Academic Stress and Evaluation of a Mindfulness Training Intervention Program

Chenlin Ying1,2*, Changjiang Liu3, Jingzhou He3, Jinfeng Wang4

ABSTRACT
Many studies have shown that students of different disciplines experience a high level of stress in university environments. It seems that mindfulness education can increase the ability of students to cope with stressful factors in university environments. The purpose of this study was to test the efficacy of a mindfulness training intervention program for college students. 38 students participated in the present study (58% female and 42% male, age: mean = 24.31, SD = 1.05). The students randomly were assigned to an experimental group (n = 20) and a control group (n = 18). The experimental group received an 8-week mindfulness training intervention program, but no control group. At an 8-week follow-up, participants in the experimental group reported an improvement in response to stressors and perceived reduction of stress relative to participants in the control group. However, we observed no differences in stressors, response to stressors and perceived reduction of stress between the experimental and control groups. The findings indicate that a mindfulness training intervention delivered in the university setting may be an effective way to increase response to stressors and reduce perceived stress among college students.

Key Words: Stress, Mindfulness, Stressors, Perceived Stress

Introduction
Education is a stressful experience, especially in the medical professions dealing with human lives. In the meantime, academic stress relates to the growing need for knowledge and, at the same time, the person’s perception of not having enough time to achieve that knowledge (Gadzella and Baloglu, 2001). Examinations are one of the most important stressors in schools and universities with different psycho-physiological outcomes. As a result of stress, the activity of the nervous system, and therefore the amount of pulse, automatically increases (Sakuragi and Sugiyama, 2004). Examination stress is characterized by physical, cognitive, and behavioral symptoms when preparing for exams and performing tests, and once it becomes a problem that interferes with a high level of stress by preparing for the exam and doing the test (Latas et al., 2010). The results of Martin et al.’s study showed that 67.9% of nursing students in Scotland suffered from academic stress (Jones and Johnston, 2000).

The response to stress comes from various axials activity, such as the hypothalamus-pituitary-adrenal (HPA) axis (Smith and Vale, 2006). This axis is activated by stress and secretes cortisol or stress hormone that has many psychosocial effects (Kalman and Grahn, 2004). Stressful experiences can influence neuroendocrine function, safety and physical and psychological health through this axis (Al-Ayadhi, 2005). If stressful environmental factors persist for a long time, it can lead to physical and psychological problems such as anxiety,

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depression, fear, cardiovascular symptoms, digestive problems, insomnia, headache, lymphadenopathy and excessive sweating palms (Grandy et al., 1989). The most harmful effect of long-term stress is to disturb the effective functioning of thinking and learning (Goldstein, 1980).

Students are a group of people who are particularly susceptible to stress and may come up with incompatible responses to stress, such as turning to cigarettes, abuse of alcohol and drugs, as well as drugs and suicide attempts (Rubenstein, 1989). Stress can lead to various negative consequences in individuals, such as physical illness, mental disorders, or burnout (Burnard et al., 2008). In addition, the effect of stress on a healthy person is dependent on several factors such as intensity of stress, its specific effect on living conditions, physical and mental status of the individual and the number of stressors, which occur simultaneously. The best solution to a problem is to prevent it from developing a health problem, in which training plays a major role in preventing health problems.

In recent decades, new interventional and educational approaches have been developed to cope with stress sources in cognitive approaches. Mindfulness-based interventions have shown their efficacy in the treatment of various psychological problems (Baer, 2003). Several different cases responded positively to mindfulness, such as Prevention of relapse of depression (Williams et al., 2000), substance abuse and reducing negative psychological and physical responses to stress (Peterson and Pbert, 1992), and attention deficit hyperactivity disorder (Zylowska et al., 2008). Mindfulness-Based Stress Reduction (MBSR) is the most common way of teaching mindfulness, which is known as a stress relief program and a relaxation program (Peterson and Pbert, 1992). It can be effective on the symptoms of depression, stress and anxiety and psychological worry in vulnerable girls by increasing coping skills (Duncan et al., 2009).

