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Mindfulness in Higher Education: Awareness and Attention in University Students Increase During and After Participation in a Mindfulness Curriculum Course

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Abstract This study assessed the effects of a mindfulness course in the curriculum of international students ($n=104$) from 16 different countries at the University of Amsterdam. The curriculum consisted of seven weekly lectures, as well as studying scientific articles on mindfulness research and gaining some experiential learning in meditating. The primary goal of this course was not to become more mindful, but to learn about the origins and the applications of mindfulness in (child) psychiatry. Students filled in the Five Facet Mindfulness Questionnaire (FFMQ) at “wait-list,” pre-course, post-course, and at 7 weeks follow-up. Multilevel analyses showed that mindful awareness decreased during wait-list ($d=-0.11$), increased from pre-course to post-course ($d=0.36$), and even more so from pre-course to follow-up ($d=0.53$). Differential effects for students from within and outside the Netherlands are discussed as well as for “meditator” versus “novice” students. International students and meditators showed an increase in mindfulness already during the course, whereas Dutch students and novices only reported an increase in mindfulness at follow-up. Overall, participation in a low-intensity mindfulness course in a university’s curriculum leads to an increased non-judgmental and non-reactive stance towards student’s thoughts, feelings, and emotions, during the course period, and their mindfulness increased even further after the course period. This increased mindfulness may help them in coping with stress given the pressure they are under and may improve their performance and their quality of life.

Keywords Mindfulness · University students

Introduction

University students show a very high rate of stress, anxiety, and depression. For instance, at the University of Michigan, the estimated prevalence of a depressive or anxiety disorder was 15.6 % for undergraduates and 13 % for graduate students (Eisenberg, Gollust, Golberstein, and Hefner 2007). To compare, major depressive disorder has a 12-month prevalence of 6.7 % in the US general adult population (Kessler, Chiu, Demler, and Walters 2005). According to a national survey by the American College Health Association, 10 % of the students reported to “seriously consider attempting suicide.” It is clear that (university) students face a high stress load which creates a need for time-out moments, for calm, for relaxation, and for present-moment awareness in their hectic lives. Mindfulness could be a helping aid for surviving in this frantic world of a twenty-first century student. This study assessed the effects of a mindfulness curriculum course on the mindful awareness and attention of university students.

Despite the plethora of studies into the effects of mindfulness training in clinical and non-clinical populations, only a few studies of mindfulness in higher education are available. Collard, Avny, and Boniwell (2009) included an 8-week experiential mindfulness-based cognitive therapy (MBCT) course in the curriculum of psychotherapy students ($n=15$) of the University of East London. A pre-post test design showed a significant increase in mindfulness after the course. Further, the 8-week Mindfulness-Based Coping with University Life (MBCUL) was developed for stressed students at the University of Northampton and a pilot study

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showed lowered stress, anxiety, and depression as well as an increase in mindfulness in students that took part in this course ($n=10$) as compared to those who were on the wait-list ($n=6$) (Lynch, Gander, Kohls, Kudielka, and Walach 2011). A recent RCT in a sample of stressed university students and young adults ($n=76$) showed that 6 weeks of daily meditations, daily physical exercises, or daily biofeedback were equally effective in the reduction of stress, anxiety, and depression and in the improvement of psychological well-being and sleep quality (Van der Zwan, de Vente, Huizink, Bögels, and de Bruin 2014).

Apart from these mindfulness-related interventions for (stressed) students, we are aware of a few universities where the study and practice of mindfulness is actually integrated in the curriculum. At the University of Oxford, UK, a 2 year master's degree is offered in MBCT. In line, at the Lesley University of Massachusetts, USA, a 2 year master of arts in mindfulness studies is offered. And at the University of Sapienza, Rome, Italy, a 1-year curriculum that fully focuses on different aspects of mindfulness is available. These three examples are high-intensity courses. In the current study, we assessed the effects of a low-intensity 7-week mindfulness curriculum course (in which students mainly attended lectures about mindfulness, not an experiential course such as mindfulness-based stress reduction (MBSR) or MBCT) for international university students on their level of mindful awareness and attention.

