Relationship between mindfulness, psychopathological symptoms, and academic performance in university students

Vorontsova-Wenger, Olga; Ghisletta, Paolo; Ababkov, Valentin; Barisnikov, Koviljka

How to cite

VORONTSOVA-WENGER, Olga et al. Relationship between mindfulness, psychopathological symptoms, and academic performance in university students. In: Psychological Reports, 2020, p. 1–20. doi: 10.1177/0033294119899906

This publication URL: https://archive-ouverte.unige.ch/unige:146519
Publication DOI: 10.1177/0033294119899906

The Relationship between Mindfulness, Psychopathological Symptoms, and Academic Performance in University Students

Olga Vorontsova-Wenger [a]

Paolo Ghisletta [a,b]

Valentin Ababkov [c]

Koviljka Barisnikov [a]

[a] Department of Psychology, University of Geneva, Geneva, Switzerland

[b] Swiss Distance Learning University, Switzerland, and Swiss National Centre of Competence in Research LIVES – Overcoming vulnerability: Life course perspectives, Universities of Lausanne and of Geneva, Switzerland

[c] Medical Psychology and Psychophysiology Department, Saint Petersburg State University, Russia

Correspondence should be sent to: Olga Vorontsova-Wenger, Child Clinical Neuropsychology Unit, Department de Psychology, University of Geneva, 40, boulevard du Pont d'Arve, CH – 1205 Geneva, Switzerland

email: Olga.Vorontsova-Wenger@etu.unige.ch, phone: +41 22 379 93 94

Abstract

It has been shown that a mindfulness construct involving five component skills (observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience) is related to well-being and lessens depression, anxiety and stress symptoms. This study investigates the relationship between mindfulness, academic performance and psychopathological symptoms in a sample of Swiss university students during preparation for exams. A sample of 150 university students from the psychology department at the University of Geneva completed self-report measures examining their mindfulness skills and academic performance, as well as anxiety, depression and stress symptoms. Results indicated that the total mindfulness score and the non-reactivity facet of mindfulness were associated with depression scores. Furthermore, mindfulness skills were positively correlated with students' academic performance. Finally, certain demographic variables, such as gender, were linked to the presence of depression, anxiety and stress symptoms in the sample. The clinical implications of these results are discussed.

Keywords: stress – mindfulness – depression symptoms – anxiety symptoms – psychological and emotional well-being – academic performance

Introduction

In recent years, the study of psychopathological symptoms (anxiety, depression, eating disorders, post-traumatic stress disorder) presented by university students has attracted growing interest. Aspects of university life (e.g., registration fees, courses and exams) may be stressful for students (Lassarre, Giron, & Paty, 2003). The empirical evidence in this research field has shown that the rate of such symptoms in high school and university student populations across different cultures is extremely high (Bayram & Bilgel, 2008; Curran, Gawley, Casey, Gill, & Crumlish, 2009; Ediz, Ozcakir, & Bilgel, 2017; Eisenberg, Gollust, Golberstein, & Hefner, 2007; Ibrahim, Kelly, Adams, & Glazebrook, 2013). For instance, according to a recent meta-analysis of 69 studies of students (N = 40,348), the prevalence of anxiety was 33.8% (Quek et al., 2019). According to another meta-analysis with data extracted from 167 studies (N = 116,628), the prevalence of depression was 27.2% (Rotenstein et al., 2016). Moreover, recent studies suggest that stress is quite prevalent in student populations: up to 52% (Youssef, 2015; Zeng, Wang, Xie, Hu, & Reinhardt, 2019).

To our knowledge, only a few studies have investigated the prevalence of psychopathological symptoms and stress in Swiss high school and university students (Buddeberg-Fischer, Bernet, Schmid, & Buddeberg, 1996; David, Ceschi, Billieux, & Van der Linden, 2008; Gerber & Pühse, 2008). For example, David et al. (2008) assessed 132 students at the University of Geneva using the Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996a) and found high depression levels (mild 25.75%; moderate 9.09%; severe 4.55%). Gerber and Pühse's (2008) findings

from a Swiss high school student sample ($N = 407$, $M = 14.01 \pm 1.38$ years) suggest that school-related stress and psychosomatic complaints are important issues during their education.

In a study conducted in the Canton of Zurich, Switzerland, Liakoni, Schaub, Maier, Glauser, and Liechti (2015) showed that half of the high school students in their sample ($N = 1{,}139$, mean age = 17.1 years, range: 16–24 years) had used a substance at least once to improve their academic performance. The authors found that students who perceived more performance pressure (score: 3–4, $N = 579$) were more likely to have used at least one cognition-enhancing substance ($N = 337$, 58.2%) than students who perceived no or only minimal performance pressure during their studies (score: 1–2, $N = 560$), of which 281 (50.2%) used cognition-enhancing substances ($\chi^2 = 7.39$, $p < 0.01$).

In recent research conducted with Swiss music students in the French-speaking part of Switzerland ($N = 126$, mean age = 22.4, standard deviation = 4.5), Antonini Philippe, Kosirnik, Vuichoud, Williamon, and Crettaz von Roten (2019) found generally good psychological well-being, but lower levels for female participants when psychological health was examined as a function of sex.

The above-mentioned findings show that some psychological issues associated with school-related stress are already observed in high school students and seem to continue throughout the period of higher education. However, little is known about these difficulties in university students and, in particular, Swiss university students.

