental approach to vocabulary acquisition and stress levels

The second research question in this thesis investigated the effects of mindfulness on high school students' mental approach to vocabulary acquisition. The hypothesis suggested that mindfulness would help students feel calmer, concentrate better on learning new vocabulary, and help reduce their stress levels. This hypothesis was tested through the questionnaire given to the experimental group after completing the second vocabulary test. In general, most of the students felt calmer and more relaxed after the mindfulness exercise, and they were able to focus better on learning new vocabulary. Furthermore, most of the students would like to try more mindfulness exercises in the future. They also agreed that the use of mindfulness could help them improve their academic results.

In the *Handbook of mindfulness in education*, one chapter by Broderick, P. C., & Metz, S. M. (2016) is dedicated to mindfulness for adolescents; it is called 'Working on the inside: Mindfulness for adolescents.' As it is widely known, adolescence can be stressful; students report high-stress levels associated with tests, interaction with teachers, homework, or

expectations for achievement (Jacobshagen, Rigotti, Semmer, & Mohr, 2009; Ystgaard, 1997). The bachillerato students in this study were in their adolescence (16-17 years old). Young adults are also affected by social and time pressures. A study by Melman, Little, and Akin Little (2007) reported a relationship between the number of regularly scheduled activities and self-reported levels of anxiety in adolescents. Furthermore, Broderick & Metz (2016, 359) mention the importance of emotion regulation for adolescents. Emotion regulation processes can include identifying and accepting emotional experiences, sustaining emotional and motivational states, prioritizing competing goals, managing distress and modulation of excitement, and adaptive adjustment of behavioral responses. Researchers view these various emotion regulation processes as a foundation of academic achievement, wellbeing, and positive adjustment throughout life (Eisenberg, Spinrad, & Eggum, 2010).

Furthermore, Lyons & De Lange (2016, 275) also consider the positive effects of mindfulness training on emotion regulation. They consider emotion regulation as fundamental to school success. Individual differences in emotion regulation have been found to predict adaptive social functioning in preschoolers (Rubin, Coplan, Fox, & Calkins, 1995), school readiness, and academic competence in early childhood (Ursache et al., 2012); academic success and productivity in the classroom. Moreover, Graziano et al. (2007) suggest that children who have difficulty regulating their emotions have trouble learning in the classroom are less productive when completing assignments. Thus, interventions that improve children's ability to regulate their emotions (such as mindfulness) have the potential to improve academic success.

I agree with Broderick & Metz (2016) and Lyons & De Lange (2016) that emotion regulation is essential for adolescents. Mindfulness may provide a way of controlling one's behaviours. Over time, specific manners may become automatic and operate outside of conscious awareness in response to particular triggers (Berkowitz, 2008). Some behaviors such as

procrastination or aggression may become impulsive, automatic responses to emotional distress (stress, anger, anxiety). Mindfulness allows us to ‘increase the gap between impulse and action’ (Ekman, as cited in Boyce, 2005, 40).

Additionally, according to Lyons & De Lange (2016, 275), mindfulness may also positively affect inhibitory control. Inhibitory control can stop a person from making an inappropriate response (Munakata et al., 2011). In school settings, inhibitory control is essential in helping students to focus on their tasks and follow classroom rules (not talking to friends when one is supposed to be concentrating on an assignment). Inhibitory control is also vital in testing situations, in which one must inhibit giving wrong answers that may come to mind quickly but are incorrect.

Furthermore, Broderick & Metz (2016, 358) focus on the effects of stress on adolescents; they may be uniquely sensitive to the effects of stress. Although the human stress response is adaptive in short bursts and helps mobilize energy reserves for goal-directed purposes, stress can negatively affect health, learning, and productivity when it is prolonged (McEwen, 2003). Cardiovascular, gastrointestinal, immune, reproductive, and other bodily systems are negatively impacted by chronic stress (Romero & Butler, 2007). Moreover, we should not forget to mention the MBSR (Mindfulness-based stress reduction) program by John Kabat-Zinn when discussing stress reduction. The MBSR was developed in the 1980s, and it provided an entry point to mindfulness to western audiences. This standardized eight-week program has been used to improve many psychological and physical symptoms, including stress, depression, anxiety, wellbeing, emotion regulation, and interpersonal behavior, with benefits extending to children and adolescents.

