

Academic Stress and Mental Health in International University Students: The Role of Mindfulness, Self-Compassion and Psychological Flexibility

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Abstract

Background: International university students experience significant amounts of academic stress which are associated with anxious and depressive symptoms. Concepts related to mindfulness might help international university students to cope with academic stress and buffer against mental health. **Aim:** This study investigated the role of mindfulness including its facets (observing, describing, acting with awareness, non-judging, and non-reactivity), self-compassion and psychological flexibility in the relationship between perceived academic stress and mental health (i.e. anxiety and depression). **Method:** The sample comprised 190 international university students in the Netherlands. The participants filled in self-report questionnaires about mindfulness, self-compassion, psychological flexibility and symptoms of anxiety and depression. It was controlled for age, gender and the number of negative life events experienced. **Results:** Hierarchical regression analyses revealed, that higher levels of perceived academic stress were significantly positively related to anxiety and depression symptoms. Analyses of the direct effects of the mindfulness-related constructs revealed, that the observing facet and psychological inflexibility were significantly positively related to anxiety. In relation to depression, the acting with awareness facet and self-compassion were significantly negatively related, while psychological inflexibility was significantly positively related to depression. In contrast to hypotheses, mindfulness, self-compassion and psychological flexibility did not moderate the relationship between perceived academic stress and mental health symptoms in this study. **Conclusion/Implication:** The results might provide possible targets for mental health interventions in international university students, i.e. promoting a psychologically flexible attitude towards one's experiences, being mindful, particularly acting with awareness, and being compassionate towards oneself.

Keywords: Academic stress; international students; mindfulness; self-compassion; psychological flexibility; anxiety; depression

1. Introduction

Mental health problems are common among university students. Recent research has shown concerning rates of anxiety and depression in this population (e.g. Larcombe et al., 2016; Regehr, Glancy, & Pitts, 2013; Stallman, 2010). In the American College Health Association-National College Health Assessment II (ACHA-NCHAI) 2019 Spring Survey 65.7% of the students indicated that they had felt overwhelmed with anxiety and 45.1 % indicated that they had felt depressed during the last 12 month period ($N=67.972$; ACHA, 2019). In recent years, the prevalence of anxiety and depression among university students has been increasing (Center for Collegiate Mental Health, 2019) and it has been recognized as a global issue (Sharp & Theiler, 2018). Moreover, university students have been shown to have an increased prevalence of mental health problems compared to their non-university counterparts in the general population (Larcombe et al., 2016; Stallman, 2010). This suggests that factors specific to the academic environment may make these students an at risk population for mental disorders. A recent review on psychological distress in university students stated, that mental health problems might results from the challenges that university life brings about (Sharp & Theiler, 2018). University students have to deal with multiple academic, personal, and social demands and this may result in academic stress involving mental and emotional strain (Lin & Huang, 2014). Recently, as measured with the Kessler 10 (K10; Kessler et al., 2003), a short measure of general psychological distress, clinically significant stress levels (cut-off score ≥ 20) (Stallman & Hurst, 2011) of 59.70% have been reported in Australian university students (Stallman & Hurst, 2016). In a sample of law students Bergin & Pakenham (2015) showed that perceived academic stress, involving academic demands, social isolation, career pressure and study/life imbalance is associated with higher depression and anxiety symptoms. Mental disorders, such as anxiety and depression have a huge impact on the student's quality of life and can be detrimental for their academic performance, engagement in school and the rate of graduates (Grégoire, Lachance, Bouffard, & Dionne, 2018). In the NCHA 2019 Spring Survey 27.8% of the students reported that anxiety and 20.2% that depression had impacted their academic performance within the last 12 month (ACHA, 2019).

1.1 The special case of international students

A special group of university students are international students, students studying at a university in a country other than their country of origin (Dutta & Chye, 2017). An increasing number of students decide to go abroad to pursue their academic careers. The numbers of

international students in the U.S. are increasing, with 5.5% of the U.S. higher education being international students (Institute of International Education, 2019). In recent years with the development of international study programs, there is also an increasing number of international students in countries where the native language is not English, like Germany or the Netherlands (Rienties & Tempelaar, 2013).

Compared to domestic students, international students have to deal with several unique challenges that might influence their mental health, such as adjusting to a different academic environment and different cultural norms (Forbes-Mewett & Sawyer, 2016; Shadowen, Williamson, Guerra, Ammigan, & Drexler, 2019; Smith & Khawaja, 2011). Thus, academic stress in international students may be aggravated by having to adapt to unfamiliar educational methods, different interactions between students and professors and potential language problems. In addition, international students may feel pressured to perform well and meet academic expectations of their family in their home country (Mori, 2000; Smith & Khawaja, 2011).

