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The Possible Learning and Teaching Benefits of Short Mind-calming Exercises in Undergraduate Courses

Abstract

The potential benefits of meditation exercises to promote more focused student attention and engagement have only rarely been quantitatively investigated at the college/university level. Here, I report student perceptions on the impacts of regular short mind-calming exercises at the beginning of every class in second, third, and fourth-year biology undergraduate courses, using voluntary anonymous surveys that were completed by at least two-thirds of each class (total enrollments 326, 68, and 15 respectively).

In the third year course, 93% of respondents indicated that the exercise was “enjoyable and relaxing”, 73% indicated that it was “a valuable use of lecture time because I feel it enhances deep learning”, 75% found it a useful perspective “to achieving balance/calm in my life”, and 76% rejected the suggestion that although “the exercises are useful, they are not course-related material and therefore are inappropriate within class time”. Responses to several other distinct survey statements were also strongly positive, and furthermore, very similar favourable results as above were obtained in the other two courses. Overall, although it is unclear whether these very short exercises *actually* enhanced learning, many students *perceived* that it did. Finally, my teaching performance in university-based student assessments of the third-year course was significantly elevated in the year with mind-calming exercises compared to each of the previous nine iterations in which I had been an instructor. Together, these quantitative results suggest that the regular use of such exercises has multiple direct and indirect benefits that may contribute to more effective undergraduate learning and teaching.

Les bénéfices potentiels d'exercices de méditation pour promouvoir une meilleure attention et une meilleure participation des étudiants ont rarement été étudiés de façon quantitative au niveau collégial ou universitaire. Dans cet article, je rapporte les perceptions des étudiants sur les effets de courts exercices pour apaiser le mental au début de chaque classe dans des cours de biologie de deuxième, de troisième et de quatrième années, en utilisant des questionnaires anonymes remplis bénévolement par au moins deux-tiers des étudiants dans chaque classe (effectifs totaux de 326, 68 et 15 respectivement).

Dans le cours de troisième année, 93 % des répondants ont indiqué que l'exercice était « plaisant et relaxant », 73 % ont indiqué qu'il était « une bonne utilisation du temps de classe parce que selon moi, l'apprentissage profond est amélioré », 75 % ont trouvé que c'était une perspective utile « pour atteindre l'équilibre et le calme dans ma vie », et 76 % ont rejeté la suggestion selon laquelle, bien que « les exercices soient utiles, ils ne font pas partie de la matière du cours et par conséquent ils ne sont pas appropriés dans le cadre de la classe ». Les réponses à plusieurs autres déclarations distinctes du questionnaire étaient également fortement positives et, de plus, des résultats favorables semblables à ceux rapportés ci-dessus ont été obtenus dans les deux autres cours. Dans l'ensemble, bien qu'il ne soit pas clair si ces très courts exercices renforcent *réellement* l'apprentissage, de nombreux étudiants *ont eu l'impression* que c'était le cas. Pour finir, les évaluations de mon enseignement par les étudiants du cours de troisième année dans les questionnaires préparés par l'université étaient considérablement meilleures au cours de l'année où nous avons pratiqué des exercices pour apaiser le mental par rapport à chacune des neuf évaluations précédentes dans les cours que j'avais enseignés. Pris dans leur ensemble, ces résultats quantitatifs suggèrent que l'utilisation régulière de tels exercices présente de nombreux bénéfices directs et indirects qui peuvent contribuer à un enseignement et à un apprentissage meilleurs au niveau du premier cycle.

Keywords

post-secondary education, mindfulness meditation, life-skill, university, pedagogy; enseignement post-secondaire, méditation consciente, compétence élémentaire, université, pédagogie

Cover Page Footnote

The author is very grateful to Paula Gardner and Jill Grose (Brock University) for the initial inspiration to try in-class meditation, and for their subsequent advice and enthusiasm. Thanks also to the two anonymous reviewers, as well as Harris Ivens, Maggie Veneman and Mike Hann for helpful comments and suggestions on earlier versions of this manuscript.

Contemplative meditation-based practices are rapidly increasing in popularity as a means to enhance individual well-being, quality of life, and in particular to cope with stress (Brown et al., 2007; Kabat-Zinn, 1990; Nhat Hanh, 1975; Williams & Penman, 2011). In the education sector in particular, there have been many recent initiatives to instill “mindful awareness” at the kindergarten as well as at the lower and upper grade high school levels across Europe and North America (Rechtschaffen, 2014; Schoerberlein & Sheth, 2009). By contrast, at the university level, student exposure to the practice and potential benefits of mindfulness is generally confined to extracurricular options that are specifically aimed at stress management and promoting mental health. Although quite a few medical and psychology programs now require students to take a separate mindfulness course (Britton et al., 2013; deBruin, Meppelink, & Bogels, 2015), the use of contemplative teaching practices directly in-class within regular core courses for those undergraduate programs or indeed within any other typical university curriculum is very rare.

Nevertheless, small cohorts of faculty have recently been incorporating various contemplative practices into a diverse range of undergraduate courses including women’s studies, practical environmentalism, philosophy, art, business management, physics and history of science, law, English, and chemistry (Barbezat & Bush, 2014; Zajonc, 2013). Regular short mindful awareness meditation exercises at the beginning of each class are the most common method for proponents to directly implement contemplative practice into post-secondary courses (for a video example of this practice, see link at Brock University Health Services, 2017). In reviewing the impacts of these practices, Barbezat and Bush (2014) conclude:

Contemplative and introspective modes of learning are an exciting pedagogical development. Placing students at the heart of their education fosters a rich environment for learning and provides the opportunity for students to cultivate attention, deepen their understanding of their studies, engender richer relationships with themselves and others, and stimulate profound inquiries into the nature of themselves and the world around them. (p. 20)

Although there is substantial qualitative and anecdotal information indicating considerable benefits to this type of practice in terms of promoting deeper, higher quality, more engaged student learning in university and college classrooms (Barbezat & Bush, 2014), quantitative data are almost entirely absent (Ramsburg & Youmans, 2014; Shapiro, Brown, & Astin, 2011). Here, I report a systematic study of student perceptions on the impacts of doing a regular approximately three-minute mind-calming exercise at the beginning of every lecture and discussion session in: (a) a third-year undergraduate ecology full semester course (n=68 enrolled students), (b) a large second-year biodiversity half semester course (n=326), and (c) a small fourth-year seminar full semester course (n=15). Detailed, anonymous, voluntary student surveys with carefully worded and value-balanced statements were used midway and at the end of each of three courses to address the following questions:

1. Do students enjoy such mind-calming exercises?
2. Do students feel the exercises promote deep learning?
3. Do students consider such mind-calming exercises a useful life skill?

Method

The Mind-calming Practice

At the beginning of each 50-minute scheduled slot in the third-year course, I first spent about four minutes outlining the core ecological themes of the lecture, how they related to the overall structure and conceptual framework of the course, and their biological significance (full course description available from the author upon request). This initial introduction is obviously critical pedagogically, but it also allowed some time for latecomers to arrive without disrupting the ensuing meditation exercise. Once that introduction was complete, I initiated the mind-calming exercise by closing the lecture hall doors (if necessary), dimming the lights, and sitting up on the teaching desk or demonstration bench. Each time, I would first state that this is an entirely voluntary exercise aimed at calming the students' minds to potentially enhance their subsequent participation and active learning in the ensuing lecture/discussion, and then ask that those students who prefer not to participate to remain quiet so as not to disturb their neighbors. Then I invited participants to close their laptops, sit firmly in their chairs, with their backs straight, hands on their knees, and feet planted firmly on the ground. I encouraged them to bow their heads slightly and close their eyes or make a soft gaze at some point in front of them. At this point, I would lead them through one of the following mind-calming exercises as a means to initially direct their minds to a particular focus and encourage them when their minds inevitably became subsequently distracted, to gently but firmly bring their minds back to that focus. The specific focus of the mind-calming exercise in each session was one of the following:

- a) Being consciously aware of one's breathing, either the temperature change and air flow at the nostrils, the sensation of airflow in the throat, the rising and falling of one's chest, or alternatively the corresponding contraction and expansion of the stomach with each inhalation and exhalation.
- b) Directing one's breathing so that it is primarily through the left or right nostril and inhaling 3 times on one side, and then the other, and back again, or alternating between nostrils with each inhalation.
- c) Concentrating attention on one's feet and their connection to the ground, aware of the sensations in the big toe of one foot, and then the next toe and so on all the way to the little toe, and then switching to the other foot.
- d) Focusing on one's hand, starting with the thumb, sensing the base connection to the palm, and then travelling out to the tip, then the index finger and so on all the way to the little finger, and then the palm itself and reflecting on all the intricate movements this organ is capable of, and then switching to repeat the action on the other hand.
- e) Imagining a "Google Earth" image of the top of one's head, and then zooming slightly out to see the shoulders and the knees, then zooming a little further to see one's neighboring classmates sitting in a similar position, then the whole lecture hall ("all of us here together"), then through the roof to see the whole building, and then the campus, and the city, with its particular geographic location near a very large lake, the region, and then further out to the continent, the whole Earth, and further out again as a planet in the solar system that itself is within the Milky Way galaxy, and finally out further as a tiny speck in the Universe. After a considerable pause, I would suggest reversing the imaginary image, zooming slowly in and back down through all the spatial scale levels down to the lecture

hall, and finally to one's body. Sometimes at the end of this exercise, I would paraphrase Singer (2007) by slowly saying: "Here we are, sitting in a classroom, in a building, on the edge of a planet, spinning around in the middle of nowhere."