Implementing mindfulness in schools

The positive impacts of mindfulness for students are countless, from stress reduction, improvements in working memory to less emotional reactivity and others. Implementing

mindfulness is mostly cost-free, and schools do not need to invest large amounts of money to be able to implement it. High school students are usually extremely busy navigating their life through school obligations, hobbies, social pressures, or bodily changes. The use of mindfulness can be an excellent tool for them to feel calmer and more relaxed. Mindfulness techniques may be helpful for young adults for the rest of their lives. In my opinion, implementing mindfulness into more classrooms could be highly beneficial for students. In this final part of my thesis, I will introduce some ways of implementing mindfulness in classrooms.

Many studies have shown positive effects of mindfulness on stress and anxiety reduction in students and the general population. According to Lyons & De Lange (2016, 273), the MBSR (Mindfulness-Based Stress Reduction) program has significant impacts on health and wellbeing. However, the MBSR program may be challenging to implement in all schools because it is rather time-consuming. The MBSR is perhaps the most frequently used and studied method of mindfulness training. MBSR is an intensive, 8-week group intervention designed to teach and promote mindfulness in everyday life. Individuals learn three core mindfulness techniques: mindful breathing (concentrating on the sensation of breathing while, at the same time, remaining open to other bodily sensations, thought processes, and emotions), the body-scan exercise (progressively applying awareness to different parts of the body), and mindful stretching (Felter et al., 2013, 533).

Lyons & De Lange (2016, 279) argue that the essential principle to keep in mind when implementing mindfulness is: ‘use it or lose it.’ To gain the benefits of mindfulness, students must be consistent in their practice. One of the basic principles of learning is that spaced practice is superior to an equal amount of condensed practice (Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006). In other words, it is better to do a short mindfulness session regularly than one long session sporadically. The human brain is shaped by experience, and the neural

connections that we use more frequently will become more robust (e.g., Neville & Bavelier, 1998; Rosenzweig & Bennett, 1996).

Furthermore, Lyons & De Lange (2016, 279) suggest that teachers should also use mindful inquiry (asking students to focus on their sensory experiences during class) in addition to mindfulness training activities. Students will be able to retain new information if it is integrated into an existing schema (Brewer & Nakamura, 1984). By practicing mindfulness in various contexts, students have the opportunity to make connections between how mindfulness is practiced in different settings and process the elements of the practice on a deeper level (Craik & Tulving, 1975).

A teacher needs to complete appropriate training before implementing mindfulness into their classrooms. The risks of implementing mindfulness are minimal, but the practice may lead some students to become aware of negative emotions which they did not previously notice. (Broderick, 2013). Teachers need to know how to manage these kinds of responses (Lyons & De Lange, 2016, 280).

There are numerous mindfulness programs commercially available programs and curricula for teaching mindfulness to students from preschoolers to high school students, including MindUp (Hawn Foundation, 2011), Inner Kids, Stressed Teens, and Learning to Breathe (Broderick, 2013). Most of these programs include books or lesson plans and teacher training programs to help prepare teachers to lead their students through the practices.

When looking for a good way of implementing mindfulness into a classroom, a few crucial aspects need to be considered. The first aspect is the length of the mindfulness exercise. It should not be more than 10 minutes long; it should be realistically administered into a classroom without disrupting the learning environment. The second aspect is to match the mindfulness exercise with the audience's expectations and needs. According to Lyons & De Lange (2016, 272), mindfulness activities for children should become gradually more abstract

with increasing grade levels to correspond with age-related increases and in children's ability to think abstractly and reflect on their thinking (Flavell, Miller, & Miller, 1985). For example, young students may practice mindful awareness of thoughts by imagining that they are standing high on a hill looking down at a train, with each train car carrying one of their thoughts. Their task is to notice each thought as it passes by without adding emotional responses or cognitive judgments (Broderick, 2013). Older adolescents may be given even less support, for example, practicing mindfulness of emotions by being told to ride the waves of their emotions like a surfer riding a wave (Broderick, 2013).