Given the importance of emotions to cognitive processes such as attention, memory, perception and decision-making (Brosch, Scherer, Grandjean, & Sander, 2013), emotional impairments could be extremely detrimental to students' cognitive functioning and well-being. Numerous negative consequences of psychopathological symptoms in student samples have been presented in the literature, including psychosomatic complaints (Gerber & Pühse, 2008), problems maintaining their academic performance (Waqas et al., 2015; Yasin & Dzulkifli, 2011) and deterioration in their mental quality of life (Burger, Neumann, Ropohl, Paulsen, & Scholz, 2016). Moreover, high levels of stress are associated with burnout symptoms (Gerber et al., 2015).

To the best of our knowledge, no previous study has assessed perceived stress and different psychopathological symptoms and their relationship to academic performance in Swiss university students. This is rather surprising considering that the literature shows that the high prevalence of depression and anxiety among students is an important issue in both Eastern and Western countries (Curran et al., 2009; Ediz et al., 2017; Ibrahim et al., 2013; Strizhev, Boyko, Lozhnikova, & Zaitceva, 2016) and may have an impact on academic performance (Abu Ruz, Al-Akash, & Jarrah, 2018).

One important protective factor against the negative effects of stress and depression is mindfulness (Brooks et al., 2017). Mindfulness has been defined in various ways in the literature. According to Kabat-Zinn (2003), it involves intentionally paying sustained attention to one's ongoing sensory, cognitive, and emotional experience, without elaboration or judgment. Mindfulness is part of the

human experience – an internal resource available to be observed and used in the service of learning, development, and healing (Grossman, Niemann, Schmidt, & Walach, 2004). According to Bishop et al. (2004), mindfulness refers to both the self-regulation of attention to one's current experience and a particular orientation toward this experience, characterized by curiosity, openness, and acceptance. To define the main aspects of mindfulness, Baer, Smith, Hopkins, Krietemeyer, and Toney (2006) developed five facets, represented by the five following component skills: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. Studies that have used the Five Facet Mindfulness Questionnaire (FFMQ) report that most mindfulness facets are significantly related to experience with mindfulness practice, as well as to psychological symptoms and well-being (Baer et al., 2008; Bohlmeijer, ten Klooster, Fledderus, Veehof, & Baer, 2011; Cash & Whittingham, 2010).

However, studies attempting to capture the relationship between mindfulness facets and symptoms of depression, anxiety and stress have produced divergent findings. For instance, a recent cross-sectional study in healthy and clinical samples (N = 203) found that four mindfulness facets (acting with awareness, non-judging, non-reactivity, observing) were negatively associated with depression measured with the BDI-II (Didonna et al., 2019). The effect size (R^2) reported in the article ranged from 0.56 to 0.63. However, in a longitudinal study, Barnes and Lynn (2010) conducted with undergraduate students (N = 145), three facets of mindfulness – acting with awareness, non-reactivity and non-judging – were inversely related to depression

measured with the BDI-II. When mindfulness facets were analyzed simultaneously, only non-judging and non-reactivity remained significant ($r = 0.24$; $r = 0.33$). This result agrees with the evidence provided by a recent cross-sectional study of students and the general population ($N = 400$) (Medvedev, Norden, Krägeloh, & Siegert, 2018). Once demographic characteristics were controlled for, non-judging and non-reactivity were inversely related to depression, as measured with the Depression Anxiety and Stress Scales (DASS-21; Lovibond & Lovibond, 1995). In Soysa and Wilcomb's (2013) study of undergraduate students (N = 204), self-compassion and self-efficacy were investigated in addition to the facets of mindfulness. Depression was predicted by acting with awareness ($r^2 = 0.217$), non-judging ($r^2 = 0.207$), and describing ($r^2 = 0.163$). These divergent findings may be explained by differences in samples (e.g., individuals who practice mindfulness meditation, healthy versus clinical populations) and depression scales.

Although it is well documented that mindful awareness is negatively correlated with anxiety (e.g., Anastasiades, Kapoor, Wootten, & Lamis, 2016; Bellinger, DeCaro, & Ralston, 2015), there is little agreement regarding the relationship between specific mindfulness facets and anxiety. In the study by Medvedev et al. (2018) in a non-clinical sample, two mindfulness facets – acting with awareness and non-judging – predicted anxiety measured with the DASS-21. This result partly agrees with evidence provided by a recent study of patients that used a repeated-measures design ($N = 134$) (Webb, Beard, Forgeard, & Björgvinsson, 2018). In that study, mindfulness facets and anxiety symptoms measured with the Generalized Anxiety Disorder Scale – 7 (Spitzer,

Kroenke, Williams, & Lowe, 2006) were assessed at three points: at admission, third day of treatment and sixth day of treatment. Other skills (e.g., behavioral activation, distress tolerance) were also measured. Once these skills were controlled for, the acting with awareness and non-reactivity facets were found to significantly predict the improvement in anxiety symptoms. In the study by Soysa and Wilcomb (2013), only non-reactivity (r^2 = 0.037) and non-judging predicted anxiety (r^2 = 0.186). In a cross-sectional study of undergraduate students (N = 106), only non-judging predicted anxiety measured with the DASS-21 (r^2 = 0.106) (Cash & Whittingham, 2010). These heterogeneous findings may be accounted for by the different samples and measures of anxiety.