These additional demands place international students at a greater risk of developing mental health problems compared to domestic students (Mori, 2000). High rates of anxiety and depression have been reported in international students (Forbes-Mewett & Sawyer, 2016; Mesidor & Sly, 2016). According to qualitative reports from professionals working with international students the factors determining mental health of international students are their adjustment to a new academic environment, managing their daily lives in a new cultural context and being aware and reaching out for mental health services (Forbes-Mewett & Sawyer, 2016). However, it has often been reported that mental health services are underused by international students (Mori, 2000; Shadowen et al., 2019). Instead, maladaptive coping strategies have been shown to be present among international students (Smith & Khawaja, 2011). Poor coping abilities have generally been associated with mental health problems in university students (Byrd & McKinney, 2012), and it has thus been suggested that student's psychological attributes could act as resilience factors against mental health when faced with academic demands (Sharp & Theiler, 2018).

1.2 Mindfulness, self-compassion and psychological flexibility

With the increasing practice of third wave behavioral therapies like mindfulness based cognitive therapy (MBCT), compassion focused therapies, and acceptance and commitment therapy (ACT), concepts related to mindfulness have received increasing attention.

Mindfulness, self-compassion and psychological flexibility have generally been shown to be

associated with good mental health and suggested to be potential buffering resources to cope with stress.

Mindfulness refers to “paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally” (Kabat-Zinn, 1994, p.4). It entails noticing and observing external and internal experiences and then refocusing one’s attention back to what is going on at the present moment (Barcaccia et al., 2019; Brown & Ryan, 2003). A variety of different conceptualizations of mindfulness have been proposed operationalizing mindfulness as a single facet, measured with the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) or as consisting of multiple facets, measured with the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2008). The FFMQ consists of five different facets. The observing facet entails observing and perceiving things in the environment and in one’s inner world (e.g. sounds, smells, thoughts, emotions, sensations). Describing refers to the ability to find words to describe one’s inner experiences and labeling them. Acting with awareness refers to paying attention to one’s current activities rather than performing them automatically. Nonjudging of inner experience entails having a non-judgmental attitude towards one’s cognitions and emotions. Nonreactivity to inner experience, refers to the ability to let thoughts and cognitions appear and vanish by not getting overly involved with them. Mindfulness has been shown to have a positive association with various components of mental health, such as better subjective well-being, decreased symptom severity, less cognitive and emotional disruption and enhanced regulation of behavior (Brown & Ryan, 2003; Keng, Smoski, & Robins, 2011). Among the five facets of mindfulness, higher levels on the non-judgmental facet were found to be the most strongly related to psychological symptoms, including decreased anxious and depressive symptoms (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Barcaccia et al., 2019; Cash & Whittingham, 2010). Additionally, acting with awareness has also been shown to be highly associated with anxiety (Barcaccia et al., 2019) and depression (Barcaccia et al., 2019; Cash & Whittingham, 2010). In contrast, the describing and observing facets were not significantly related to anxiety and depression (Barcaccia et al., 2019; Cash & Whittingham, 2010). There is one study that investigated the moderating role of total mindfulness and the five mindfulness facets in the relationship between perceived stress and psychological adjustment in a sample of law students (Bergin & Pakenham, 2016). Bergin & Pakenham (2016) found that a total mindfulness score, obtained by summing the scores of each facet, reduced the effect of perceived stress on anxiety and depression for those high in mindfulness compared to those low in mindfulness. Analyses of the different mindfulness facets revealed, that the describing

facet buffered the relationship between perceived stress and anxiety and depression and the observing facet buffered the relationship between perceived stress and depression and life satisfaction. However, their findings were in contrast to previous studies finding that the acting with awareness facet, non-reactivity facet and non-judging facet of mindfulness had a moderating role in the relationship between anxiety and depression (Bränström, Duncan, & Moskowitz, 2011; Ciesla, Reilly, Dickson, Emanuel, & Updegraff, 2012; Marks, Sobanski, & Hine, 2010).