Burnett, R. (2011, 82) proposes another great way to teach mindfulness to kids using a short clip from the animated Dreamworks film *Kung Fu Panda*. It does not describe what you do, it does not give a textbook definition of what mindfulness is, nor does it even use the word mindfulness, but it captures the flavour of it in an easily understood way. Our troubled hero, a panda called Po, is very stressed about life. He stands in the moonlight beneath a blossoming peach tree and laments his many failures. 'I probably sucked more today than anyone in the history of kung fu — in the history of China — in the history of sucking!' he declares. His anguished monologue is an engaging compendium of contemporary malaise: he thinks he is rubbish at everything (low self-esteem), he knows he overeats (eating disorders), he worries a great deal (stress/anxiety). Confronted with many difficulties, he is on the verge of giving up his dream of kung-fu glory and going back to making noodles. Thankfully, staff in hand, the wise old turtle Oogway arrives, a kung-fu master approaching the end of his turtle years, and gently reprimands the troubled panda:

'Quit, don't quit! Noodles, don't noodles! You are too concerned about what was and what will be. There is a saying: yesterday is history, tomorrow is a mystery, but today is a gift. That is why it is called the 'present.' (Kung Fu Panda, 2008, Dreamworks Animation LLC.)

As the old turtle says this, Po begins to understand that we may only find happiness in the present moment. Kids may be able to understand this much better than definitions.

The third aspect to successfully include mindfulness in a classroom is to inspire students to keep up their practice at home. According to Ramsburg & Youmans, R.J. (2014, 439), introducing meditation in the classroom also produces other student benefits beyond grade increases, including greater student interest in topics related to meditation, mindfulness, and self-regulation and greater understanding and appreciation of the differences between eastern and western psychology (Hull 2001; Michaelson 2006). Furthermore, numerous studies have shown enhancements in cognitive, physiological, and neurological functioning with meditation training (Brown et al., 2007; Cahn and Polich 2006); these improvements are likely to be of benefit and interest to various student populations.