Several studies have investigated the relationship between mindfulness facets and stress. According to a recent cross-sectional study of undergraduate students (N = 114), stress measured with the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) was predicted by non-judging, non-reactivity, and acting with awareness (total r^2 = 0.367) (Mayer, Im, Stavas, & Hazlett-Stevens, 2019). However, in the study by Medvedev et al. (2018), only the non-judging and non-reactivity facets were significant. In Cash and Whittingham's (2010) study, only non-judging predicted stress (r^2 = 0.087).

As mentioned above, psychopathological symptoms have numerous negative consequences for students' well-being and, in particular, their academic performance. It has been documented that mindfulness is inversely associated with the symptoms of depression, anxiety and stress. Recently, researchers have tried to capture a specific

role for each mindful facet (Soysa and Wilcomb, 2013; Webb et al., 2018). However, there is little consensus regarding the relationship between mindfulness facets and psychopathological symptoms and stress.

Finally, concerning the relations between mindfulness and academic performance, Caballero et al. (2019) demonstrated that greater mindfulness was associated with better academic outcomes in US students in Grades 5 to 8. It would be interesting to investigate whether a similar correlation might be observed in university students as well.

The present study assessed a sample of university students (with the aim of developing a better understanding of the psychological health of older students. The purpose of this study is first to assess the level of psychopathological symptoms such as depression, stress and anxiety in psychology students at the University of Geneva, as well as some risk factors that may be associated with these symptoms. In addition, the relationship between the five facets of mindfulness and academic achievement, as well as these psychopathological symptoms, was assessed. It was expected that participants with greater mindfulness skills would present lower levels of psychopathological symptoms and better academic performance than those with less developed skills. It was also expected that a relationship would be found between academic performance and the level of psychopathological symptoms.

Method

Participants

The sample in this study is composed of students studying at the Faculty of

Psychology and Educational Sciences at the University of Geneva. The sample comprised 90 undergraduate psychology students in their third year (last year of the bachelor's program) and 60 graduate students in their second year (last year of the master's program). The students were invited to participate in the study during the eight weeks before their exam session. To control for possible differences between the two groups, additional sensitivity analyses were run with dummy variables (0/1) for graduate students vs. undergraduate students, and no effects were found on any dependent variables. All the participants were recruited in class by way of an advertisement. The advertisement explaining the study was presented at the beginning of a specific class that was targeted for recruitment. Student participation was completely voluntary.

The sample size was calculated with a power analysis run with G*Power (Universität Kiel, Kiel, Germany; cf. Faul, Erdfelder, Lang, & Buchner, 2007) with a view to obtaining a 95% chance of detecting an increase in the primary outcome, with an alpha level of 5%. The G*Power analysis revealed that a total sample size of 103 participants was required for the study. First an advertisement was run for undergraduate students and 90 participants were recruited. Then graduate students were advertised for in order to complete the sample; 60 graduate students corresponded to the criteria for the study. Thus, 150 students were enrolled, which improves the power of the results.

This study was approved by the ethics committee of the Psychology Department at the University of Geneva. Informed written consent was obtained from

all participants. Participation was voluntary, and the data were processed anonymously. The population's characteristics, with the percentage of psychopathological symptoms and the results for the mindfulness construct, are shown in Table 1.

----- Insert Table 1 about here -----

Eligibility criteria. The inclusion criteria for participation in the study were as follows: (1) ≥18 years of age, (2) regular student (full-time attendance at the university), (3) not currently undergoing formal psychotherapy, (4) not engaging in meditation practice, and (5) not taking any medication.

Procedure

Firstly, 150 students received a written informed consent form approved by the ethics committee. Then, five questionnaires were distributed to the participants. The questionnaires were administered collectively for a group of students during the specific class that was targeted for recruitment. The participants completed the questionnaires and were permitted to ask questions during the session or later (by email or by phone). After the questionnaires were administered, a number was assigned to each participant for anonymous data processing. Two participants were excluded from the study, as they did not complete all the questionnaires.

Measures

Depression. To assess depression levels, the French validated version of the Beck Depression Inventory (BDI-II; Beck et al., 1996a; French translation in Beck, Steer, & Brown, 1996b) was used. This is a 21-item self-administered questionnaire developed

to measure depression symptoms. The BDI-II total score is calculated by summing the 21 items for a maximum of 63 points. Scores of 0 to 11 are considered in the normal range, 12 to 19 as mild depression, 20 to 27 as moderate depression, and scores of 28 to 63 are considered to indicate severe depression.

Anxiety. The French validated "Form Y" version of the State-Trait Anxiety Inventory Test (STAI-Y; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983; French translation and validation in Spielberger, Bruchon-Schweitzer, & Paulhan, 1993) was used to assess anxiety levels. This is a self-administered questionnaire consisting of 40 items, developed to measure two types of anxiety symptoms: state anxiety (20 items) and trait anxiety (20 items). Each response to an item in the STAI is scored from 1 to 4, with 1 indicating the lowest level of anxiety and 4 the highest. Scores lower than 35 are considered in the very low anxiety range, 36 to 45 as the low anxiety range, 46 to 55 as the mild anxiety range, 56 to 65 as the high anxiety range, and scores of over 65 are considered to indicate the very high anxiety range.

Stress. Participants' stress levels were assessed with the French validated version of the Perceived Stress Scale (PSS; Cohen et al., 1983; French translation and validation in Bellinghausen, Collange, Botella, Emery, & Albert, 2009), a 10-item self-report questionnaire developed to measure respondents' perception of stress. Individual scores on the PSS can range from 0 to 40, with higher scores indicating higher perceived stress. Scores ranging from 0 to 26 are considered to indicate minimal perceived stress, and scores of 27 to 40 indicate high perceived stress.