Method

Participants

Bachelor students from the University of Amsterdam were the participants in this study ($n=104$, $n=92$ females). Average age of the students was 22.5 years ($SD=2.8$). Since the mindfulness course was an international course in the curriculum, students from 16 different countries participated: Bulgaria, $n=1$; China, $n=2$; Costa Rica, $n=2$; Curacao, $n=2$; Denmark, $n=2$; Germany, $n=3$; Great Britain, $n=1$; Greece, $n=1$; Hungary, $n=1$; Iceland, $n=1$; Italy, $n=2$; Norway, $n=1$; South-Africa, $n=3$; the Netherlands, $n=66$; Turkey, and $n=1$; USA, $n=15$. Overall, 63.5 % of the students were of Dutch origin.

Procedure

Six weeks before the course started, a “wait-list” (T0) measurement took place, 1 week before start of the mindfulness course pre-course assessment (T1) took place, immediately after the 7-week course post-course test (T2), and follow-up measurement (T3) took place 6 weeks after post-course. Students were blind with respect to the number of

measurements that were coming, and they were not aware of the purpose of filling in the questionnaire. During their course, they also learned about mindfulness measurements and filling out the Five Facet Mindfulness Questionnaire (FFMQ) was presented as being part of the curriculum to learn about mindfulness measurements and questionnaires. Students gave consent to participate, and the Ethics Committee of the University of Amsterdam approved the study.

The mindfulness course was a third-year elective bachelor course of 6 ECTS. The course consisted of seven weekly 2-h lectures by qualified and highly experienced mindfulness trainers and researchers. Lectures were accompanied by video lectures of Mark Williams and Jon Kabat-Zinn, and students watched two mindfulness documentaries (Be Still and the Dharma Brothers). In addition, they studied 13 scientific articles about mindfulness as well as the book by Segal, Williams, and Teasdale (2013). According to the study manual, the goals of this part of the curriculum for students were as follows: (1) to acquire knowledge about the historical perspective and development of mindfulness-based interventions, (2) to learn about the most common MBSR and MBCT trainings, (3) to become familiar with mindfulness interventions in child psychiatry, (4) to learn about the relation between mindfulness-based interventions and more classically known forms of psychotherapy, and (5) to practice a little with different forms of meditation themselves.

The following topics were part of the mindfulness course: history of MBSR and MBCT, differences between mindfulness training and cognitive behavior training (CBT), mindfulness and depression (i.e., Hofmann et al. 2010; Segal et al. 2013), mindful parenting (i.e., Bögels, Lehtonen, and Restifo 2010), mindfulness in pregnancy and childbirth (i.e., Duncan and Bardacke 2010), mindfulness for children and teenagers with ADHD (i.e., Van der Oord, Bögels, and Peijnenburg 2012), mindfulness for children and teenagers with autism (i.e., Singh, Lancioni, Singh, Winton, Singh, and Singh 2011), and mindfulness interventions at schools (i.e., van de Weijer-Bergsma, Langenberg, Brandsma, Oort, and Bögels 2012). Each of these main themes was studied from three perspectives: a clinical perspective, actual training protocols and patient groups were discussed and viewed in different videos; a research perspective, scientific studies were discussed; and an experiential perspective, during the lectures, several meditations were practiced with the students, for instance the raisin meditation, the breath meditation, the 3-min breathing space, the body scan, and the thoughts meditation. Further, they were given meditation exercises during the course to practice them at home. For instance, they practiced the *.b* exercise. That is, subgroups of two students exchanged mobile phone numbers for this exercise. Once a day, each of the two students would send the other, at a random moment, a so-called *.b* message by WhatsApp (Kuyken, Weare, Ukoumunne, Vicary, Motton, Burnett, et al. 2013). At the