Mindfulness programs for adolescents

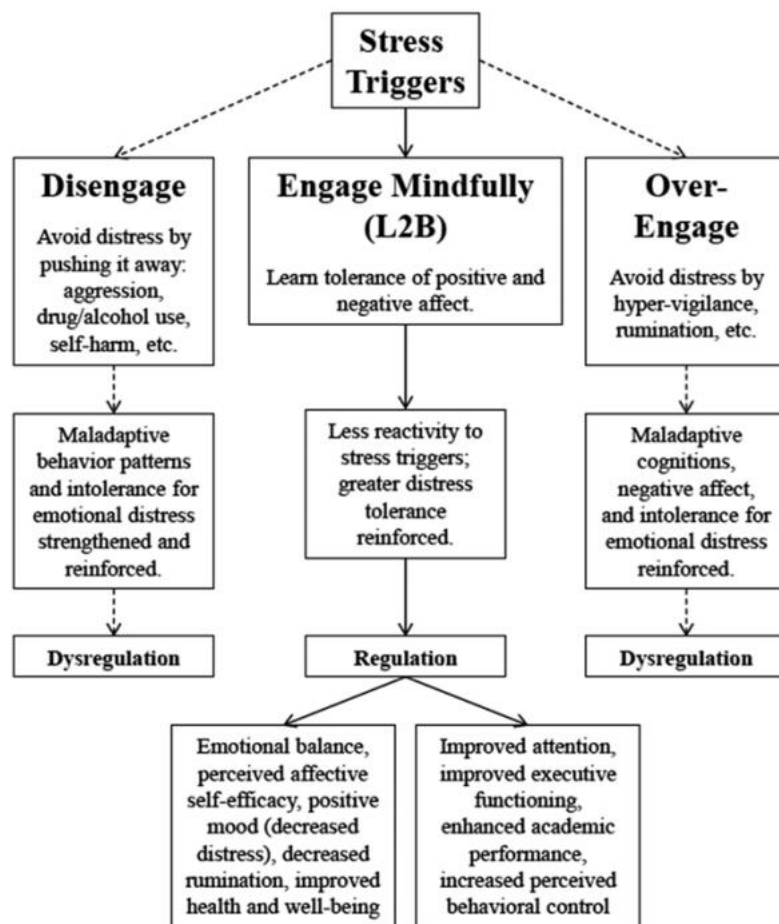
As maintained by Luong et al. (2019, 2683), The benefits that many practitioners seem to reap from secularized mindfulness are precious in the school setting (Mind and Life Education Research Network (MLERN) et al., 2012). MBIs (Mindfulness-Based Intervention) designed for school settings have provided meaningful results on factors such as stress, anxiety, depression, emotion regulation, and self-efficacy both for teachers (for a review, see Emerson et al. 2017; Hwang et al. 2017; Klingbeil and Renshaw 2018; Lomas et al. 2017) and students (for a review see Carsley et al. 2018; Felver et al. 2016; McKeering and Hwang 2019; Meiklejohn et al. 2012; Waters et al. 2015; Weare 2014; Zenner et al. 2014).

Burnet (2011, 92) proposes three ways to capture the attention of adolescents in a relatively short period for them to become interested in mindfulness.

1. They can direct their attention. When they are asked to place their attention in their feet, or their hands, or onto their breath, not only can they usually do it, but it interests them that they can do it.
2. They can sustain their attention in this place, even if only for brief periods, say between 30 seconds and a minute. This holds their interest and extends their curiosity.
3. They acknowledge these exercises as being of value. They understand that a mind which is usually very scattered can be more ‘collected’ and concentrated, and it is something they savor.

Mindfulness programs for students such as Mindful Schools, Learning to Breathe, Stressed Teens, MindUp, or Inner Resilience have already been implemented. Learning to Breathe (L2B) is a research-based mindfulness program specifically targeted to adolescents. It improves health and wellbeing, enhances emotion regulation, strengthens attention and performance, builds stress management skills, and supports prosocial behaviour. Each lesson includes age-appropriate discussion, activities, and opportunities to practice mindfulness in a group setting. L2B has been researched in many settings and used with adolescents and adults. L2B has been recognized in the 2015 CASEL (Collaborative for Academic, Social, and Emotional Learning) Guide as meeting research criteria for effective SEL (social-emotional learning) programs.

The L2B program assumes that mindfulness practice will help students’ academic and behavioral outcomes by reducing stress, increasing distress tolerance, and supporting academic goals. The following figure explains how the L2B program works.



Source: Broderick, P. C., & Metz, S. M. (2016, 363).

In the figure above, stress is defined as the experience of conscious and unconscious emotions and patterns of reactivity that cause regulatory processes to break down and impede goal-directed behavior (Broderick & Metz 2016, 363). Students usually either disengage or over-engage when faced with stress, leading to maladaptive behavior patterns and increased intolerance for emotional distress. The L2B program can help students to engage mindfully and become less reactive to stress triggers. This will lead students to better emotional balance, positive mood, improved attention, or enhanced academic performance.

Metz et al. (2013) conducted a study using the L2B, which assessed the effectiveness of a mindfulness-based program, Learning to BREATHE, on adolescent emotion regulation. Participants included 216 regular education public high school students with pretest and

posttest data participating in the program or instruction-as-usual comparison condition.