Personal data and academic performance. To collect this information, a scale

developed by the authors of this study was used. It is a 15-item self-report questionnaire developed to collect demographic data (e.g., gender [i.e., biological sex], age, accommodations, mean daily commute to the university, financial condition, mean weekly time spent working at a job, mean weekly time spent on exam preparation, importance of achievement, and academic performance).

Mindfulness concept. The five main components of mindfulness skills were assessed with the French validated version of the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2006; French translation and validation in Heeren, Douilliez, Peschard, Debrauwere, & Philippot, 2011). This is a 39-item self-report questionnaire developed to explore the five facets of mindfulness (observing: 8 items; describing: 8 items; acting with awareness: 8 items; non-judging of inner experience: 8 items; and non-reactivity to inner experience: 7 items). Item scores range from 1 (never or very seldom true) to 5 (very often or always true), and the possible range for the total score is from 39 (low mindfulness) to 195 (high mindfulness).

Data analyses

Data were analyzed using Statistica (Version 12; Statsoft, 2016). All variables were checked for normality of variance. To assess the strength of associations between symptoms and the students' profiles, four logistic regressions were conducted with the factors from the self-report demographic questionnaire to describe the students' profiles in relation to psychopathological symptoms. To ensure that there was no redundancy, multicollinearity among predictors was checked. Next, the relationship between mindfulness and depressive, anxious and stress symptomatology was

examined using robust multiple linear model regression analyses. Finally, to assess the relation between psychopathological symptoms and academic performance, correlation analyses were run.

Results

The first regression revealed that time spent on exam preparation ($\beta = .37$, $p < .05$) was related to the level of state anxiety symptoms: the more time spent on exam preparation, the higher the risk of state anxiety. In addition, if students spent more time working at a job in addition to their studies, they were likely to have a higher state anxiety level ($\beta = .31$, $p < .05$). Moreover, the more time spent commuting to the university, the higher the scores for state anxiety ($\beta = .29$, $p < .001$). Gender was observed to be associated with state anxiety ($\beta = .21$, $p < .001$): male students had a higher level of state anxiety than females. For this regression, R^2 varied between .29 and .37. The second regression related to trait anxiety prediction had no significant results. As with the state anxiety analyses, gender was linked to depression in the third regression ($\beta = .27$, $p < .001$): female students presented higher levels of depression than male students. All other effects were non-significant. For this regression, R^2 ranged between .31 and .39. The fourth regression showed a similar result: only gender was related to stress level ($\beta = .11$, $p < .001$): female students presented higher levels of stress than male students. For this regression, R^2 varied between .19 and .24.

The results showed that total mindfulness score ($\beta = .41$, $p < .05$) and the non-reactivity facet were related to depression ($\beta = .41$, $p < .05$). Adjusted $R^2 = 0.73$: the total effect size for depression prediction, when all predictors were considered

together. Furthermore, the non-judging facet had a significant negative effect related to anxiety symptoms ($\beta = -.33$, $p < .05$). Adjusted $R^2 = 0.68$: the total effect size for anxiety prediction, when all predictors were considered together. However, none of the mindfulness facets was found to have a significant effect on stress in the student sample.

Regression analyses were used to capture the association between total mindfulness score and depression symptoms, anxiety symptoms and stress level. All effects were negative and significant: depression ($\beta = -.37$, $p < .001$); anxiety ($\beta = -.52$, $p < .001$); and stress ($\beta = -.72$, $p < .001$). Adjusted $R^2 = 0.84$: the total effect size for mindfulness prediction, when all predictors are considered together. The effect of the gender and age variables was controlled in these analyses. A significant positive correlation was observed between total mindfulness score and mean grade in the last exam session ($r = 0.43$, $p < .001$). A significant negative correlation was observed between depression, stress scores and mean grade in the last exam session ($r = -0.51$, $p < .001$). However, the correlation between anxiety score and mean grade for the last exam session was not significant with particular consideration of the students' gender and environmental conditions.

Discussion

This study investigated, first, the presence of psychopathological symptoms such as anxiety, depression, and high perceived stress in psychology students at the University of Geneva. According to the results, the mean depression score measured with the BDI-II was 9.97 ($SD = 8.33$), considerably lower than the rates indicated in recent

meta-analyses (Quek et al., 2019; Rotenstein et al., 2016). Participants reported high levels of anxiety, measured with the STAI-Y, and stress, measured with the PPS (38.14%, *SD* = 12.65, and 29.15%, *SD* = 5.75, respectively).

Next, the relationship between the facets of mindfulness (observing, describing, acting with awareness, non-judging, and non-reactivity), academic performance and psychopathological symptoms, namely depression, anxiety and stress, was explored. As expected, university students in the sample with better mindfulness skills showed a lower level of psychopathological symptoms than students with less developed mindfulness skills. ~~Notably, the total mindfulness score and the non-reactivity facet associated to depression in our university sample. We have also documented that among the five facets of mindfulness, non-judgment negatively correlated with anxiety. Similar results are provided by the recent study (Levin, Haeger, & Smith, 2017) where the implicit emotional judgments were found to be related to anxiety.~~ Overall, these results are in line with previous research showing that individuals with strong mindfulness skills suffer less from detrimental psychopathological symptoms than individuals with less developed mindfulness skills (Baer et al., 2008; Bohlmeijer et al., 2011; Cash & Whittingham, 2010).