Based on this approach, cognitive psychologists explain that the major part of students’ academic stress comes from their concerns about the future, and therefore, training at that moment and the experience of knowing the momentary processes of mind can be a good alternative for these students. In this regard, Astin (2001) states that the mindfulness techniques help individuals to push the mode of observation towards consciousness content, and this can be a useful cognitive-behavioral coping strategy (quoted from Evans et al., 2008).

The first purpose of our study was to test the efficacy of a mindfulness training intervention program in reducing academic stress among students. In addition, some recent studies have referred that the efficacy of the mindfulness training intervention is moderated by individual differences at pretest, our secondary aim of this study was to examine whether the program would be differentially effective for college students.

Methods
Participants
We recruited participants from a college in China. We gave an opportunity in the study to sixty-three freshmen students with written consent who were present during before the assessment. Of these, 38 (58% female and 42% male) students completed the 8-week follow-up survey. We ranged the sample age from 20 to 30 years (M=24.31, SD=1.05).

Procedure
We sent an invitation to one college to participate and written information about our intervention to the headmaster at the participating college. We also presented the aim of our study, our process of selection of the sample, the measures, and the mindfulness training intervention program at meetings with the freshmen students. The sample of 38 freshmen students was randomly assigned to a mindfulness training (n = 20) and a control group (n = 18). We did not consider student randomization possible under the conditions of this mindfulness training intervention program as it would have interfered with ongoing relationships with students.

Measures
Stressors and response to stressors
Stressors and response to stressors were assessed using the Student-Life Stress Inventory (SLSI; Gadzella & Baloglu, 2001). The inventory consisted of 51 items in 9 floors. The five floors are subject to stressors, including failures, conflicts, pressures, changes, and self-imposed stress, and the four floors are subject to response to stressors, including physical, emotional, behavioral and cognitive assessment. In each sub-scale, the questions are combined with each other to obtain a general score. Higher scores indicate higher academic stress and more responses to stress. The academic stressors section consists of
seven items for the subscale failure, three items for conflicts, four items for pressures, three items for changes, and six items for self-imposed stress. Misra and Castillo (2004) reported an alpha coefficient of 0.65, 0.63, 0.71, 0.75, and 0.63 for failures, conflicts, pressures, changes and self-imposed stress respectively. The response to stressors section consists of fourteen items for the subscale physical, four items for emotional, eight items for behavioral, and two items for cognitive. Misra and Castillo (2004) reported an alpha coefficient of 0.78, 0.81, 0.68, and 0.85 for physical, emotional, behavioral and cognitive respectively. Some studies supported the reliability and validity of the inventory (Gadzella & Baloglu, 2001; Gadzella, 1994; Alzaeem et al., 2010).

Perceived reduction of stress
Perceived reduction of stress was assessed using the Perceived Stress Scale (PSS; Cohen et al., 1983). This scale has three different versions of 4, 10, and 14 substances that are used to measure perceived general stress in a past month. The scale covers thoughts and feelings about stressful events, control, overcoming, coping with stress, and experienced stresses. The scale also examines the risk factors for behavioral disorders and shows the process of stressful relationships. A higher score represents higher perceived stress. Durán et al., (2006) obtained an alpha coefficient of 0.74 for this scale. Cohen et al., (1983) calculated the correlation coefficient using symptomatological measures ranged between 0.52 and 0.76 to calculate the criterion validity of the scale. Some studies supported the reliability and validity of the inventory (Fliege et al., 2001, 2005).

Mindfulness training intervention program
We used an intervention with respect to another mindfulness intervention named Mindfulness-Based Stress Reduction (MBSR), which has been shown to have a positive effect on perceived academic stress in the occupational context (Wang et al., 2016; Ye, 2017).