Program participants reported statistically lower levels of perceived stress and psychosomatic complaints and higher levels of efficacy in affective regulation. Program participants also evidenced statistically significant gains in emotion regulation skills, including emotional awareness, access to regulation strategies, and emotional clarity. These findings provide promising evidence of the effectiveness of Learning to BREATHE on developing key social-emotional learning skills.

Furthermore, Broderick & Jennings (2012) reviewed the contextual and neuropsychological challenges of the adolescent period with particular attention to the role that universal prevention can play in moderating the harmful effects of stress. The centrality of emotion regulation skills to long-term health and wellness suggests their importance in prevention and intervention efforts for youth. Mindfulness has been shown to be an effective means of reducing stress and improving emotional balance in research with adults, although research on mindfulness with adolescents is limited. The authors present available data and describe one potentially effective program for adolescent mindfulness: Learning to BREATHE.

In my opinion, this program is well structured and may be accessible to many schools; it may be an alternative to MBSR (Mindfulness-Based Stress Reduction) because L2B is specifically targeted to adolescents. Teachers who wish to implement this program must undergo a two-day foundation workshop and a three-day intensive training workshop. In these workshops, teachers will learn how to teach mindfulness and test the techniques themselves. BREATHE is an acronym corresponding to the exercises students would do – B for body, R for reflections, A for attention, T for tenderness or compassion, H for habits of a healthy mind, E for empowerment.

Another mindfulness program that might be useful for adolescents is called Stressed Teens. It was developed in 2004 by Gina M. Biegel, a psychotherapist, researcher, speaker, and author

specializing in mindfulness-based work with adolescents (Biegel, G., 2004). Stressed Teens is based on the Mindfulness-Based Stress Reduction for Teens Program (MBSR-T) in varying forms. MBSR-T is an adaptation of the MBSR (Mindfulness-Based Stress Reduction) program for adults by Kabat-Zinn. Like MBSR, MBSR-T is based on secular adaptations of mindfulness practices with roots in Eastern meditation traditions. MBSR-T is also strongly influenced by mindfulness-based cognitive therapy. This program teaches mindfulness skills; it provides a mind-body approach and focuses on the whole person. Stressed Teens can improve adolescents' functioning and quality of living socially, physically, and psychologically. This program also offers a whole-school program for one calendar year, which includes 48 lessons. Training for professionals is available through a 10-week online Stressed Teens Certificate Program. This program is designed for educators and psychologists, psychotherapists, nurses, or other mental health professionals. Compared to the L2B training program, which lasts five days, the Stressed Teens programs are significantly longer. Both L2B and Stressed Teens are very well-designed programs, and each school or educator needs to decide for themselves which program would be more beneficial for them and especially for their students. Stressed Teens also offers financial support to schools with financial difficulties.

When implementing mindfulness in a second language classroom (as was the case in this study), the teacher needs to assess the students' language level. I would not recommend a prerecorded mindfulness exercise to students whose English level is B2 and lower. A mindfulness exercise might not be effective in this case because the students could have comprehension difficulties. If a teacher wanted to implement a body scan exercise in a second language classroom with students whose English level is A2, it would be necessary to introduce them to all the essential vocabulary. However, other exercises might be practical such as mindful coloring or other mindfulness games for students. There is also an option for

an English teacher of lower-level students to use a mindfulness exercise in the students' native language.

Conclusion

The present study focused on the effects of a short mindfulness exercise on high school students' vocabulary acquisition. The control group completed a vocabulary test, and the experimental group did the same test with a preceding mindfulness exercise. This experiment was repeated twice. The first time the difference in the rate of vocabulary acquisition between the two groups was not statistically significant, even though the experimental group achieved better results than the control group. The second time the difference in the results between the two groups was statistically significant $P(T \leq t) \text{ two-tail} = 0.029288555$. Therefore, the use of mindfulness increased students' rate of vocabulary acquisition.