In particular, the total mindfulness score and the non-reactivity facet were associated with depression in this sample. This result partially agrees with the findings of recent studies that investigated the link between mindfulness facets and the symptoms of depression. Non-reactivity was found to be inversely related to depression in a cross-sectional study by Didonna et al. (2019) and in a longitudinal

study by Barnes and Lynn (2010). However, effects of other facets were also detected: acting with awareness, observing (Didonna et al., 2019) and non-judging (Medvedev et al., 2018). Moreover, in a study by Soysa and Wilcomb (2013), the non-reactivity facet was not found to be significant when analyzed with self-compassion and self-efficacy.

Of the five facets of mindfulness, only non-judging was found to be negatively correlated with anxiety in this study. This result is in line with the results of Cash and Whittingham's (2010) cross-sectional study. However, in Soysa and Wilcomb's (2013) study, the non-reactivity facet was also found to be significant. Non-judging did not have a significant effect when other skills, for instance behavioral activation and distress tolerance, were controlled for (Webb et al., 2018).

In this sample, mindfulness facets had no effect on stress level. This result does not agree with the study by Mayer et al. (2019), who found that non-judging, non-reactivity, and acting with awareness predicted stress. The choice of sample size might have determined this difference, as might the different methodologies (online survey vs. laboratory testing). It is also possible that the stress measure used here did not capture the variable exhaustively and other measures (e.g., measuring cortisol levels) would lead to a different result.

Given the substantially different findings regarding the mindfulness facets and their relationship to depression, anxiety and stress, more studies are needed to understand the specific role of these constructs. A meta-analysis could also clarify their impact. Moreover, little is known about the psychological processes underlying

the impact of mindfulness facets on depression, anxiety and stress. For instance, recent studies suggest that the relationships between mindfulness facets and depression are mediated by awareness, acceptance of negative emotions, and rumination (Cheung & Ng, 2018; Petrocchi & Ottaviani, 2015; Royuela-Colomer & Calvete, 2016).

In accordance with the second research hypothesis, it was shown that students' mindfulness facets are positively correlated with their academic performance. In other words, students with a mindful approach are more successful at their university studies. That result is consistent with previous findings that have shown a link between mindfulness skills and executive functioning (Thierry, Bryant, Nobles, & Norris, 2016) and enhanced general academic performance (Sampl, Maran, & Further, 2017). However, in this study, no relationship was found between anxiety score and final exam score. Other factors (good preparation, capacity to manage anxiety) may interfere with the link. Moreover, the cutoff of the stress measure validated in a French population was probably too low compared to its original English version. In future studies, other validated instruments might be used (e.g., MSP25 questionnaire; Lemyre & Tessier, 1988).

Finally, the demographic characteristics of this Swiss student sample and their influence on psychopathological symptoms were investigated. It was observed that gender (male), mean weekly time spent at an extracurricular job and mean daily commute to the university are linked to anxiety symptoms. However, only gender (female) is related to stress and depression. It should be mentioned that the sample was quite representative of the young Swiss population in that female gender was

associated with depressive symptoms, which is in agreement with the data provided by the Swiss Health Observatory (2016).

The encouraging results of this study are extremely important in the current context in which the rate of psychopathological symptoms, especially internalizing problems, in young people is not only high but is constantly increasing worldwide (Bor, Dean, Najman, & Hayatbakhsh, 2014). Students facing stress and suffering from anxiety and depression symptoms have difficulties maintaining their academic performance (Yasin & Dzulkifli, 2011). Previous studies demonstrated that the application of mindfulness-based interventions in school settings has great potential for improving educational and psychosocial outcomes for today's youth (Felver, Tezanos, & Singh, 2015; Renshaw & Cook 2017). A promising research area is therefore the investigation of whether the development of mindfulness skills would predict a decrease in psychopathological symptoms and improved academic performance in university students. Future studies could also explore whether mindfulness-based interventions adapted to students' needs and other techniques, such as listening to music (Panteleeva, Ceschi, Glowinski, Courvoisier, & Grandjean, 2018), may be useful for improving well-being and academic success in a university population.

Limitations

As for the limitations of the study, the sample was somewhat limited in size (although sufficient according to the power analysis), and all participants were enrolled in the same faculty at a single Swiss university. Thus, generalization to a larger population

may not be warranted. In addition, increasing the number of participants and using a control group are recommended to improve future studies. Another limitation is that the paper applies a cross-sectional, correlational design. The predictive role of the measured constructs cannot be determined and causal effects cannot be established. Although the results suggest that students practicing mindfulness may benefit from positive outcomes, it could also be that those students are a selected subsample, with lower symptomatology. Nevertheless, the observed associations (e.g., mindfulness score and psychopathological symptoms) may well indicate a potential for psychological interventions influencing mindfulness and thus inducing changes in levels of depression and anxiety. Future research is needed to ascertain the validity of this hypothesis.

Conclusion

The evidence from the current study highlighted the substantial prevalence of psychopathology symptoms among Swiss university students. It also showed that female gender is related to stress and depression, while male gender is associated with anxiety symptoms. Moreover, the time spent at work outside of studies and daily commute time are related to anxiety symptoms. Finally, students with higher mindfulness skills, as measured by five mindfulness facets (observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience), showed a lower level of psychopathological symptoms and better academic performance than students with less developed mindfulness skills. Mindfulness practice and improved material conditions should have a positive impact

on students, so these interventions should potentially be proposed in university programs to increase students' well-being and academic achievements.