- f) Performing a brief "body scan" where the students are asked to imagine a gentle heat or light beam focused on their toes, and then it slowly moving to their ankles, calves, knees, thighs, waist, shoulders, stomach and arms, shoulders, and head.
- g) Visualizing a field site that we had visited earlier in the course and imagining being there now, what it would look like, what sounds can be heard, what one can feel, and smell.
- h) Toward the end of the course, when there were multiple "active learning" sessions in a specialized room with large tables at which groups sat and discussed or solved problems, I would focus the mind-calming exercise on encouraging students to imagine watching a video from just above their heads, looking down on themselves listening, talking, and interacting with others.

During several of the mind-calming exercise sessions, students were reminded of the "chattering mind" that leads them to become distracted from the primary focus, and of the need to recognize and acknowledge that process, and then direct their attention back to the chosen focus. I explained that this deliberate redirection is the act of mindfulness and that it is a process, rather than a goal. In the early sessions I spoke quite a lot, but allowed more silent time within the exercise as the course progressed. Finally, I took care initially to explain that there was some evidence to suggest that such mind-calming exercises may enhance student learning capacity but that little of it was conclusive. I went on to indicate that this was the first large course in which I was trying the practice, and that it was very much an experimental trial that would be assessed based on surveys (described below) to determine its effectiveness for future courses. I also made clear that this was an entirely secular activity. Once the particular mind-calming exercise for each session was completed, which generally took 3-4 minutes, I asked the students to gently reawaken themselves to the present environment by slowly wiggling their toes and fingers, and then thanked them while raising the room light level. Afterwards, I immediately launched into a typical interactive question and answer-based lecture/seminar session. Example audio files of two such sessions are available in Supplementary Files 1 and 2.

In the very large second-year course (also 50-minute sessions), I essentially did a shortened (1-2 minute) version of the exercises described above at the beginning of every lecture in the half semester for which I was the instructor (14 sessions). By contrast, in the small fourth-year seminar course (80-minute sessions), I did extended versions (5-9 minutes) of the above exercises for all 24 sessions of the full semester.

Data Collection

Midway through the third-year course, I assessed students' reactions to the exercises using an online survey tool (surveyMonkey.com) with nine statements to which respondents would answer strongly agree, agree, neutral, disagree, or strongly disagree. The students were assured that the surveys were voluntary and anonymous. Furthermore, I emphasized that the goal was to evaluate the full spectrum of responses all the way from those who felt very positively to those who disliked the exercise practice. In addition, at the end of the survey, students were encouraged to write comments to "help me understand how this experience has been for you, and to offer suggestions or criticisms of the exercise and of its potential for you." At the end of the course, a

similar survey was carried out using many of the same questions as in the midway survey, along with some new ones, and again comments were invited at the end (see Appendix A for the full surveys). The surveys were accessible online for about one week, and one e-mail reminder was sent out two days before closing them. No indications of the survey results were provided back to the students to avoid biasing the subsequent data collection. In all, 38 and 29 students chose to respond to the midway and final surveys respectively. Total class enrollment began at 70 and dropped to 68 by the end of the course. Actual attendance was recorded in five separate lecture sessions (using unannounced randomly scheduled pop-up quizzes) through the course (mean 53, range 48-56), suggesting that on average the surveys were completed by 55-72% of those students who were choosing to regularly attend the class.

An identical format and very similar statements to those in the third-year course study were used in the anonymous voluntary surveys of the second-year students at the end of my instruction in that course (after a half semester) (See Appendix B), with 220 of the 326 enrolled students responding, and at the end of the fourth-year seminar course (See Appendix C), with 13 out of the total of 15 enrolled students responding. Note that in the interests of keeping the manuscript concise, and because the results from the three different courses are so similar, I have focused the subsequent text on describing the results of the third-year course in detail, but that all data for the other two course surveys are presented either in Figure 2 or Table 2.

Compliance with Ethical Standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Specifically, the students were informed in writing (and orally) that their participation in the surveys was voluntary, and that no IP address information would be collected from any respondents by the survey software so that the all data would be anonymous. The Queen's University General Research Ethics Board have reviewed and approved the protocol used in this study, including the use of class average exam scores and university-based student assessments of my teaching to assist in interpreting the students' survey data (GREB-GBIOL-018-18).

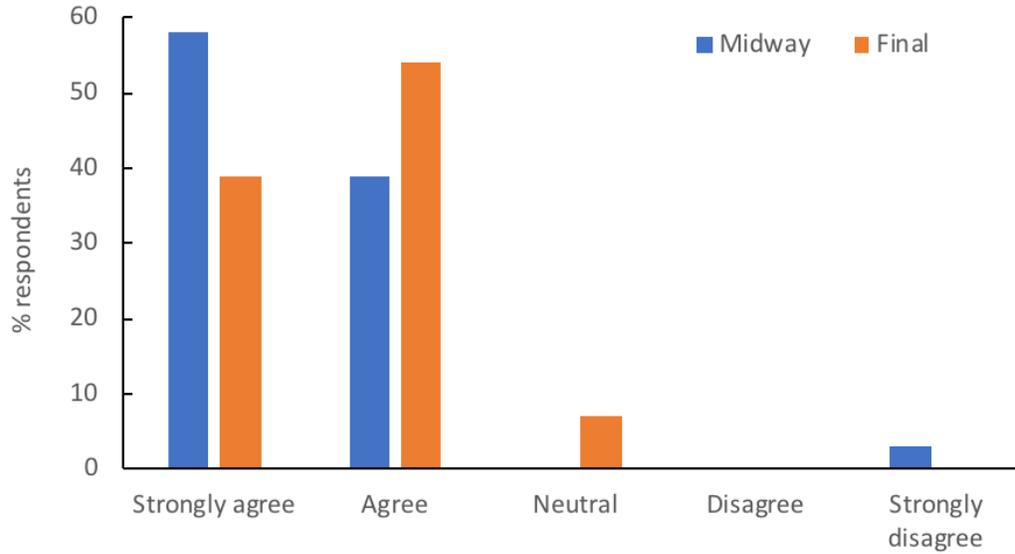
Results

Do Students Enjoy Such Mind-calming Exercises?

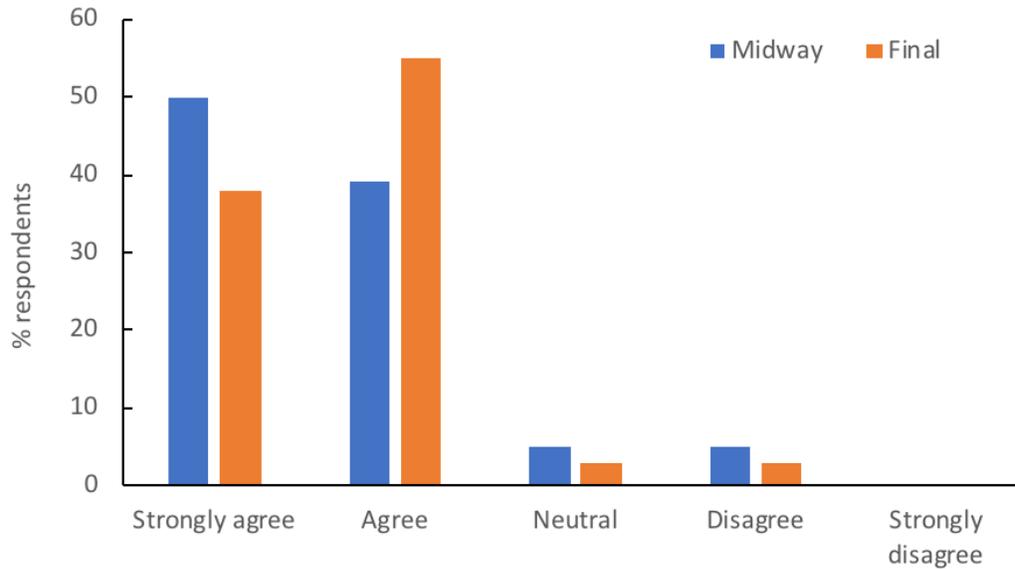
Ninety-seven and 93% of the respondents in the midway and final surveys respectively in the third-year course indicated that they either agreed or strongly agreed with the statement "The mind-calming exercise is enjoyable and relaxing" (Figure 1a). Furthermore, 89 and 93% of the respondents in the midway and final surveys respectively agreed or strongly agreed with the statement "I look forward to the mind-calming exercise in each lecture session" (Figure 1b). Nevertheless, at least 16% of the midway survey respondents indicated that they felt uncomfortable during the very first mind-calming exercise (Table 1, statement i), suggesting that the initial experience was unpleasant for some but that their enjoyment increased after multiple sessions. In an effort to provide balance across the survey, the following statement was included in the midway survey: "The mind-calming exercise in this course is inappropriate and should be stopped immediately." No respondents indicated agreement, and 92% either disagreed or strongly

disagreed (Table 1, statement ii). Together these results strongly support the conclusion that the vast majority of responding students thoroughly enjoyed the mind-calming exercises in this course.