The MBSR program was a 8-week program, a group session per week, designed to complement advice provided by the anxiety care team. During the sessions, meditative and emotional and cognitive self-regulation skills and, finally, stress reduction methods including winding scan training and yoga methods were taught. Participants were trained to focus on their activities and be aware at any moment of their condition, and whenever emotions and senses are processed, they should observe without judgment, so the participants will learn to focus their thoughts and feelings, but no content. At the first session, the MBSR was begun to provide group coherence and introduction of individuals, and educational information on stress. At the second session, it was taught to practice body check, and for homework, body check, conscious eating, and sitting meditation. In the third session, relaxed and conscious movements of yoga were presented as a way to calm down the physical symptoms of stress and awareness of delicate body movements. It was also considered body checking, yoga, meditation session focused on breathing, awareness of non-heartfelt events and awareness of a common event as homework. In the fourth session, sitting meditation was considered emphasizing the perception of physical sentiment as mere emotion. At this point, a number of homework recommendations were made including body checks, yoga, walking meditation, and sitting meditation. In the fifth session, it was exchanged about half way through. The homework also included a communication exercise and an awareness of the difference between the usual reaction (without choice) and the response (with choice). At the sixth session, the meditation was sitting deeply for a long time. In this meeting, homework exercises included body checks, yoga, walking meditation, sitting meditating sessions and daily routine exercises. The seventh session focused on practicing non-selective consciousness or setting meditation. Non-selective consciousness is different from focusing on a particular subject in whom the individual focuses on the subject or mental or physical image. The homework was including body checks, yoga, walking meditation, consciousness and setting meditation in everyday life. At the eighth session, body check was begun, and it continued with setting meditation’ (Ye, 2017).

Statistical analyses
We compared Stressors and response to stressors between experimental and control group with analysis of variance (ANOVA). We examined the outcome variables with 2 × 2 MANOVA with the time of measurement (pre and post-test).

Results
Preliminary analyses
All outcome variables were examined for participants in the experimental and control
Table 1. Demographic and baseline characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>All students</th>
<th>Experimental group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 38</td>
<td>n = 20</td>
<td>n = 18</td>
</tr>
<tr>
<td>Age, mean (SD)</td>
<td>24.31 1.05</td>
<td>25.12 1.23</td>
<td>24.21 1.52</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16 42.1</td>
<td>8 40</td>
<td>8 44.4</td>
</tr>
<tr>
<td>Female</td>
<td>22 57.9</td>
<td>12 60</td>
<td>10 55.6</td>
</tr>
<tr>
<td>Nationality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American</td>
<td>2 5.3</td>
<td>1 5</td>
<td>1 5.6</td>
</tr>
<tr>
<td>European</td>
<td>3 7.9</td>
<td>2 10</td>
<td>1 5.6</td>
</tr>
<tr>
<td>Arabic</td>
<td>1 2.6</td>
<td>0 0</td>
<td>1 5.6</td>
</tr>
<tr>
<td>Studying</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>8 21.1</td>
<td>4 20</td>
<td>4 22.2</td>
</tr>
<tr>
<td>Psychology</td>
<td>19 50</td>
<td>10 50</td>
<td>9 50</td>
</tr>
<tr>
<td>Other</td>
<td>11 28.9</td>
<td>6 30</td>
<td>5 27.8</td>
</tr>
</tbody>
</table>

Table 2. Average scores and standard deviations of the music therapy group and standard care group

<table>
<thead>
<tr>
<th>Variables</th>
<th>Experimental group (n=20)</th>
<th>Control group (n=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
</tr>
<tr>
<td>Stressors</td>
<td>4.18</td>
<td>4.32</td>
</tr>
<tr>
<td>Response to stressors</td>
<td>3.26</td>
<td>0.67</td>
</tr>
<tr>
<td>Perceived Reduction of stress</td>
<td>2.41</td>
<td>0.58</td>
</tr>
</tbody>
</table>

*p < 0.05, **p < 0.01

Figure 1. Changes in response to stressors over time at baseline and follow-up

Figure 2. Changes in perceived reduction of stress over time at baseline and follow-up

groups at baseline and follow-up assessments. There were 20 participants allocated to the experimental group and 18 to the control group. In Table 1, the demographic characteristics at before the program are presented. We observed no differences between experimental or control group on demographic and pretest characteristics, such as age (experimental group: M= 25.12, SD = 1.23; control group: M= 24.21, SD = 1.52).