Acknowledgements

We would like to thank all the participants in this study. We would also like to thank the interns and master's students at the Child Clinical Neuropsychology Unit (Department of Psychology, University of Geneva, Switzerland) for their assistance with data collection and their constructive suggestions. Special thanks to Lauren Barr for her constructive feedback and assistance during preparation of this paper.

Funding

This study was supported by the Swiss National Science Foundation under Grant No. P1GEP1_158955 and by the Ernest Boninchi Foundation. The publication was supported by Swiss WellBeing Consulting SA.

References

Abu Ruz, M. E., Al-Akash, H. Y., & Jarrah, S. (2018). Persistent (anxiety and depression) affected academic achievement and absenteeism in nursing students. *The Open Nursing Journal, 12*, 171–179. doi:10.2174/1874434601812010171

Anastasiades, M. H., Kapoor, S., Wootten, J., & Lamis, D. A. (2016). Perceived stress, depressive symptoms, and suicidal ideation in undergraduate women with varying levels of mindfulness. *Archives of Women's Mental Health, 20,* 129–138. doi:10.1007/s00737-016-0686-5

Antonini Philippe, R., Kosirnik, C., Vuichoud, N., Williamon, A., & Crettaz von Roten, F. (2019). Understanding wellbeing among college music students and amateur musicians in western Switzerland. *Frontiers in Psychology, 10,* 820. doi:10.3389/fpsyg.2019.00820

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13,* 27–45.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., … Williams, J. M. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15,* 329–342.

Barnes, S. M., & Lynn, S. J. (2010). Mindfulness skills and depressive symptoms: A longitudinal study. *Imagination, Cognition and Personality, 30,* 77–91. doi:10.2190/IC.30.1.e.

Bayram, N., & Bilgel, N. (2008). The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Social Psychiatry and Psychiatric Epidemiology, 43,* 667–672.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996a). *Manual for the Beck Depression Inventory – II.* San Antonio, TX: Psychological Corporation.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996b). *Manuel: Inventaire de Depression de Beck – 2ème édition.* Paris: Editions du Centre de Psychologie Appliquée.

Bellinger, D. B., DeCaro, M. S., & Ralston, P. A. S. (2015). Mindfulness, anxiety, and high-stakes mathematics performance in the laboratory and classroom. *Consciousness and Cognition, 37,* 123–132. doi:1016/j.concog.2015.09.001

Bellinghausen, L., Collange, J., Botella, M., Emery, J.-L., & Albert, E. (2009). Validation factorielle de l'échelle française de stress perçu en milieu professionnel. *Santé publique, 4,* 365–373.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., … Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11,* 230–241.

Bohlmeijer, E., ten Klooster, P. M., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric properties of the Five Facet Mindfulness Questionnaire in depressed adults and development of a short form. *Assessment, 18,* 308–320.

Bor, W., Dean, A. J., Najman, J., & Hayatbakhsh, R. (2014). Are child and adolescent mental health problems increasing in the 21st century? A systematic review. *Australian and New Zealand Journal of Psychiatry, 48,* 606–616. doi:10.1177/0004867414533834

Brooks, J. M., Muller, V., Sánchez, J., Johnson, E. T., Chiu, C.-Y., Cotton, B. P., … Chan, F. (2017). Mindfulness as a protective factor against depressive symptoms in people with fibromyalgia. *Journal of Mental Health, 7,* 1–7.

Brosch, T., Scherer, K. S., Grandjean, D., & Sander, D. (2013). The impact of emotion on perception, attention, memory, and decision-making. *Swiss Medical Weekly, 143,* w13786.

Buddeberg-Fischer, B., Bernet, R., Sieber, M., Schmid, J., & Buddeberg, C. (1996). Epidemiology of eating behaviour and weight distribution in 14- to 19-year-old Swiss students. *Acta Psychiatrica Scandinavica, 93,* 296–304.

Burger, P. H. M., Neumann, C., Ropohl, A., Paulsen, F., & Scholz, M. (2016). Development of depression and deterioration in quality of life in German dental medical students in preclinical semesters. *Annals of Anatomy, 208,* 183–186. doi:10.1016/j.aanat.2016.05.011

Caballero, C., Scherer, E., West, M., Mrazek, M., Gabrieli, C., & Gabrieli, J. (2019). Greater mindfulness is associated with better academic achievement in middle school. *Mind, Brain, and Education, 13,* 157–166. doi:10.1111/mbe.12200

Cash, M., & Whittingham, K. (2010). What facets of mindfulness contribute to psychological well-being and depressive, anxious, and stress-related symptomatology? *Mindfulness, 1,* 177–182.

Cheung, R. Y. M., & Ng, M. C. Y. (2018). Mindfulness and symptoms of depression and anxiety: The underlying roles of awareness, acceptance, impulse control, and emotion regulation. *Mindfulness, 10,* 1124–1135. doi:10.1007/s12671-018-1069-y

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24,* 385–396.

Curran, T. A., Gawley, E., Casey, P., Gill, M., & Crumlish, N. (2009). Depression, suicidality and alcohol abuse among medical and business students. *Irish Medical Journal, 102,* 249–252.

David, M., Ceschi, G., Billieux, J., & Van der Linden, M. (2008). Depressive symptoms after trauma. Is self-esteem a mediating factor? *The Journal of Nervous and Mental Disease, 196,* 735–742.