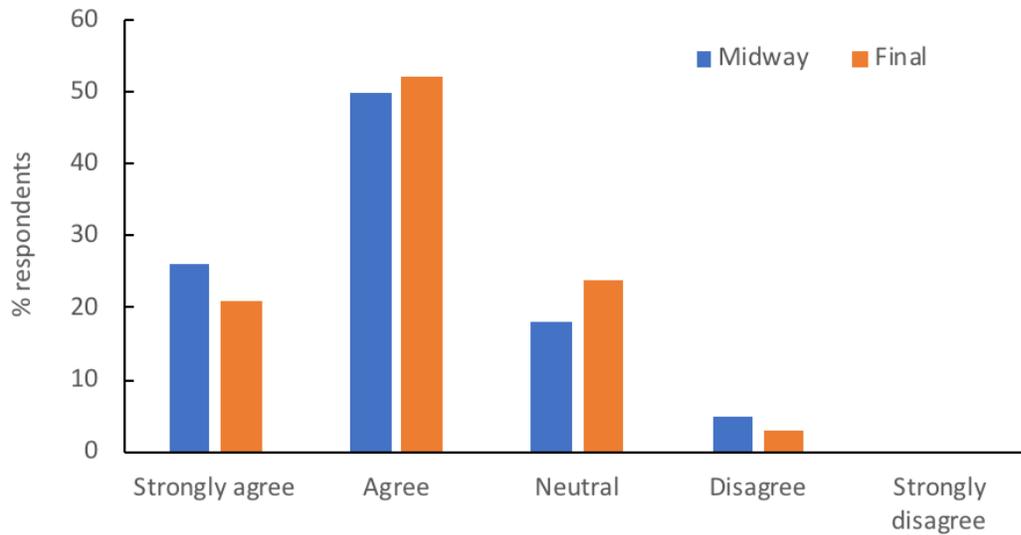
a) The mind-calming exercise is enjoyable and relaxing



b) I look forward to the mind-calming exercise



c) The exercise is a valuable use of lecture time because I feel it enhances deep learning



d) This exercise has introduced me to a valuable perspective that is useful outside the course in learning how to achieve calm/balance in my life

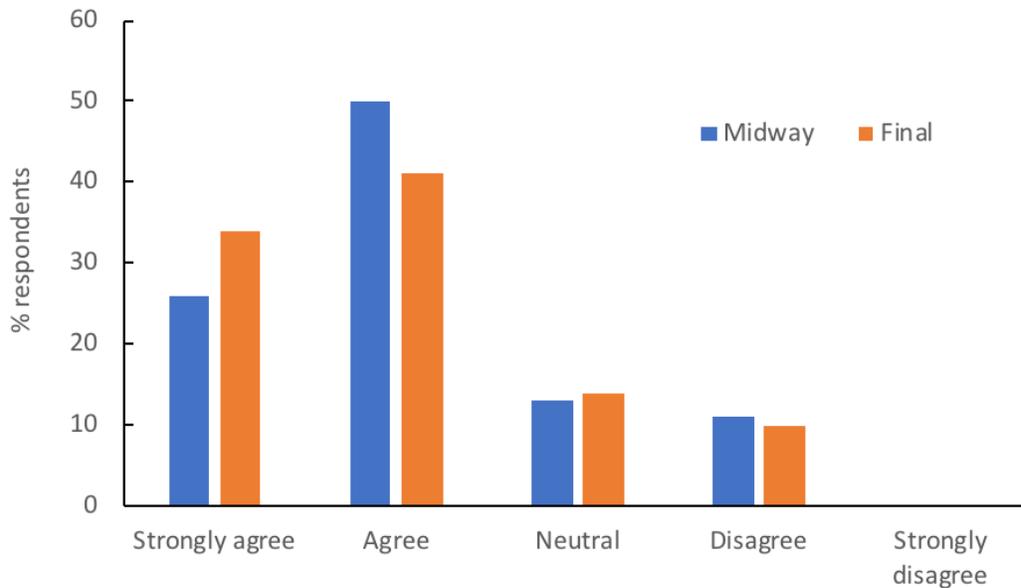


Figure 1. Third-year course student responses to survey statements relating to their enjoyment (a, b), perception of enhanced learning value (c), and broader life-skill benefit (d) of the regular mind-calming exercises at the midpoint and end of the course (data are % of respondents (numbering 38 and 29 in the midway and final surveys respectively); mean course attendance 83%; total enrollment 68 students during each of the surveys).

Nevertheless, survey statements that suggested expanding the scope of the practice by doubling the exercise time (Table 1, statement iii) or by including an extended mind-calming session at the end of the course to aid reflection were met with only moderate support, and the majority (41% and 50%) were neutral on this issue in both the midway and final surveys respectively (Table 1, statements iv, v). Finally, the issue of perceived appropriate class size and stage in the undergraduate program for the mind-calming exercises was investigated. 71% of respondents disagreed with the statement that this practice is really only appropriate for 4th year courses with class sizes less than 20 students (Table 1, vi).

Table 1

Third-Year course Students' Self-reported Enjoyment, Perception of Enhanced Learning Value, and Perception of Broader Life-skill Benefit of the Mind-calming Exercise (data are % respondents)

Survey Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Enjoyment					
(i) Exercise felt uncomfortable on first occasion (M)		16	26	26	32
(ii) This practice should be stopped immediately (M)			8	16	76
(iii) Time used for the exercise should be doubled (M)	3	13	39	37	8
(iv) Have a final extended session at the end of the course to aid reflection (M)	11	27	41	22	
(v) Have a final single extended session at the end of the course to aid reflection (F)		18	50	29	4
(vi) Only appropriate for 4 th year small classes (< 20 students) (M)		8	21	45	26
Perceived learning enhancement					
(vii) Exercises are useful to some students, but are not course-related material and therefore are inappropriate within class time (F)		7	17	48	28
(viii) Exercise less effective and valuable as course progressed (F)			10	69	21
(ix) There were times during our lectures when I noticed myself drifting away into distractions, and was able to refocus using this mind-calming approach (F)	10	31	31	21	7

Broader life-skill benefit					
(x) I have used this practice to help me cope with nervous or stressful situations in my life (F)	21	38	31	7	3

Note. The data reported here are the third-year course student responses to all survey statements that have not already been presented in Figure 1. Results are % as described in Figure 1 legend; “M” and “F” indicate statements in the midway and final surveys respectively.

Do Students Feel the Exercises Promote Deep Learning?

Seventy-six and 73% of respondents in the midway and final surveys respectively of the third-year course indicated that they either agreed or strongly agreed with the statement “The exercise is a valuable use of my time in the lecture time-slot because I feel it enhances the depth and quality of my learning” (see Figure 1c). Furthermore, and again to achieve balance across the final survey, the following statement was included: “Mind-calming exercises may be useful to some students, but they should be provided as an extracurricular university-supported activity because they are not course-related material and therefore are inappropriate within class time.” Only 7% of respondents agreed with this statement, while 76% either disagreed or strongly disagreed (Table 1, vii). Furthermore, 90% of respondents in the final survey disagreed or strongly disagreed with the statement: “As we progressed through the course repeatedly doing this mind-calming exercise, it became less effective and valuable for me” (Table 1, viii). Together, the above results suggest that most respondents believed that the exercises were benefitting their learning. However, in response to the more probing statement that the mind-calming exercises might be a contributory cause for their perceived enhanced learning, the responses were distributed across all categories with 41% agreeing, 31% neutral and 28% disagreeing (Table 1, ix).

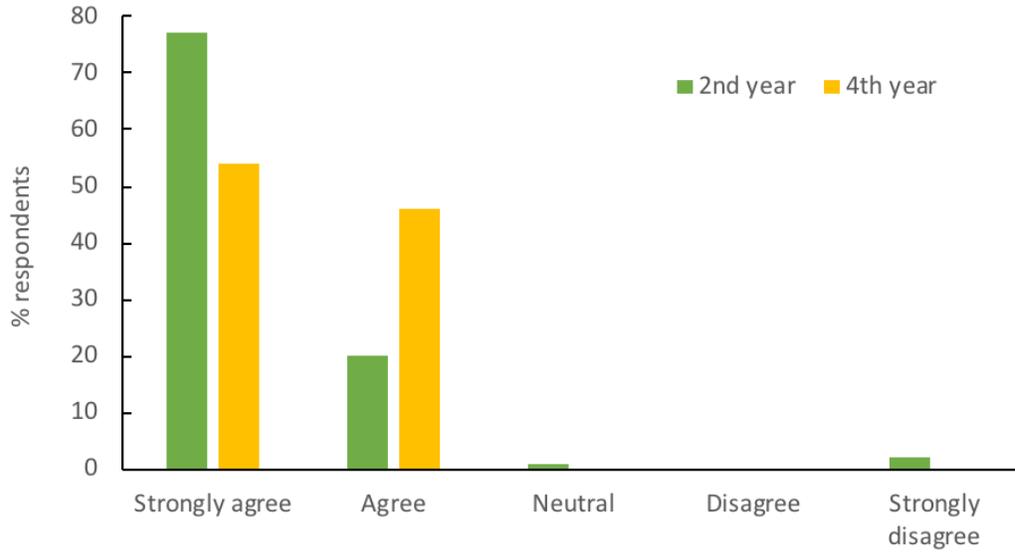
Do Students Consider Such Mind-Calming Exercises A Useful Life Skill?