The second part of the experiment focused on students' mental approach to the acquisition of new vocabulary. The results were assessed through an online Likert scale questionnaire. Only the experimental group completed this questionnaire, and it revealed that the use of mindfulness helped students feel calmer and concentrate better on vocabulary acquisition.

Finally, this study proposed ways of implementing mindfulness in more schools. After reviewing the literature on this topic, the best currently available program for implementing mindfulness for high school students seems to be the L2B (Learning to Breathe) program or the Stressed Teens program.

The present study has provided some exciting and statistically significant results. However, it also has some potential limitations. It is important to note that this study was done on a small scale with a limited number of students. Further limitations of this study are time constraints; I could only perform the experiment with the students once to prevent disrupting their regular classes. The difference between the first two vocabulary tests did not show statistical

significance; only the second one did. It would have been interesting to repeat the experiment with different sets of vocabulary and analyse the results.

Moreover, the two sets of vocabulary were matched in terms of frequency (according to the Corpus of Contemporary American English – COCA) – all of the words appear in the first 1,000 least frequently used words. If this study was repeated with younger students, it would be helpful to include other factors such as the age of acquisition to choose the two vocabulary sets. Caution must also be extended to the generalizability of results: the sample reported here included Spanish high school students in comfortable socio-economic contexts. Different effects might be expected in other types of schools (for example, alternative schooling models or vocational schools) or special schools (catering to students with special educational needs due to learning difficulties, physical disabilities, or behavioral problems).

There are several directions for future research in this area. In terms of the effects of mindfulness on vocabulary acquisition, similar studies on a larger scale could be done with students of various ages. It would also be interesting to implement different methods of teaching vocabulary and other forms of testing it.

Teacher training is also an important area for research. According to Lyons & De Lange (2016, 278), teachers need to be trained, but the parameters around training are not well defined. It is unclear how many hours of training teachers need to be able to teach mindfulness with fidelity. It is also unknown if teachers need to develop their practice of mindfulness before teaching it to others. Lyons & De Lange (2016, 279) also add that future research with children and adolescents should investigate the mechanisms of change by which mindfulness practice causes changes in the brain and behavior. It is essential to identify how the active ingredients of mindfulness training (e.g., sustained attention, nonreactivity) impact different aspects of self-control (e.g., selective attention, working memory, emotion regulation). This research would help teachers determine how to best help

students with improvement needs. It would also help researchers better understand how self-control develops and why there are individual differences in this ability.

The current research confirms that mindfulness practice has the power to help reduce stress, help in academic achievement, or promote a sense of wellness. These findings are significant for modern-day adolescents. Teachers, researchers, and school professionals need to find a way to support the regular implementation of mindfulness in educational settings. Supporting adolescents in a challenging period of their lives could have short-term as well as long-term effects. At the end of the 19th century William James (1890, 424) wrote that an education that could improve attentional faculties would be the education ‘par excellence.’ However, teachers who may be considering whether to adopt meditation in the classroom should do so only after weighing the potential pros and cons. Teachers should also have minimal experience with mindfulness and test the techniques that they will use on themselves first. The mindfulness exercises should be tailored to the class, depending on the students’ age. Finally, I would like to encourage teachers to take the step, try to include some mindfulness activities in their classes, and assess the results for themselves.

Appendix 1 – Vocabulary set number 1

Vocabulary set number 1			
English words	Morphophonological length	Frequency	Definition
Accretion	3	902	an increase by natural growth or addition
Abnegation	4	101	the denial and rejection of a doctrine or belief
Calumny	3	212	a false accusation of an offense
Circumlocution	5	88	an indirect way of expressing something
Elegy	3	698	a mournful poem; a lament for the dead
Adumbrate	4	79	describe roughly or give the main points or summary of
Epistolary	5	287	written in the form of letters or correspondence
Irreverence	4	341	a mental attitude showing lack of due respect
Interlocutor	5	887	a person who takes part in a conversation
Presage	3	602	a foreboding about what is about to happen
	39		

Appendix 2 – Transcript of the mindfulness exercise by Headspace

[5-Minute Meditation - Headspace](#)

So just making sure that you're sitting comfortably.