Didonna, F., Rossi, R., Ferrari, C., Iani, L., Pedrini, L., Rossi, N., … Lanfredi, M. (2019). Relations of mindfulness facets and psychological symptoms among individuals with a diagnosis of obsessive-compulsive disorder, major depressive disorder and borderline personality disorder. *Psychology and Psychotherapy: Theory, Research and Practice, 92*, 112–130. doi:10.1111/papt.12180

Ediz, B., Ozcakir, A., & Bilgel, N. (2017). Depression and anxiety among medical students: Examining scores of the beck depression and anxiety inventory and the depression anxiety and stress scale with student characteristics. *Cogent Psychology, 4,* 1283829.

Eisenberg, D., Gollust, S. E., Golberstein, E., & Hefner, J. L. (2007). Prevalence and correlates of depression, anxiety, and suicidality among university students. *American Journal of Orthopsychiatry, 4,* 534–542.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). GPower 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175–191. doi:10.3758/BF03193146

Felver, J. C., Tezanos, K. M., & Singh, N. (2015). A systematic review of mindfulness-based interventions for youth in school setting. *Mindfulness, 7,* 34–45.

Gerber, M., Feldmeth, A. K., Lang, C., Brand, S., Elliot, C., Holsboer-Trachsler, E., & Pühse, U. (2015). The relationship between mental toughness, stress, and burnout among adolescents: A longitudinal study with Swiss vocational students. *Psychological Reports, 117,* 703–723. doi:10.2466/14.02.PR0.117c29z6

Gerber, M., & Pühse, U. (2008). Don't crack under pressure! Do leisure time physical activity and self-esteem moderate the relationship between school-based stress and psychosomatic complaints? *Journal of Psychosomatic Research, 65,* 363–369.

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits. A meta-analysis. *Journal of Psychosomatic Research, 5,* 35–43.

Heeren, A., Douilliez, C., Peschard, V., Debrauwere, L., & Philippot, P. (2011). Cross-cultural consistency of the Five Facets Mindfulness Questionnaire: Adaptation and validation in a French sample. *European Review of Applied Psychology, 61*, 147–151.

Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research, 47,* 391–400. doi:10.1016/j.jpsychires.2012.11.015

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice, 10,* 144–156.

Lassarre, D., Giron, C., & Paty, B. (2003). Stress des étudiants et réussite universitaire: les conditions économiques, pédagogiques et psychologiques du succès. *Orientation Scolaire et Professionnelle, 32,* 669–691.

Lemyre, L., & Tessier, R. (1988). Mesure de Stress Psychologique (MSP): Se sentir stressé-e. *Canadian Journal of Behavioural Science / Revue canadienne des sciences du comportement, 20,* 302–321.

Liakoni, E., Schaub, M. P., Maier, L. J., Glauser, G.-V., & Liechti, M. E. (2015). The use of prescription drugs, recreational drugs, and “soft enhancers” for cognitive enhancement among Swiss secondary school students. *PloS ONE, 10,* e0141289. doi:10.1371/journal.pone.0141289

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney: Psychology Foundation of Australia.

Mayer, C., Im, S., Stavas, J., & Hazlett-Stevens H. (2019). Mindfulness facets associated with perceived stress: The role of nonreactivity. *Journal of Depression and Anxiety Forecast, 2,* 1009. Retrieved from https://scienceforecastoa.com/Articles/JDAF-V2-E1-1009.pdf

Medvedev, O. N., Norden, P. A., Krägeloh, C. U., & Siegert, R. J. (2018). Investigating unique contributions of dispositional mindfulness facets to depression, anxiety, and stress in general and student populations. *Mindfulness, 9,* 1757–1767. doi:10.1007/s12671-018-0917-0

Panteleeva, Y., Ceschi, G., Glowinski, D., Courvoisier, D., & Grandjean, D. (2018). Music for anxiety? Meta-analysis of anxiety reduction in non-clinical samples. *Psychology of Music, 46,* 473–487.

Petrocchi, N., & Ottaviani, C. (2015). Mindfulness facets distinctively predict depressive symptoms after two years: The mediating role of rumination. *Personality and Individual Differences, 93,* 92–96. doi:10.1016/j.paid.2015.08.017

Quek, T. T., Tam, W. W., Tran, B. X., Zhang, M., Zhang, Z., Ho, C. S., & Ho, R. C. (2019). The global prevalence of anxiety among medical students: A meta-analysis. *International Journal of Environmental Research and Public Health, 31,* E2735. doi:10.3390/ijerph16152735

Renshaw, T. L. & Cook, C. R. (2017). Introduction to the special issue: Mindfulness in the schools – Historical roots, current status, and future directions. *Psychology in the Schools, 54,* 5–12. doi:10.1002/pits.21978

Rotenstein, L. S., Ramos, M. A., Torre, M., Segal, J. B., Peluso, M. J., Guille, C., … Mata, D. M. (2016). Prevalence of depression, depressive symptoms, and suicidal ideation among medical students. A systematic review and meta-analysis. *JAMA, 316,* 2214–2236. doi:10.1001/jama.2016.17324

Royuela-Colomer, E., & Calvete, E. (2016). Mindfulness facets and depression in adolescents: Rumination as a mediator. *Mindfulness*, *7*, 1092–1102. doi:10.1007/s12671-016-0547-3

Sampl, J., Maran, T., & Further, M. R. (2017). A randomized controlled pilot intervention study of a mindfulness-based self-leadership training (MBSLT) on stress and performance. *Mindfulness, 8,* 1393–1407.