Seventy-six and 75% of respondents in the midway and final surveys respectively of the third-year course indicated that they either agreed or strongly agreed with the statement “This exercise has introduced me to a valuable perspective that is useful outside the course in learning how to achieve calm/balance in my life” (Figure 1d). In response to the final survey statement “I have used this practice to help me cope with nervous or stressful situations in my life”, 59% of respondents agreed or strongly agreed (Table 1, x). Overall, therefore, it is very clear that a large proportion of the respondents valued the potential stress-coping benefits of being able to use mind-calming practices, and that over half of them had actually used this practice outside the classroom.

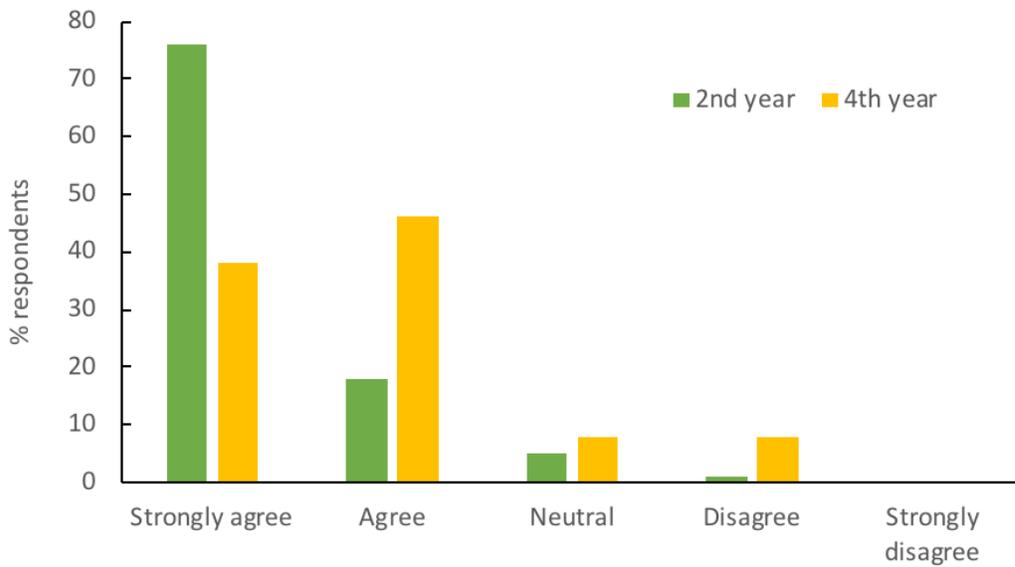
Did Student Responses Differ Among the Courses?

Even though the three courses differed substantially in size and in the academic stage at which they occur in the undergraduate program, the overall patterns in the survey responses were remarkably similar (Figures 1 and 2; Tables 1 and 2). Furthermore, the students’ comments at the end of the online surveys in each of the courses were consistently very positive (Appendices 2, 3, and 4).

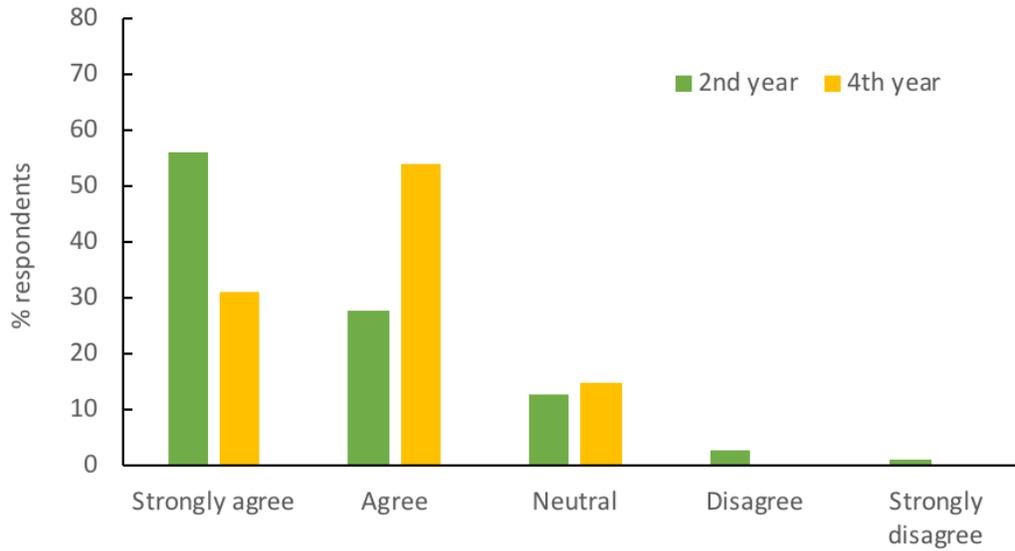
a) The mind-calming exercise is enjoyable and relaxing



b) I look forward to the mind-calming exercise



c) The exercise is a valuable use of lecture time because I feel it enhances deep learning



d) This exercise has introduced me to a valuable perspective that is useful outside the course in learning how to achieve calm/balance in my life

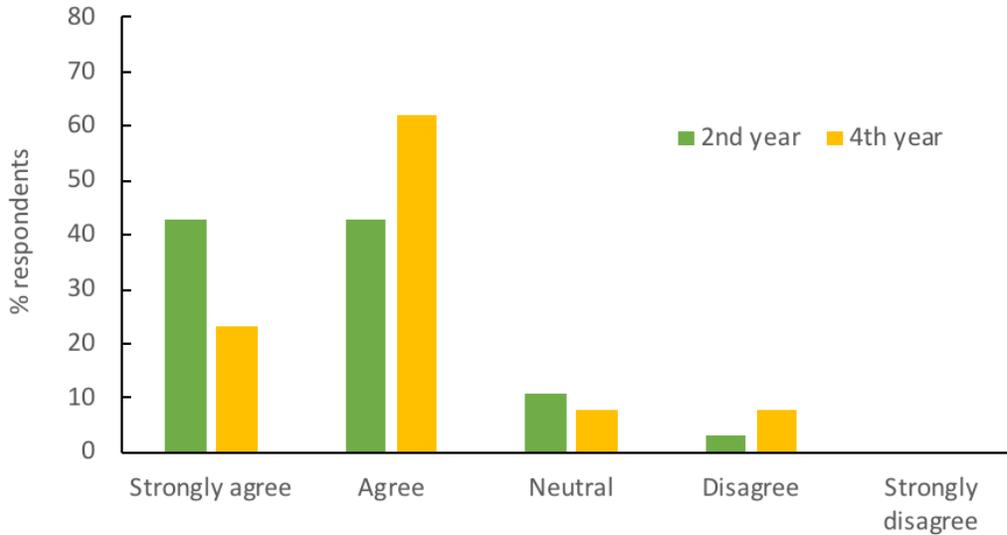


Figure 2. Second and fourth-year course student responses to survey statements relating to their enjoyment (a, b), perception of enhanced learning value (c), and broader life-skill benefit (d) of the regular mind-calming exercises (data are % of respondents (numbering 220 in the 2nd year course and 13 in the 4th year seminar course); total course enrollments 326 and 15 respectively).

Table 2

Second and Fourth-year course Students' Self-reported Enjoyment, Perception of Enhanced Learning Value, and Perception of Broader Life-skill Benefit of the Mind-calming Exercise (data are % respondents)

Survey Statement	Course Level (Year)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Enjoyment						
(i) Exercise felt uncomfortable on first occasion	2nd	1	7	13	32	47
	4th			8	85	8
(ii) This practice should be stopped immediately	2nd	1	1		11	88
	4th			15	8	77
(vi) Only appropriate for 4 th year small classes (< 20 students)	2nd			5	38	56
(v) Have a final single extended session at the end of the course to aid reflection	4th		42	50	8	
Perceived learning enhancement						
(vii) Exercises are useful to some students, but are not course-related material and therefore are inappropriate within class time	2nd		1	10	42	47
	4th			31	62	8
(ix) There were times during our lectures when I noticed myself drifting away into distractions, and was able to refocus using this mind-calming approach	2nd	19	32	34	11	3
	4th		31	46	23	
Broader life-skill benefit						
(x) I have used this practice to help me cope with nervous or stressful situations in my life	2nd	38	34	20	9	

Note. The data reported here are the second and fourth-year course student responses to all survey statements that have not already been presented in Figure 2. Results are % as described fully in Figure 2 legend. Roman numerals refer to corresponding statements in Table 1 (statement “v” above was not included in the second-year course survey, and statements “vi” and “x” above were not included in the fourth-year course survey).

Discussion

These surveys of the impacts of short mind-calming exercises at the beginning of each class in three markedly different undergraduate courses provide quantitative data demonstrating benefits to the students in terms of their course enjoyment, and therefore presumably of their engagement with the course materials. Furthermore, the vast majority of the respondents consistently reported strongly positive responses on the values of such mind-calming exercises for improving the quality and depth of their learning, and for introducing them to a useful skill to cope with life's stresses.

What Factors Might Constrain the Widespread Applicability and Usefulness of Such Practices in Post-Secondary Education?