We are going to start with the eyes open.

Taking a moment to pause and taking in the space around you.

And when you're ready, just taking a big deep breath. In through the nose and out through the mouth.

Now just take a couple of breaths like that. Aware of the body expanding as it takes in the air. And the muscles softening as you exhale.

And with the next out-breath, just gently closing the eyes.

And as you feel the body pressed down into the seat beneath you, feet connecting with the ground. Just taking a moment to enjoy that feeling of having stopped, of having nothing to do for a few moments.

As you pause, probably starting to become aware not only of the thinking of the mind but also of how the body feels.

So just checking in with the body, noticing where there is a feeling of heaviness or lightness in the body. Any feeling of movement or stillness.

And as you sit there just noticing how the body is breathing. Often it is a good indication of how you're feeling in your body and your mind—noticing if those breaths are long or short, deep, or shallow. If you can't feel the movement of your breath in the body, just gently placing your hand on your stomach.

And just stay with that feeling for a few breaths longer, following the rising sensation and the falling sensation—nothing else to do.

And then, for a moment, we are going to let go even of any focus on the breath. Just give yourself a few seconds to let the mind wander. Let the mind do whatever it wants to do. So really nothing to do at all now.

And then just gently bringing the attention back to the breath again, not breathing in any special way, just reconnecting with the natural rhythm of the breath, the rising and falling sensation.

And then, just as we did before, just letting go of the focus on the breath. And once again, just allowing the mind to do whatever it wants to do. And letting the mind think if it wants to think.

And then just bring the attention gently back into the body. The mind is feeling refreshed, reconnecting with that feeling, sensation of the body on the seat beneath you. And when you're ready, just gently opening the eyes again.

Appendix 3 – Vocabulary set number 2

Vocabulary set number 2			
English words	Morphophonological length	Frequency	Definition
Requisition	4	248	an authoritative demand
Tangential	3	573	of superficial relevance, if any
Intransigent	4	422	impervious to please, persuasion, requests, or reason
Antediluvian	6	120	of or relating to the period before the biblical flood
Quixotic	3	553	not sensible about practical matters
Ostensible	4	649	appearing as such but not necessarily so
Officious	3	245	intrusive in a meddling or offensive manner
Neophyte	3	705	any new participant in some activity
Legerdemain	4	94	an illusory feat
Irreverence	4	341	a mental attitude showing lack of due respect
	38		

Appendix 4

Informed consent form

Title of the research project: ¹ Master's Thesis - The effects of mindfulness on high school students' vocabulary acquisition and stress reduction

Principal researcher's contact details:² Jana Machacova, phone number: +420 775 126 690, email: 41657359@epp.urv.cat

I.....³holder of identity card number.....:

- I have read the copy that I have received of the participant information document regarding the study.
- I have been able to ask and have received answers to my personal questions regarding the study and my participation in it.
- I understand that I am participating in this study in accordance with the specifications in the participant information document and in accordance with the answers that I have received to my questions and I understand the risks and benefits that this entails.
- I accept that my participation is voluntary and I freely agree to participate in the study.
- I understand that I can withdraw at any time from participating in the study and that my withdrawal will not affect me negatively in any way.
- I have been informed about how my personal data will be processed.
- I give my consent for my data to be accessed and used under the conditions specified in the document containing information on the study addressed to the participant.

☐ **Yes** ☐ **No**

- ⁴I give my consent for the dissemination of my personal data together with the publication of the results of the study.

☐ **Yes** ☐ **No**

- Once the research has been completed, the data obtained may be of interest to other related studies. In this regard, the following options are offered:

☐ **NOT TO AUTHORISE** the use of the data in other related research projects.

☐ **TO AUTHORIZE** the use of the data in other related research projects.

☐ **The destruction** of the sample.

☐ **The sample may be used** in future biomedical research projects in the same area.