moment of either sending or receiving a *.b*, they would need to stop whatever they were doing and take a 3-min breathing space (*.b*=stop and breathe). Students' final grade for the course was based on multiple-choice questions (i.e., "MBCT was originally developed in order to prevent relapse of: A. Alcohol and substance abuse; B. Major depressive episodes; C. Generalized anxiety episodes" or "Full Catastrophe Living is a famous book in the literature around mindfulness by Jon Kabat-Zinn. With your current knowledge of mindfulness, what is the most likely meaning of this title? To learn: A. How to have less catastrophes happening in your life; B. How to accept and embrace catastrophes in your life; C. Not to worry so much about catastrophes in your life") and open-ended essay style questions (i.e., "With respect to your own practice of the meditations during this course, either at home or during the lectures, please describe your experiences, reflections and discoveries in a maximum of 200 words").

Measures

FFMQ

The FFMQ is a 39-item self-reported questionnaire that consists of five facets of mindfulness: observing, describing, acting with awareness, non-judging, and non-reactivity (Baer, Smith, Hopkins, Krietemeyer, and Toney 2006). Items are scored on a 5-point scale where 1=never or very rarely true and 5=very often or always true. Observing reflects the tendency to notice or attend to internal and external experiences (i.e., "When I take a shower or bath, I stay alert to the sensations of water on my body"). Describing reflects the tendency to describe and label these experiences with words (i.e., "I'm good at finding the words to describe my feelings"). Acting with awareness refers to directing undivided attention to one's current activity (i.e., "I rush through activities without being really attentive to them"). Non-judging reflects a non-evaluative attitude towards inner experiences (i.e., "I think some of my emotions are bad or inappropriate and I shouldn't feel them"). Non-reactivity is the tendency to allow thoughts and feelings to come and go, without getting caught up in them or react instantly to them (i.e., "I perceive my feelings and emotions without having to react to them"). Internal consistency of the FFMQ varies between .75 and .90 for the Dutch population (de Bruin, Topper, Muskens, Bögels, and Kamphuis 2012). In the current sample, internal consistencies were the following: T0: $\alpha=0.78$, T1: $\alpha=0.87$, T2: $\alpha=0.80$, and T3: $\alpha=0.90$.

Data Analyses

The effectiveness of the mindfulness university course on students' own level of mindful awareness and attention was examined by multilevel analyses because these analyses

account for dependencies in nested data. In this study, measurements were nested in respondents (i.e., students reported four times about the same behaviors, namely at wait-list, pre-course, post-course, and follow-up course measurement). Dependent variables were the outcome measures (FFMQ subscales) while time was entered as predictor. Standardized scores of the FFMQ were used (with a mean of 0 and standard deviation of 1). This way, the parameter estimates can be interpreted as a measure of effect (Cohen's *d*). An effect size of 0.3 was considered small, of 0.5 medium, and an effect size of 0.8 was considered large (Cohen 1988). Because significant effects of time ($p<0.05$) were found on the total FFMQ score, additional analyses were conducted on the five subscales.

Results

Attendance rate of students at the seven lectures was high, considering being present was not compulsory. Around 10 % of the students attended a maximum of three lectures; the other 90 % attended four or more of the lectures, with over 30 % attending six to seven lectures.

Students rated their level of affinity with mindfulness in general on a 1–10-point scale. This affinity showed a borderline significant increase during wait-list period (from T0 to T1, parameter estimate=0.13) and a significant increase after the mindfulness course (from T1 to T2, parameter estimate=0.49).

Students also reported on the extent to which they practiced the meditation exercises at home. Between T1 and T2, course-related meditations (e.g., breathing space, sitting meditation, *.b* exercise) were practiced with the following frequencies: not at all (8.9 %), less than once a week (29.1 %), about once or twice a week (43 %), about three to five times a week (16.5 %), and daily (2.5 %). One of the students from China reported that even though she did not pass the exam, she felt it was a life-changing course for her. She had no prior experience with meditation, but since the course, she felt she was able to observe her emotions more and learned to accept them in a calmer way (cited with student's permission).