Perhaps the greatest constraint is that the class time invested in the exercises means even less time available to actually teach the course material. However, many leaders in undergraduate education are highlighting concerns about information overload - the 'tyranny of content' - that is pervading postsecondary teaching, and that is growing in intensity as the knowledge base increases (Berg & Seeber, 2016; Mazur, 1996). They argue that we should be redirecting our teaching efforts away from maximising detailed knowledge content, and more towards actively engaging students with the fundamental concepts of the material and whatever questions, problems or arguments it addresses (Mazur, 1996). This redirection toward deeper, more actively engaged learning that is focussed on skills such as critical thinking and synthesis may be assisted by the use of contemplative approaches such as mind-calming exercises. As post-secondary teachers, Barbazet and Bush (2014) point out:

We have often stressed the highly instrumental form of learning to the exclusion of personal reflection and integration. It is understandable how this happens; developing careful discursive, analytical thought is one of the hallmarks of a good education. However, creative, synthetic thinking requires more than this; it requires a holistic engagement and attention that is fostered by the student finding himself or herself in the material. No matter how radically we conceive of our role in teaching, the one aspect of students' learning for which they are unambiguously sovereign is the awareness of their experience and their own thoughts, beliefs, and reactions to the material covered in the course. In addition, students need support in discerning what is most meaningful to them – both their direction overall and their moral compass. Without opportunities to inquire deeply, all they can do is proceed along paths already laid down for them. (p. 4)

A second major constraint in the implementation of contemplative practices is that the capacity to incorporate this kind of exercise directly into undergraduate courses will obviously depend on the outlook and training of the faculty and program associates/lab instructors involved. On the one hand, for those faculty who are already very familiar with meditation/mindfulness, leading such short sessions may seem relatively straightforward. For the vast majority who are presumably not familiar, courses on meditation practice (and even instructor-level options) are now widely available. It is absolutely critical for a successful outcome that the person leading contemplative exercises such as those described in this study is fully familiar with the practice and its underlying goals. For example, the leader should have an awareness of, and sensitivity to, the psychological anxieties that some students may experience by for example dimming the lecture

room lights, or making particular statements during the mind-calming exercise such as “Right now is the only time when you are alive” (see Appendix D, comment #16).

What Future Research Directions Does This Study Suggest?

Assessments of the pedagogical effectiveness of most contemplative teaching methods aimed at enhancing thinking abilities and deep comprehension desperately need quantitative data to support the qualitative perceptions of its practitioners (Barbazat & Bush, 2014; Shapiro et al., 2011). Although the vast majority of respondents in this study clearly and consistently felt that the mind-calming exercises enhanced their learning, further extensive research is now warranted and needed to determine if such exercises actually did achieve that goal. The survey results reported here are an important quantitative indicator, but properly designed experimental studies (e.g., Ramsburg & Youmans, 2014) will be required to fully evaluate the benefits of such practices.

Furthermore, I had assumed that class size would be a fundamental issue constraining the usefulness of such approaches in courses across an undergraduate program. Since the exercise must always be voluntary, there may be a critical class size threshold beyond which passive cooperation by those students who choose not to actively participate in the exercise breaks down, disrupting the lecture room atmosphere necessary for mind-calming. Students in the second and third-year courses in this study clearly felt that large class size did not constrain the value of the exercises (Tables 1 and 2 vi), suggesting that if there is an upper limit on appropriate class size, it must be at enrollments greater than 326.

Does the Use of Such Practices Enhance Teaching Quality?

Many faculty and lab instructors will feel too busy and stressed to take on this extra activity. However, those emotions are exactly what the mind-calming exercises are attempting to alleviate, and therefore undertaking such exercises in class may assist not only the students but also the teacher. There is a small but growing body of literature by proponents of contemplative teaching methods that highlights the perceived benefits of such exercises for the quality of one’s teaching (Barbazat & Bush, 2014; Berg & Seeber, 2016; Hooks 1994; Shapiro et al., 2011; Schoerberlein & Sheth, 2009; Rechtschaffen, 2014). My study provides rare quantitative data on student appreciation of one such contemplative method, and therefore should become part of the fundamental foundation and rationale for future in-depth pedagogical analyses of whether the practices are actually effective in enhancing not just learning as indicated earlier, but also teaching.

In terms of student assessment of teaching performance, the introduction of these regular mind-calming exercises had a substantial positive impact in the courses studied here. Like most post-secondary institutions, Queen’s university has a standard set of ten survey statements which in our case are circulated on paper at the beginning of one lecture toward the end of each course to evaluate student perception of teaching performance. The students are given about 10 minutes to complete them anonymously, and then return them to a class student representative in the lecture hall. A meta-analysis of all such teaching survey results for all courses across the entire Department of Biology (about 33 faculty) over nine years (that included normalization to remove the impact of variation in class size), concluded that high scoring in the following university-administered teaching assessment survey statements (S) were particularly closely correlated with perceived teaching quality: “Overall, an effective teacher” (S2 - the survey statement that was most highly

correlated with faculty internal and external teaching award successes); “I learned a great deal from this course” (S3); and “Overall, an excellent course” (S1) (Robertson, 2005).

I have been involved in teaching the third-year undergraduate course used in this study 10 times over the past 13 years, and prior to 2017, my performance in these survey statements has generally been consistent (Figure 3) - apart from obvious “teething” issues in my first year! However, the strong increases in all of the most critical teaching survey statements cited above between 2016 and 2017 are striking, especially because (unlike previous iterations) I taught the course alone in both years, using very similar materials with mostly minor changes to content and presentation, and I taught it in the same question-and-answer seminar style rather than standard lecture style. The principal difference between the two years was the introduction of the mind-calming exercises in 2017. Overall then, there is little doubt that these exercises significantly enhanced the university-administered student assessments of my teaching performance. How should this effect be interpreted? Although these consistent performance increases across those critical teaching survey statements could be due to more effective teaching and learning as a result of the mind-calming exercises, I suggest that they are primarily a consequence of student perception of their implementation as being an indicator of how much their professor cares about them as learners and as individuals (Figure 3 - see strong corresponding increase in response to S10: “The instructor in this course showed a genuine concern for students”; and Appendix D which contains numerous students’ responses in the comments section of the third-year course online surveys that support this contention). Experts in education have long recognized that a sense of “connection” to the teacher, and overall “atmosphere” in the learning environment, fundamentally affect the learners (Whitehead, 1929).

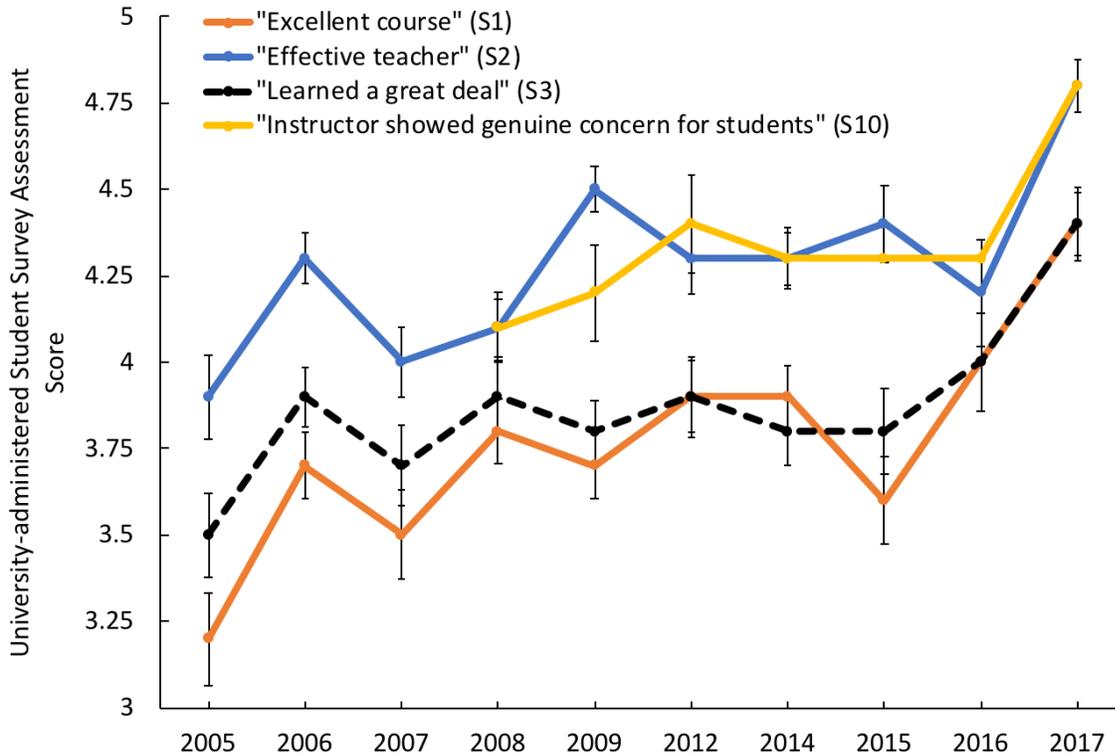


Figure 3. Student assessment scores for the following university-administered survey statements (S) of teaching performance for all years in which I have been involved in the course: S1 “Overall, an excellent course”; S2 “Overall, an effective teacher”; S3 “I learned a great deal from this course”; S10 “The instructor in this course showed a genuine concern for students”. Data are means and standard errors of the student response categories ranging from strongly agree, agree, neutral, disagree to strongly disagree weighted from 5 to 1 respectively; n (i.e., number of respondents) = 44-92. Data for survey statement S10 are only available from 2008 onwards.