Effectiveness of the intervention

A two-way MANOVA was used to investigate the effectiveness of the intervention in improving response to stressors and perceived reduction of stress. Our study found significant differences between baseline and outcome measures for the experimental group but not for the control group. The study also found no significant differences between the experimental group and the control group at baseline, but significant differences at follow-up. This would suggest that the experimental and control group had similar conditions of times and spatial at baseline but the experimental group had significantly improved when measured at follow-up.

Finally, our findings show that there is a nonsignificant increase of stressors in the experimental group (baseline: M = 4.18, SD = 0.36; follow-up: M = 4.32, SD = 0.42), but it is significance in the control group (baseline: M = 4.25, SD = 0.33; follow-up: M = 5.19, SD = 0.47). Our findings showed no significant difference in
Mindfulness training can improve response to stressors in anxious and healthy patients and conclude that mindfulness role in responding to stressors in a current state, and in processes. Arch and Craske (2010) examined immersion in deeper and frustrating cognitive states of mind. This study aims to evaluate the efficacy of a mindfulness training intervention program for the students of a college in China. We designed the program of this study to directly address risk factors for stressors, including poor response to stressors and perceived stress.

According to the results, mindfulness training intervention program is effective in reducing students' academic stress. This finding is consistent with Evans' (2008) study, which showed mindfulness strategies are able to dramatically reduce perceived stress levels, and reducing stress and anxiety increases the ability of individuals to take control of situations. On the other hand, the occupational context of mindfulness training suggests that this method can reduce a variety of troublesome conditions, including stress, anxiety, recurrence of depression and eating disorder (Slyter, 2012; Hofmann et al., 2010; MacKenzie & Kocovski, 2016).

Segal et al., (2012) describe the effectiveness of mindfulness that mindfulness strategies help people get some new experience of stressful situations in a current state, and in this way, be prevented from worrying and immersion in deeper and frustrating cognitive processes. Arch and Craske (2010) examined mindfulness role in responding to stressors in anxious and healthy patients and conclude that mindfulness skills training can improve response patterns to stressors in anxious individuals. Carlson et al., (2003) also achieved significant advances in quality of life, stress symptom and sleep quality in patients with breast and prostate cancer after receiving a mindfulness-based stress reduction program. In this regard, Vygotsky (1980) showed that mindfulness-based therapies are effective in reducing mental stress, chronic pain, anxiety, relapse prevention, depression, generalized anxiety disorder, post-traumatic disorder, and other disorders.

Other studies showed that mindfulness meditation improves mood, and its short-term training reduces fatigue and anxiety (Zeidan, 2010). Also, other studies showed that mindfulness training affects depression, anxiety, and psychological adjustment (Bohlmeijer et al., 2010). Further, mindfulness-based therapy improves stress symptoms, anxiety, and self-esteem (Goldin & Gross, 2010). Studies have shown that mindfulness techniques are effective in increasing muscle relaxation and reducing worry, stress, and anxiety (Kabat-Zinn, 2003). In a study on the effects of the Mindfulness-Based Stress Reduction (MBSR) program on pain, positive states of mind, stress, and self-efficacy, the scores of subjects increased in the post-test compared with the scores of subjects in the pre-test, indicating the effect of the program on the above variables (Chang et al., 2004).

There are potentially important implications in the results of this research for developing prevention and intervention programs for college students. The first important implication is the use of a mindfulness training program among college students. The second important implication is that a mindfulness training program may be an effective way to increase response to stressors and reduce perceived stress among college students.

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