In Table 1, the means and standard deviations on the FFMQ subscales and total score are presented for the different measurement occasions. Subsequently, in Table 2, it can be seen that a significant effect was found at pre-course assessment for FFMQ total score indicating that during the wait-list period (from T0 to T1), self-rated mindful awareness had significantly decreased with a parameter estimate (interpretable as Cohen's *d*) of -0.11 . From pre-course to post-course measurement (T1 to T2), total FFMQ score significantly increased (parameter estimate=0.36). Students rated themselves as being more mindful after the course. This effect lasted into follow-up. From pre-course to follow-up

Table 1 Means and standard deviations on the FFMQ at wait-list (T0), pre-course (T1), post-course (T2), and follow-up assessment (T3)

	Wait-list		Pre-course		Post-course		Follow-up	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
FFMQ total	3.17	0.37	3.13	0.38	3.28	0.42	3.38	0.39
Observing	3.38	0.62	3.34	0.61	3.44	0.66	3.39	0.71
Describing	3.45	0.62	3.37	0.64	3.59	0.62	3.59	0.58
Act. awareness	3.04	0.65	2.95	0.70	2.97	0.63	3.14	0.61
Non-judging	3.12	0.79	3.10	0.84	3.39	0.88	3.62	0.89
Non-reactivity	2.83	0.51	2.86	0.52	2.99	0.51	3.11	0.51

The FFMQ was filled out by 90 % of the students at wait-list, by 89 % at pre-course, by 75 % at post-course, and by 49 % at follow-up assessment

assessment (T1 to T3), total FFMQ score significantly increased (parameter estimate=0.53). When post-course assessment was compared to follow-up (T2 to T3), it was found that effects increased even further after the mindfulness course (parameter estimate=0.17). For FFMQ subscale effects, see further Table 2.

To further disentangle the findings, the factors “nationality” and “meditator” were added to the model as fixed effects. Furthermore, the unstandardized total score of the FFMQ was analyzed to improve interpretability. When students from the Netherlands ($n=66$) were compared with those from other countries ($n=38$), it was found that there was no main effect of the course for nationality, indicating that overall Dutch and international students had similar results on self-reported mindfulness. However, looking at the post hoc pairwise comparisons, adjusted for multiple testing by the Bonferroni procedure (Aickin and Gensler 1996), differences between Dutch and international students were found. Both for Dutch and international students, no change occurred during wait-list in FFMQ total score. In Dutch students, mindfulness increased

significantly from pre-course to follow-up (mean difference=0.18) and mindfulness increased with marginal significance from post-course to follow-up (mean difference=0.10). From pre-course to post-course, however, no change was found in Dutch students. Subsequently, for the international students, mindfulness significantly increased from pre-course to post-course and from pre-course to follow-up (respectively, mean difference=0.22 and 0.24). From post-course to follow-up, mindfulness did not further increase in international students. In sum, the beneficial effects of the course already became visible for the international students during the course and were maintained after the course, whereas Dutch students mostly benefited from the lectures and mindfulness practices after the course ended. A graphical display of these results can be found in Fig. 1.

When students were dichotomized into meditators ($n=61$) and novices ($n=42$), no main effect of the course for meditators and novices occurred, indicating that overall meditators did not differ from novices in their self-reported mindfulness scores. However, looking at the post hoc pairwise comparisons, differences during the course between meditators and novices were present. During the wait-list period, total FFMQ scores did not change for both meditators and novices. The novices reported a significant increase in total FFMQ from pre-course to follow-up (mean difference=0.20), but not from pre-course to post-course, nor from post-course to follow-up. The meditators reported a significant increase in FFMQ total score from pre-course to post-course and from pre-course to follow-up (respectively, mean difference=0.21 and 0.23). The effect remained stable from post-course to follow-up. Therefore, results indicate that the meditators already benefited to the utmost from the lectures and mindfulness practice during the course, while for the novices, becoming more mindful seemed to be a more gradual process, during and after the course. A graphical display of these results can be found in Fig. 2. Important to note, however, is that meditators in this study were defined as students who meditated in the past ($n=27$) or were currently meditating on a daily ($n=5$), weekly ($n=11$), monthly ($n=5$), or less than monthly ($n=10$) basis, or