Impact on Exam Performance

Almost identical short-answer style questions in the third-year ecology course were deliberately used for the mid-term exam in both years, and likewise for the final exam in both years. Furthermore, there was no history of this exam duplication practice in previous iterations of the course, implying that the students would not have been anticipating it. The average class mid-term exam score for the year of the mind-calming exercise was significantly higher than in the previous year (means of 77% and 65% respectively; $p < 0.007$ (t test with $n = 33$ and 53 respectively)) for those students who were present at all 5 times when attendance was recorded (during random pop-up quizzes) in each year. That particular student group were analysed because they are likely to have experienced the strongest potential impact of the mind-calming exercises, but the same effect also occurred for the whole class (means of 71% and 61% respectively; $P < 0.008$ (t test with $n = 64$ and 85 respectively)). By contrast, the final exam results for the regularly attending student group in those two years tended to be slightly lower in the year with mind-calming exercises (means of 71% in 2017 and 73% in 2016 respectively; $P < 0.08$ (t test with $n = 33$ and 53 respectively)), and this effect was statistically significant when the whole class data were analysed (means of 73% in 2017 and 77% in 2016 respectively; $P < 0.007$ (t test with $n = 64$

and 85 respectively)). Furthermore, there were no significant differences in overall final course grades (lecture exams and lab exercises, each worth 50% of total final mark) between the two years using either the regular attender or whole class datasets.

In summary, I suggest that although there is some indication of a possible beneficial impact of the mind-calming exercises (i.e., in the midterm), caution is necessary in interpreting these results. The methodological approach used in this study was not designed primarily to address exam performance and is weak because of variation in marking quality by the multiple different teaching assistants within each year, and between years (both midterm and final exams comprised short answer-type questions that therefore involve considerable subjectivity in grading), as well as differences in student cohorts. Conclusive assessments of the impact of contemplative exercises on student learning, and on exam performance, would require a much more rigorous experimentally-based study design with carefully validated measurements, where students are randomly assigned to meditation and control groups, with the latter involving a non-meditative program that accounts for instructor attention, time commitment, and that incorporates an equivalent “expectation of improvement” which the group assigned to the meditation may anticipate (Shapiro et al., 2011, p. 517).

Additional Insights from the Survey Comments of the Third-Year Course Students

The survey comments from both the midway and end-of-course respondents in the third-year course were almost entirely positive, with many indicating that the exercise was particularly beneficial in settling them down once they had arrived at the lecture hall so that they could concentrate more effectively on the course material. Note that for brevity this text section is focussed on the student comments in the third-year course surveys only, but that similar patterns of response content were present in the second- and fourth-year course student comments (full responses for each course are available from the author upon request). For example, see the following sub-quotes from the student responses (which are reported in their entirety by # in Appendix D): “At first this felt a bit awkward, but now it really helps center my thoughts and get me “in the mind set” for lectures” (#1); “I genuinely look forward to this exercise, as I often feel less stressed, calmer, and open-minded afterwards.” (#4); “I find the exercise to be very beneficial to me. It allows me to calm down and prepare myself for lecture. It makes me feel like my professor cares very much about my learning experience, which in turn makes me feel eager to learn in an environment where my input and participation is valued. When I find myself distracted in class, it is only for a fleeting moment as I am drawn back to the course content when I remember the breathing exercise and how the mind often wanders and we must bring it back into focus.” (#6); “I like this exercise as it allows me to take a moment to breathe deeply and take my mind away from stressors. It helps when slowly moving into an engaging lesson as it almost allows for a ‘fresh mind’.” (#7, and see similar comments #1, #8, #11, #13, #21, #22, #23, #27, #33, #35, #41, #42, #44); “I actually missed our exercises during guest lectures, as it felt that something was “missing” from the learning experience.” (#31, see also #46).

Several students reported potential benefits not just within the course used in this study, but in their other courses, as well as in dealing with life issues. For example:

“With very little free time and a lot of work, university can seem like a non-stop race to catch-up. This exercise helps me calm down, relax, and therefore be more productive and less anxious throughout the day. I have started using it outside of class as well and have found it very effective at helping me keep focused and on task without the feeling of despair that normally accompanies the workload” (#14).

“It was a very unique experience engaging in the exercise at the beginning of the lectures and I thought it was a bit weird at first but I'm glad we did it as it has given me the opportunity to explore techniques that could enrich my own life that I may have never thought or bothered to try” (#36).

Furthermore, some students clearly felt that they became more aware of the process of their learning. In other words, they were acknowledging metacognition – which “represents the capacity to be aware of, reflect upon, and exercise control over one’s cognitive processes, including those important to learning” (Shapiro et al., 2011, p. 512). Metacognition is an integral part of mindfulness (Britton et al., 2013) and is believed to be a very important component of deep comprehension (Shapiro et al., 2011). One student commented:

“Learning in a university setting has become more and more focused on output in terms of assignments and tests, and less focused on the value of actually learning. Many students are simply looking for the easiest way to get a good mark while learning the least possible amount of material. I found the mind-calming exercise not only helped me learn better, but reminded me that the purpose of being in university is to learn as deeply as possible” (#34, see also #43).

Several students queried whether the exercise was actually enhancing their learning and questioned the loss of time that could have been used for covering course material. “I genuinely enjoyed the mindfulness exercise, but did feel on certain occasions (like right before the midterm, or when we were rushing to finish material), it did cut into our limited class time.” (#40, see also #18). However, others specifically stated that they thought taking the 2-3 minutes was worth it (#35, #37). Perhaps the survey comment best representing and summarizing the various issues associated with the practice was the following:

“I really liked this activity because it introduced me to the world of mindfulness and the possibilities of using ‘mind-calming’ techniques to focus on being aware of the present. However, I am not sure if these mind-calming techniques have any effect on deep learning and engagement through the way they were being practiced in lecture. With only 2-3 mins about three times per week, there was never a lot of time to figure out how to use the strategies effectively once lecture had started/in other tasks. Only when I would practice mindfulness techniques at other points in the week would I feel like I had improved my sense of balance/awareness. That being said, without the exercises and the professor's guidance, I would have likely never started practicing mindfulness outside of class. Unfortunately, with 50-minute lectures, devoting more than 5% of the time to mindfulness activities may actually do more harm than good when it comes to students’ learning (i.e., instead, perhaps take the last three minutes of every lecture to summarize key points, major takeaways, closing thoughts, etc.). In closing, I enjoyed the exposure to the mindfulness

techniques, but I am unsure whether or not they delivered on their potential in the setting of short sessions in lectures. Providing students with longer, more meaningful opportunities for mind-calming outside of lecture may be more appropriate” (#43).

Overall Conclusions

The phenomenon of mindfulness has undoubtedly been booming in western society over the past few years (Kabat-Zinn, 1990; Nhat Hanh, 1975; Williams & Penman, 2011). Its origins – the principles of striving to keep one’s consciousness focussed on being aware and attentive to one’s immediate environment in the present moment, and to constantly and deeply acknowledging the interconnectedness and impermanence of all things – extends back for thousands of years in Buddhist philosophy (Batchelor, 1998), the Greek philosophy of Epicurus and his Roman successor Lucretius (Greenblatt, 2011), and also most likely in many other cultures including Sufism (Khayyam, 2010), and those of Indigenous peoples such as the Inuit and First Nations of North America (François, 2007). The current manifestation of these principles in western society could be deemed a fad. Numerous websites and practitioners suggest mindfulness meditation – even for 5-10 minutes a day – can be a panacea to all sorts of physical and mental ailments (e.g., www.headspace.com). Although such practices may be helpful, they are unlikely to be fundamental “game changers,” and many of the claims are unjustified and not sensible. However, prolonged and deeper engagement with meditation can clearly have significant impacts on the structure and physiological functioning of the brain (Cahn & Polich, 2006; Hölzel et al., 2011), as well as reducing stress (Goyal et al., 2014; Shapiro et al., 2011), and improving cognitive abilities (Brown et al., 2007; Tang et al., 2007). At the very least, the short-term exercises in the three courses in this study introduced the students to the concept and practice of calming the mind, with at least ephemeral short-lived benefits in terms of enhanced enjoyment and deeper perceived learning ability. There’s no harm in those outcomes for sure, and they alone probably justify efforts at some implementation of the practice in post-secondary education classes – no matter what the topic. And maybe, for even just a few students, exposure to this practice might be the first step on a very long path that will ultimately lead to a much deeper fundamental awareness of themselves, and their relationship to Life and to their environment – (i.e., to more mature ways of living).