¹ Doctoral Thesis, Bachelor's Thesis or Master's Thesis If possible, also include the thesis code or reference number.

² Give the contact details of the principal researcher; name, telephone, email and physical location.

³Indicate the full name of the participant.

⁴ Only if the results of the study that are published give the name of the persons or any data that identify the person, or their image or voice without anonymization techniques.

⁵ To express their consent, the participant signs the present consent form on.....
(date) in.....:(place)

Signature of the participant

⁶ To express their consent, the legal representative of the participant signs the present consent form
on.....(date) in.....: (place)

Name of the legal representative.....

Relationship of the legal representative with the participant.....

Signature of the legal representative.....

⁵ If the participant can freely give their consent, use this section until the following note, the text of which can be eliminated.

⁶ If the participant cannot read or write, is under the age of 14 or for any other reason cannot freely give their consent, their consent needs to be given by the tutor or legal representative. In this case, use this section and eliminate the one corresponding to the previous note.

INFORMATION ON PERSONAL DATA PROTECTION	
Data Controller	The data controller is the Universitat Rovira i Virgili with Tax Identification Number Q9350003A and based at Carrer de l'Escorxador, s/n, 43003, Tarragona.
Purpose	To participate in a <i>URV research project, Master's thesis at the URV</i> ⁷ under the terms described in the participant information sheet. If the study intends to publish, disseminate and reuse the results obtained, including personal data, the personal data will be used for these purposes provided that the interested party has given their consent.
Rights	The individuals concerned can exercise their right to access, rectify, remove, move, limit or oppose the processing of their data in writing to the General Registry of the URV at the same address as the URV, or in person at the General Registry of the URV or telematically in accordance with the instructions at https://seuelectronica.urv.cat/registre.html .
Further information	Individuals can find additional information about the processing of personal data in the <i>URV research project, Master's thesis at the URV</i> and about their rights at the URV's Processing Registry, which is published at https://seuelectronica.urv.cat/rgpd , where they will also find the Privacy Policy of the URV. They may also find this information on the Participant's Information Document regarding the study. Furthermore, they may ask our data protection officers any question regarding the protection of personal data by sending an email to dpd@urv.cat .

Appendix 5 – First test results for each question

	Experimental group	Control group
Accretion	83%	59%
Abnegation	86%	69%
Calumny	79%	78%
Circumlocution	69%	59%
Elegy	86%	78%
Adumbrate	76%	75%
Epistolary	79%	75%
Irreverence	83%	75%
Interlocutor	100%	84%
Presage	76%	81%

Appendix 6 – Second test results for each question

	Experimental group	Control group
Requisition	93%	73%
Tangential	83%	64%
Intransigent	83%	64%
Antediluvian	86%	73%
Quixotic	86%	64%
Ostensible	69%	61%
Officious	66%	67%
Neophyte	83%	73%
Legerdemain	83%	58%
Irreverence	100%	67%

Appendix 7

Experiment 1-Test: Two-Sample Assuming Unequal Variances		
	<i>Experimental group</i>	<i>Control group</i>
Mean	81.72413793	73.4375
Variance	343.3497537	1158.77
Observations	29	32
Hypothesized Mean Difference	0	
Df	49	
t Stat	1.195435587	
P(T<=t) one-tail	0.118835218	
t Critical one-tail	1.676550893	
P(T<=t) two-tail	0.237670436	
t Critical two-tail	2.009575237	

Appendix 8

Experiment 2 - t-Test: Two-Sample Assuming Unequal Variances		
	<i>Experimental group</i>	<i>Control group</i>
Mean	83.10344828	68.125
Variance	336.453202	1054.435484
Observations	29	32
Hypothesized Mean Difference	0	
Df	50	
t Stat	2.244029818	
P(T<=t) one-tail	0.014644278	
t Critical one-tail	1.675905025	
P(T<=t) two-tail	0.029288555	
t Critical two-tail	2.008559112	

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