Table 2 Parameter estimates of multilevel analyses evaluating the effects of a mindfulness course for (international) students on their level of mindful awareness (FFMQ)

	Parameter estimates			
	wl-pre	pre-post	pre-fu	post-fu
FFMQ total	-0.11*	0.36***	0.53***	0.17*
Observing	-0.09	0.13	0.07	-0.06
Describing	-0.11 [#]	0.32***	0.29**	-0.03
Acting with awareness	-0.12	-0.00	0.16	0.16
Non-judging	-0.04	0.35***	0.56***	0.21 [#]
Non-reactivity	0.04	0.22*	0.43***	0.21*

Parameter estimates can be interpreted as Cohen’s *d* effect sizes, since results were standardized into *Z*-scores

Fu follow-up (T3), *post* post-course (T2), *pre* pre-course (T2), *wl* wait-list (T0)

[#] $p<0.10$; * $p<0.05$; ** $p<0.01$; *** $p<0.001$

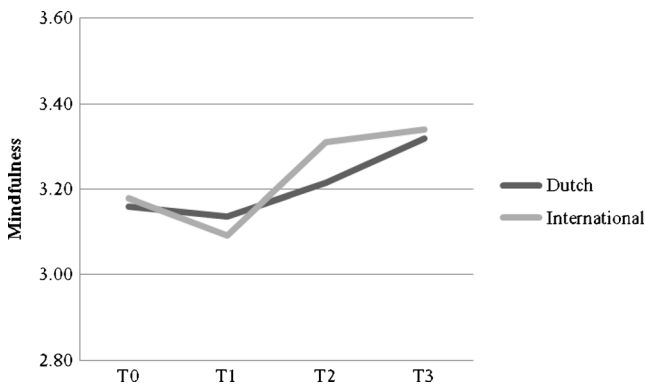


Fig. 1 Self-reported mindfulness scores (FFMQ) of Dutch students versus international students. $T0$ =wait-list, $T1$ =pre-course, $T2$ =post-course, $T3$ =follow-up. The mindfulness course took place between $T1$ and $T2$

those who classified themselves as “other” ($n=3$). Novices were those who had never meditated in their lives. One person preferred not to answer this question and was, therefore, not included in these analyses.

Meditators and international students seem to develop the same during the course, as do novices and Dutch students, who also seem to develop similarly. However, no interaction effect was found between nationality and being a meditator or a novice. This indicates that meditators are not necessarily international students and novices are not necessarily Dutch students.

Discussion

This was the first study in which the effects of a low-intensity 7-week mindfulness course in the curriculum of undergraduate international students were assessed. In the group as a whole, it was found that although overall mindfulness decreased in the weeks before the course started, level of mindful awareness increased during the curriculum course and

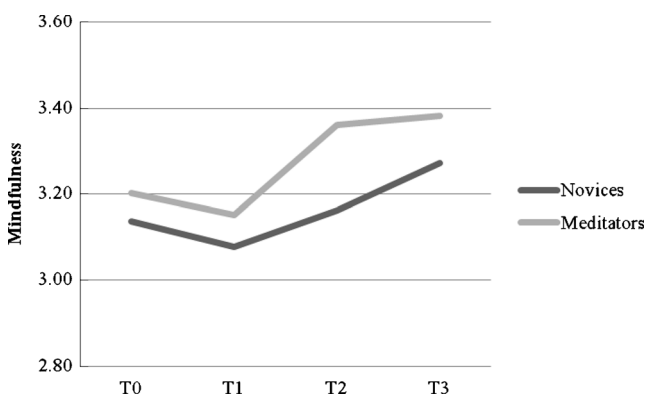


Fig. 2 Self-reported mindfulness scores (FFMQ) of meditators versus novices. $T0$ =wait-list, $T1$ =pre-course, $T2$ =post-course, $T3$ =follow-up. The mindfulness course took place between $T1$ and $T2$

increased even further after the course. More specifically, improvement was mainly seen in being less judgmental and less reactive towards thoughts, feelings, and emotions of others and particularly of oneself.