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Appendix A Midway and Final Survey Items for the Third Year Course

Midway Survey Statements

1. When the mind-calming exercise was conducted on the first occasion, it made me feel uncomfortable
 2. The mind-calming exercise is enjoyable and relaxing
 3. The mind-calming exercise in this course is inappropriate and should be stopped immediately
 4. The exercise is a valuable use of my time in the lecture time-slot because I feel it enhances the depth and quality of my learning
 5. I look forward to the mind-calming exercise in each lecture session
 6. The time used for this exercise in each lecture should be doubled to make it more effective
 7. This approach in teaching should be developed and extended to a longer session toward the end of the semester to allow some deeper reflection on the overall value to me of the learning in this course
 8. This exercise is really only appropriate for 4th year courses with small class sizes (< 20 students)
 9. This exercise has introduced me to a valuable perspective that is useful outside the course in learning how to achieve calm/balance in my life
 10. Please use this text space to help me understand how this experience has been for you, and to offer suggestions or criticisms of the exercise and of its potential for you
-

Final Survey Statements

1. As we progressed through the course repeatedly doing this mind-calming exercise, it became less effective and valuable for me
 2. The mind-calming exercise is enjoyable and relaxing
 3. Mind-calming exercises may be useful to some students, but they should be provided as an extracurricular university-supported activity because they are not course-related material and therefore are inappropriate within class time
 4. The exercise is a valuable use of my time in the lecture time-slot because I feel it enhances the depth and quality of my learning
 5. I look forward to the mind-calming exercise in each lecture session
 6. There were times during our lectures when I noticed myself drifting away into distractions, and was able to refocus using this mind-calming approach
 7. This approach in teaching should be developed and extended to a single longer session toward the end of the semester to allow some deeper reflection on the overall value to me of the learning in this course
 8. This exercise has introduced me to a valuable perspective that is useful outside the course in learning how to achieve calm/balance in my life
 9. I have used this practice to help me cope with nervous or stressful situations in my life
 10. Please use this text space to help me understand how this experience has been for you, what its potential might be for you, to offer suggestions of the exercise and how it might be improved, or to inform me of your criticisms of it.
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Note. Statements 1 through 9 for both the midway and final surveys were rated on 5-point scale ranging from *Strongly Disagree* to *Strong Agree*.

Appendix B

Survey Items for the Second Year Course

Survey Statements

1. When the mind-calming exercise was conducted on the first occasion, it made me feel uncomfortable
2. The mind-calming exercise is enjoyable and relaxing
3. The mind-calming exercise in this course is inappropriate and should be stopped immediately
4. The exercise is a valuable use of my time in the lecture time-slot because I feel it enhances the depth and quality of my learning
5. I look forward to the mind-calming exercise in each lecture session
6. Mind-calming exercises may be useful to some students, but they should be provided as an extracurricular university-supported activity because they are not course-related material and therefore are inappropriate within class time
7. There were times during our lectures when I noticed myself drifting away into distractions, and was able to refocus using this mind-calming approach
8. This exercise has introduced me to a valuable perspective that is useful outside the course in learning how to achieve calm/balance in my life
9. Please use this text space to help me understand how this experience has been for you, and to offer suggestions or criticisms of the exercise and of its potential for you
10. I have used this practice to help me cope with nervous or stressful situations in my life
11. Please use this text space to help me understand how this experience has been for you, what its potential might be for you, to offer suggestions of the exercise and how it might be improved, or to inform me of your criticisms of it.

Note. Statements 1 through 10 were rated on 5-point scale ranging from *Strongly Disagree* to *Strong Agree*.

Appendix C Survey Items for the Fourth Year Course

Survey Statements

1. When the mind-calming exercise was conducted on the first occasion, it made me feel uncomfortable
2. The mind-calming exercise is enjoyable and relaxing
3. The mind-calming exercise in this course is inappropriate and should be stopped immediately
4. The exercise is a valuable use of my time in the seminar time-slot because I feel it enhances the depth and quality of my learning
5. I look forward to the mind-calming exercise in each lecture session
6. Mind-calming exercises may be useful to some students, but they should be provided as an extracurricular university-supported activity because they are not course-related material and therefore are inappropriate within class time
7. There were times during our lectures when I noticed myself drifting away into distractions, and was able to refocus using this mind-calming approach
8. This exercise has introduced me to a valuable perspective that is useful outside the course in learning how to achieve calm/balance in my life
9. This approach in teaching should be developed and extended to a longer session toward the end of the semester to allow some deeper reflection on the overall value to me of the learning in this course
10. Please use this text space to help me understand how this experience has been for you, and to offer suggestions or criticisms of the exercise and of its potential for you

Note. Statements 1 through 9 were rated on 5-point scale ranging from *Strongly Disagree* to *Strong Agree*.

Appendix D

Comments from the Midway and Final Surveys in the Third Year Course

Please use this text space to help me understand how this experience has been for you, and to offer suggestions or criticisms of the exercise and of its potential for you.

Midway Survey

1. At first this felt a bit awkward, but now it really helps center my thoughts and get me "in the mind set" for lectures (particularly at 8:30am on Wednesdays). I like it!
 2. I enjoy the meditation session. It was awkward at first but now I look forward to it. It is ideal for 3rd or 4th year classes but should not be restricted to 20 person classes. It would be cool if the instructor had some more calming words beyond "focus on breathing". Otherwise I enjoy it and feel it relaxes me before class discussions ensue.
 3. It is as great as you are!
 4. Although there are mornings where there are noticeable distractions that make it hard to effectively participate (e.g., students typing or coming to class late), I find this to be an extremely beneficial exercise. I genuinely look forward to this exercise, as I often feel less stressed, calmer, and open-minded afterwards. I do not know how much more effective doubling the length of time would be for me, as I currently have a lot of trouble clearing my mind for the current 2 minutes. I would love to have this exercise for other lectures; however, I wonder how feasible it would be in settings outside of your classroom. I would expect many professors would either feel too rushed to meet deadlines to consider this exercise, have doubts on its overall efficacy in larger group settings, or simply lack the comfort to facilitate this exercise. Regardless, thank you for running this mind-clearing exercise with us!
 5. I find this is a helpful exercise in a smaller class size (such as ours) but in a larger class like a second-year course it may be less useful due to more opportunity for distraction.
 6. I find the exercise to be very beneficial to me. It allows me to calm down and prepare myself for lecture. It makes me feel like my professor cares very much about my learning experience, which in turn makes me feel eager to learn in an environment where my input and participation is valued. I think the exercise is an appropriate length and when I find myself distracted in class, it is only for a fleeting moment as I am drawn back to the course content when I remember the breathing exercise and how the mind often wanders and we must bring it back into focus. I think this exercise is only appropriate for 3rd and 4th year classes of 75 students or less.
 7. I like this exercise as it allows me to take a moment to breathe deeply and take my mind away from stressors. It helps when slowly moving into an engaging lesson as it almost allows for a "fresh mind". I really enjoy this exercise before class and I am most likely going to apply it outside of the classroom when I feel it is necessary.
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8. It is nice after bustling to class to be able to just settle down and calm my breathing and mind. I hate rushing to class and starting right away while I'm still hot/panting/whatever else. It was a bit weird the first time around, but I kept an open mind and have come to really enjoy the exercise. Perhaps you could look into other mind calming meditative statements to use as well as calming and focusing on breathing! When I have anxiety attacks or I can't calm my mind before sleeping, I often use the app called 'Stop, Breathe & Think'. There are so many statements used and I enjoy them very much. I'm not sure if this would be applicable in a lecture setting, but perhaps you'd find something more to work on. As always, you're an absolute gem and I appreciate the refreshing lecture style!
 9. Sometimes when you talk during the session I find it hard to dissipate my focus again, perhaps if you played soft music instead during these sessions? This is an exercise I feel would be more valuable in the middle of the day to late afternoon as in the morning it can sometimes make me quite tired whereas in the afternoon when I am at peak stress it would be nice. Overall, I like the exercise, it does help my concentration in class.
 10. I try to incorporate mindfulness into my day to day routine. It is refreshing to have a professor who values these exercises. Personally, I can't be aware of my breathing and not actively control it until my body is totally calm (this usually take me 10 minutes). For short periods, I prefer to imagine an energy in the room and it moving through different parts of my body.
 11. Coming to class and spending a few minutes to ground yourself and prepare yourself for a lecture is great for clearing away all of the other things rattling around in your mind. Unfortunately, I find myself too busy in everyday life to make time for this kind of exercise. I'd like to see it made a compulsory part of all lectures!
 12. I love doing this especially early in the morning.
 13. I meditate regularly but most times I don't have time for it in the morning before class. I find this very beneficial to relax me and bring me into the moment.
 14. With very little free time and a lot of work, university can seem like a non-stop race to catch-up. This exercise helps me calm down, relax, and therefore be more productive and less anxious throughout the day. I have started using it outside of class as well and have found it very effective at helping me keep focused and on task without the feeling of despair that normally accompanies the workload. It is probably more effective in universities for this reason, as in high school it's not as crazy and hectic and there is much more wind down time. PLEASE keep doing it.
 15. I'm not sure I can directly say that the mind-calming exercises help with my learning and comprehension of concepts in class but I do find them enjoyable as a way to relax before starting class. However, I sometimes worry that I may fall asleep in those few short minutes (especially before our 8:30 class).
 16. I believe this exercise should be left for individual exploration outside of the lecture. I pay to be taught course relevant material, not for meditation. Also, some of the "calming" comments made during the session induced a lot of anxiety in me and made focus on the lecture difficult. The comment was "This is the only time you are alive".
 17. I think this exercise has had a tremendous impact on my ability to learn in this course. Although I don't find myself easily distracted in classes, I still think this exercise has helped me to process information better and be more engaged in my learning. I have really enjoyed this exercise, and believe that it has contributed to my ability to have a deeper understanding of what was being taught/discussed in the lecture.
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18. Strongly think that taking 3-5 mins at the beginning of the lecture to calm down after rushing to class is very effective, however sometimes we start lecture a few minutes late, and then after taking the few minutes to calm down we are starting 10 minutes into the lecture slot. Frequently this results in going a few mins over the 50-minute time slot, which makes getting to your next class very stressful or results in people packing up before you are done talking.
 19. I really enjoy the mind-calming exercises. Only issue that I sometimes face is when it happens at an 8:30 am class, since I just woke up from sleep, my body is still half asleep and closing my eyes makes me a little more sleepy. But overall it really does calm me down, and has proven to be effective.
 20. This exercise is really only appropriate for 4th year courses with small class sizes (< 20 students)"I strongly disagree with this because I believe that the more students there are the easier it is to be distracted. I love that it calms the whole class, even in larger classes.
 21. I love this exercise! I look forward to it every lecture. I find I am a very scattered person but this really allows me to calm my mind and focus in on the lecture. I have a hard time focusing but I am always engaged in this class, and I think this is why! I've told all of my friends about it and they want to do it in their classes. Thank you for this, truly!!
 22. This exercise allows me to have time to get comfortable in the new location. I believe this helps me in becoming more engaged with the lecture.
 23. I find taking a moment to be mindful in my everyday life to be very enjoyable. I tend to do something similar when I am stressed out or getting ready to sleep. I really enjoy doing this exercise at the beginning of the class because I actually find it does help me to focus and ground myself, in turn helping me pay attention better in class.
 24. Unclear on what statement #7 meant. I really enjoy the exercise and find I look forward to it as it allows me to clear my mind from things in my personal life that might distract me from engaging in my learning. It gives me the chance to be mindful of my existence and put everything into perspective.
 25. I had actually just listened to a podcast on the science of mindfulness and meditation and whether they can help us in focusing and engaging the day before the first lecture, so I was quite excited to actually try it out myself and have really enjoyed these exercises so far. However, like the podcast, I remain undecided on whether these exercises have any direct effects on how I can stay focused and engaged on learning in lecture (especially with only ~6 mins a week to practice). That being said, I recently found myself drifting away in lecture one morning and was able to refocus my mind using similar techniques that we have refined in our two-minute sessions, so I may be turning into a believer! I hope we keep these exercises for the remainder of the semester, and I look forward to continue trying to incorporate mind-calming exercises into my everyday routines.
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Note. $n = 25$. Minor grammatical and typographic errors have been corrected.