Soysa, C. K., & Wilcomb, C. J. (2013). Mindfulness, self-compassion, self-efficacy, and gender as predictors of depression, anxiety, stress, and well-being. *Mindfulness, 6,* 217–226. doi:10.1007/s12671-013-0247-1

Spielberger, C. D., Bruchon-Schweitzer, M. B., & Paulhan, I. (1993). *Inventaire d'anxiété état-trait forme Y (STAI-Y).* Paris: Editions du Centre de psychologie appliquée.

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD7. *Archives of Internal Medicine, 166,* 1092–1097. doi:10.1001/archinte.166.10.1092.

Statsoft.com (2016). STATISTICA | New features in STATISTICA 12. [online] Retrieved from http://www.statsoft.com/Products/STATISTICA-Features/Version-12.

Strizhev, V. A., Boyko, E. O., Lozhnikova, L. E., & Zaitceva, O. G. (2016). Anxiety and depressive disorders in medical students. *Kuban Scientific Medical Bulletin, 2,* 126–131.

Swiss Health Observatory (2016). *La santé psychique en Suisse*. Retrieved from https://www.npg-rsp.ch/fileadmin/npg-rsp/Tnemen/Obsan_2016_psyGes_Monitoring_f.pdf

Thierry, K. L., Bryant, H. L., Nobles, S. S., & Norris, K. S. (2016). Two-year impact of a mindfulness-based program on preschoolers' self-regulation and academic performance. *Early Education and Development, 27,* 805–821.

Waqas, A., Rehman, A., Malik, A., Muhammad, U., Khan, S., & Mahmood, N. (2015). Association of ego defense mechanisms with academic performance, anxiety and depression in medical students: A mixed methods study. *Cureus, 7,* e337. doi:10.7759/cureus.337

Webb, C. A., Beard, C., Forgeard, M. & Björgvinsson, T. (2019). Facets of mindfulness predict depression and anxiety symptom improvement above CBT skills. *Mindfulness, 10,* 559-570. doi:10.1007/s12671-018-1005-1

Yasin, M., & Dzulkifli, M. A. (2011). The relationship between social support and academic achievement. *International Journal of Humanities and Social Science, 1,* 277–281.

Youssef, F. F. (2015). Medical student stress, burnout and depression in Trinidad and Tobago. *Academic Psychiatry, 40,* 69–75. doi:10.1007/s40596-015-0468-9

Zeng, Y., Wang, G., Xie, C., Hu, X., & Reinhardt, J. D. (2019). Prevalence and correlates of depression, anxiety and symptoms of stress in vocational college nursing students from Sichuan, China: A cross-sectional study. *Psychology, Health and Medicine, 24,* 798–811. doi:10.1080/13548506.2019.1574358

Table 1

Population Characteristics

Characteristics	
N	148
Age *(M, SD)*	24.43 (6.37)
Female (%)	76.35
Male (%)	23.65
Depression, BDI-II total score (*M, SD)*	9.97 (8.33)
Minimal (%)	69
Mild (%)	11
Moderate (%)	14
Severe (%)	6
Anxiety, STAI-Y (State) *(M, SD)*	38.14 (12.65)
Very low (%)	52
Low (%)	21
Moderate (%)	9
High (%)	18
Very high (%)	0
Stress, PSS total score (*M, SD*)	29.15 (5.75)
Minimal (%)	40
High (%)	60
Accommodation (%)	
alone	10.82
in a couple	22.97
with family	52.01
with roommates	12.84
other	1.36
Mean daily commute to the university (%)	
0–15 minutes	23.65
16–60 minutes	62.16
61–120 minutes	13.51
121–240 minutes	0.68
more than 241 minutes	0
Financial condition (%)	
very difficult	1.35
difficult	17.58
fairly comfortable	46.62
comfortable	29.73
very comfortable	4.73
Mean weekly time spent on an extracurricular job (%)	
none	36.48
0–8 hours	39.86
8.01–16 hours	16.22
16.01–32 hours	6.76

more than 32 hours	0.68
Mean weekly time spent on exam preparation (%)	
0–60 minutes	.05
61–180 minutes	15.54
181–360 minutes	37.16
361–600 minutes	25.68
more than 601 minutes	17.57
Importance of achievement (%)	
not at all important	1.35
moderately important	18.92
important	58.11
very important	21.62
Academic performance (*M*)	
Minimum grade last session	3.5
Mean grade last session	4.5
Maximum grade last session	5.75
Mindfulness construct, FFMQ (*M, SD)*	
Total mindfulness	114.73 (20.647)
Observing	22.73 (5.526)
Describing	26.76 (5.761)
Acting with awareness	23.79 (6.223)
Non-judging of inner experience	25.50 (6.866)
Non-reactivity to inner experience	16.57 (5.289)

Notes:

BDI-II = Beck Depression Inventory test (Beck et al., 1996b);

STAI-Y = State-Anxiety Inventory (Spielberger et al., 1993);

PSS = Perceived Stress Scale (Bellinghausen et al., 1983);

FFMQ = Five Facet Mindfulness Questionnaire (Heeren et al., 2011): observing: 8 items; describing: 8 items; acting with awareness: 8 items; non-judging of inner experience: 8 items; and non-reactivity to inner experience: 7 items