Taking into account the factors nationality (Dutch or international) and meditator (meditator or novice), a more fine-tuned picture became apparent. Dutch students seemed to be the “slow bloomers” who showed no effect on their mindful awareness during the course; however, after the course was closed, positive effects on mindful awareness became apparent 6 weeks later. Whereas for the international students, the effect took place right away during the course and remained stable until 6 weeks after the course. So although in the long run both groups increased their mindfulness, the Dutch students seem to take somewhat longer. This might be related to the higher internal motivation of the foreign students. This mindfulness course was elective; it was not a compulsory part of the curriculum. Whereas for Dutch students this choice might have been partly driven by simply obtaining a few more credit points, some foreign students specifically came from abroad to the University of Amsterdam to attend this course driven by their specific interest (and obtaining the study credit points might not have been their prior motivation). As far as we are aware, other European universities do not offer a low-intensity course on mindfulness as part of their curriculum this way, apart from the tree examples as mentioned in the “Introduction” section of 1–2 year master’s degrees but they have a different focus.

In addition, just like the Dutch students seemed to be the “late bloomers,” so were the “novices.” Whereas the meditators showed an instant increase in their mindful awareness after the course, for the novices, students who had never meditated in their lives, no short-term effects were found. However, 6 weeks after the course had ended, they found themselves being less judgmental and reactive, more aware and awake, and better able to observe and describe sensations within and outside themselves. In other words, they were more mindful in their daily lives. A delayed effect seemed to have taken place. For students who had (at least minimal) experience with meditating (the meditators in this study), the effects were substantial, during and after the course. An explanation for this faster effect of the course on (at least minimal) meditators’ mindfulness is that some seeds of mindfulness had already been planted in the past, and they had already practiced some meditation before, which allowed them to pick up the psycho-education about mindfulness and the invitation to practice faster. In contrast, the novices may have needed a “warm-up” period to learn and feel comfortable with a new field to them, and therefore, the effects only became apparent at a later stage.

Overall, the increased mindful awareness is an interesting finding considering that these students only attended relatively brief lectures in which the goals simply were to get acquainted with the origins and applications of mindfulness in (child) psychiatry and to experience some meditation for oneself.

Mindfulness scores have been shown to increase in students after a mindfulness training before (Collard et al. 2009; Lynch et al. 2011), but the “intervention” in this study by no means compares to a standard MBSR- or MBCT-related course in which for instance daily 30–45-min practice is very common. Also remarkable was the actual decline in mindful awareness before the course started (although this was not visible when the two factors were included). This might be due to that in the six pre-course weeks, students were still occupied with (the stress of) exams from other courses. Alternatively, it might be that students have answered the questions about how mindful they are too positive, and if they think about it a second time, they may become more mindful about their lack of mindfulness.

Limitations in this study were the inclusion of only one outcome variable and the high drop-out at follow-up. It is known that mindfulness is a predictor of psychological well-being (Baer, Lykins, and Peters 2012; Lykins and Baer 2009) and that an increase in mindfulness is related to improved well-being and quality of life and lowered stress experience (e.g., Brown and Ryan 2003), constructs that were not measured in this study. Further, at follow-up assessment 6 weeks after the course, only about half of the students filled out the questionnaire. It is possible that these were mainly the highly motivated students, which might, as a result, present an overly positive picture. However, multilevel analyses showed there was no main effect for filling out the follow-up measurement. Students who did complete T3 did not differ from those who did not. Further, there were no significant correlations between whether the follow-up assessment was filled out and the extent of meditation experience (meditator or novice) or the nationality of the student.

In future research on the effects of mindfulness courses on students’ own mindful awareness, the influence of increased mindfulness on personal well-being, study stress, and study performance could be assessed. If such effects are found, it could be considered to give “low-dose” mindfulness training to university students, already at the beginning of their study, so that the benefits of increased mindfulness can be used throughout the study.

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