Final Survey

26. It was great that it was at the beginning of lectures- especially our early ones! Helped us focus on that lecture. I would not recommend doing longer sessions at the end or extracurricular events as I feel it loses the effect that it has at the beginning of the lecture before covering material that we need to focus on and engage in discussion for! Overall, I really enjoyed this!
 27. I feel that these exercises were an excellent way to prepare my mind for learning at an early morning start. I think being someone who has a hard time focusing at earlier hours, these exercises were useful in preparing to absorb topics.
 28. Rather than making up narratives during the exercise to help people focus through imagination, it might be better to simply let everyone clear their thoughts-"empty mind"
 29. I missed a lot of classes due to nervous breakdowns, but when i did attend i was pleased by the meditative exercises
 30. I enjoyed the quiet time and found it helpful to focus in lecture, however, I would typically use it for prayer rather than focus on the mind-calming activity.
 31. Overall, I am very happy with the mind-calming exercises in which we participated. During the activity, I often found myself getting distracted away from the exercise, but I still feel that the net gain was positive. I actually missed our exercises during guest lectures, as it felt that something was "missing" from the learning experience. Although I struggle with focusing on this exercise, I have attempted to incorporate this exercise into my life, as I often feel refreshed, clear-headed, and an overall sense of well-being after performing the activity. Thank you, Dr. Grogan, for such a wonderful experience. You have truly inspired me to strive for an existence filled with awareness of the simple pleasures in life.
 32. I find this very effective to help me engage in deeper learning. The only mind calming exercises I had trouble with however were the ones where we were supposed to picture ourselves and then "zoom out" as if we were looking at google maps, this I had trouble with and therefore couldn't focus. The other ones such as focusing on breathing really helped though!
 33. I definitely enjoyed the mind calming exercise. I often found that I was stressed when i got to class (early, first class of the day) and the exercise helped me calm down and focus myself.
 34. I really enjoyed having the mind calming exercise every class. I already practice meditation in my daily life so for me this was a practice that I already value. In my opinion, learning in a university setting have become more and more focused on output in terms of assignments and tests and less focused on the value of actually learning. In my opinion many students are simply looking for the easiest way to get a good mark while learning the least possible amount of material. I found the mind calming exercise not only helped me learn better, but reminded me that the purpose of being in university is to learn as deeply as possible.
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35. I thought taking the first two minutes of class to calm your mind after rushing to class was an awesome idea. I also found it to be an awesome time to appreciate that I get to learn, my classmates, my profs, and to take time to thank Jesus for them! I thought it was a great experience and I thoroughly enjoyed it. I think taking 2-3 minutes at the beginning of every class is effective, however I don't think it should be extended past that time as we also want to maximize the lecture time!
 36. At first, I thought the exercise was silly. Like I was above it. But towards the middle to end of term, I got really busy and my mind was consumed with all I had to do. When I decided to engage with the exercise I noticed that I was more relaxed and better able to focus on material and be present during the lecture. Sometimes the narration was a bit unsettling, not being someone who's very comfortable with the idea of being on a spinning ball in the middle of nowhere but that's a personal gripe. I look forward to applying such an exercise in my daily life outside the classroom in order to be more present and focused on my work. It was a very unique experience engaging in the exercise at the beginning of the lectures and I thought it was a bit weird at first but I'm glad we did it as it has given me the opportunity to explore techniques that could enrich my own life that I may have never thought or bothered to try.
 37. Since this course, I have found myself using mindfulness exercises several times in my academic, professional and personal life. I think it is most definitely worth the 2 minutes at the beginning of every lecture and helps me focus in on the lecture and empty my mind of any distractions I walked in with. (I did not understand statement #7... if it meant we should extend the mindfulness exercise at the end of the semester than I agree). Thanks for the great semester!!
 38. It was a nice feeling to start off the lecture with mindfulness. I am not sure if it helped me focus but it definitely helped me be on time
 39. It changed my life, I even use it to help me fall asleep now etc.
 40. I genuinely enjoyed the mindfulness exercise, but did feel on certain occasions (like right before the midterm, or when we were rushing to finish material) it did cut into our limited class time. Overall a very useful practice though!
 41. I think that this exercise has been extremely beneficial. It is much easier to be engaged and contribute to a thoughtful discussion when you have taken a moment to relax and focus.
 42. I looked forward to the mind calming exercise each day. It was a great time to collect my thoughts and ensure my mind was clear to listen and engage.
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43. I really liked this activity because it introduced me to the world of mindfulness and the possibilities of using "mind-calming" techniques to focus on being aware of the present. However, I am not sure if these mind-calming techniques have any effect on deep learning and engagement through the way they were being practiced in lecture. With only 2-3 mins ~3x a week, there was never a lot of time to figure out how to use the strategies effectively once lecture had started/in other tasks. Only when I would practice mindfulness techniques at other points in the week would I feel like I had improved my sense of balance/awareness. That being said, without the exercises and Paul's guidance, I would have likely never started practicing mindfulness outside of class. Unfortunately, with 50-minute lectures, devoting more than 5% of the time to mindfulness activities may actually do more harm than good when it comes to students' learning (i.e., instead, perhaps take the last 3 mins of every lecture to summarize key points, major takeaways, closing thoughts etc.). In closing, I enjoyed the exposure to the mindfulness techniques but I am unsure whether or not they delivered on their potential in the setting of short sessions in lectures. Providing students with longer, more meaningful opportunities for mind-calming outside of lecture may be more appropriate.
44. I was initially hesitant about these mind-calming exercises around the time of the first survey because I was worried that I may actually fall asleep during the 8:30am sessions. But I'm happy to say that never actually happened! I'm not sure if these sessions enhanced the depth or quality of my learning per se but I think they were definitely helpful in allowing me to calm my mind and undergo important life reflection, which is a nice thing to take time to do throughout a busy week.
45. After the bustle of moving around from class to class, I find it quite beneficial to just sit and have a few moments to myself. I also enjoyed the different techniques for mind calming. I do believe it helps put me in the right mindset for learning, although I personally have never thought about utilizing the technique when i drift to distraction in lectures. That being said, I find I am more able to pay attention to your lectures compared to almost all my other courses. I'm not too large a fan of plants, so I'm fairly confident that it isn't an interest in material that is biasing this observation too heavily. Maybe the mind calming did help me be more engaged throughout, or perhaps you are just a stellar prof that has managed to engage me on material that is not my favorite - each as likely as the other! Cheers, and have a wonderful summer Paul.
46. I found it beneficial to take a moment before the lectures began, as being able to achieve calm before class allowed me to get in the right mindset of taking in the presented information. I noticed a difference in my focus when it was not performed, for example when we had some guest lectures.
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Note. $n = 21$. Minor grammatical and typographic errors have been corrected.