Self-compassion is a similar construct to mindfulness and defined as being open and understanding towards one's suffering (Neff, 2003). It involves self-kindness instead of self-judgement, common humanity rather than isolation and mindfulness versus over-identification of thoughts and feelings. Thus, in comparison to the broader concept of mindfulness, the mindfulness component in self-compassion emphasizes a compassionate approach to one's suffering instead of a greater focus on present moment awareness to positive, neutral or negative experiences (Neff & Dahm, 2015). In addition, it entails not only having a non-judgmental attitude towards one's cognitions, feelings and bodily sensations but also a motivation to do something about it and releasing oneself from suffering in the future. Self-compassion includes cognitive strategies such as being nice to oneself, giving oneself loving attention, being understanding of oneself and saying friendly things to oneself (Garnefski & Kraaij, 2019). Multiple empirical studies have consistently shown that self-compassion is linked to psychopathology, with lower levels of self-compassion being linked to increased psychopathology and higher levels of self-compassion being linked to better mental health (MacBeth & Gumley, 2012; Trompetter, de Kleine, & Bohlmeijer, 2017; Zessin, Dickhäuser, & Garbade, 2015). Trompetter et al. (2017) found that self-compassion acts as a moderator between negative affect and psychopathology by weakening the relationship between negative affect and psychopathology for those high in self-compassion compared to those low in self-compassion. They suggested that self-compassion may act as a resilience factor against psychopathology by increasing attributes like kindness and positive feelings and reducing negative affect such as criticism and rumination. Similarly, Allen & Leary (2010) found that self-compassion, as a coping strategy, may buffer against mental health problems under the experience of negative life events.

Both these concepts are also related to psychological flexibility. Psychological flexibility, underlying ACT, refers to fully contacting the present moment with all the thoughts and emotions this entails and based on the context changing or persisting with one's behavior to act in accordance with chosen goal's and values (Hayes, Luoma, Bond, Masuda,

& Lillis, 2006). Thus, it entails moving towards one's goals and values even when that might interfere with one's thoughts or feelings. Six interacting subprocesses are supposed to underlie and foster psychological flexibility: acceptance (i.e. accepting unwanted personal experiences), cognitive defusion (i.e. getting detached from one's thoughts), present moment awareness (i.e. non-judgmental attitude to ongoing events), self as context (i.e. seeing oneself as the experiencer), values (i.e. chosen personal values or life directions), and committed action (i.e. acting in a direction towards one's values) (Grégoire et al., 2018; Hayes et al., 2006). In a longitudinal study, greater levels of psychological flexibility have been shown to predict overall psychological health over a time course of one year (Bond & Bunce, 2003). Conversely, psychological inflexibility involves an emphasis on acting according to one's inner experiences (i.e. to avoid unpleasant feelings or thoughts) instead of engaging in more effective behavior consistent with one's chosen goals and values (Bond et al., 2011; Levin, Krafft, Pistorello, & Seeley, 2019). Psychological inflexibility, as measured by the Acceptance and Action Questionnaire (AAQ; Bond et al., 2011; Hayes et al., 2004), has consistently shown to have a negative association with mental health, including greater levels of depression and anxiety (Bond et al., 2011; Hayes et al., 2006; Kashdan & Rottenberg, 2010; Levin et al., 2014; Masuda & Tully, 2012). Gloster, Meyer and Lieb (2017) found that psychological flexibility moderated the relationship between stress and depression and anxiety in the general population by weakening the relationship for those high in psychological flexibility and strengthening it for those low in psychological flexibility. They suggested that psychological flexibility acts as a protective factor.

Taken together, these studies show that there is strong evidence that concepts related to mindfulness individually contribute to good mental health and preliminary evidence that these factors might be considered important protective factors that buffer against psychopathology. A limited amount of research looked at these concepts together in one study. Woodruff et al. (2014) explored the individual contribution to variation in positive and negative psychological health explained by self-compassion, mindfulness, and psychological inflexibility. In their sample of university students they found that self-compassion was a stronger predictor of positive psychological health and a stronger predictor of negative psychological health except anxiety than total scores of mindfulness measured with the MAAS or FFMQ total score. When they included separate scales of the FFMQ as predictors significantly more variance was explained and they identified the nonreactivity facet as a particular important predictor. Their findings were in line with those of Van Dam, Sheppard, Forsyth, & Earleywine (2011) who also demonstrated, that self-compassion was a stronger

predictor of anxious and depressive symptoms than a total score of mindfulness. Additionally, Woodruff et al. (2014) identified psychological flexibility to be a stronger predictor of negative mental health than self-compassion. One study found preliminary evidence, that mindfulness, self-compassion and psychological flexibility consolidated into a single factor of “mindful awareness” predicts less disability and better quality of life in a sample of war veterans (Meyer et al., 2018).

1.3 The present study

Despite the importance for identifying potential factors that could reduce stress and increase mental health in international university students, research on mindfulness related constructs as targets for interventions at university is limited. There is some preliminary evidence for the effectiveness of intervention programs in university students based on these concepts (Grégoire et al., 2018; Regehr et al., 2013; Smeets, Neff, Alberts, & Peters, 2014). However, to the best of our knowledge, no previous study investigated the role of mindfulness, self-compassion, and psychological flexibility in the relationship between perceived academic stress and mental health in international university students together in one study. Considering the broader context of the high and rising prevalence of mental disorders affecting university students all over the world, with international students being at particular risk due to their unique challenges involved in going abroad, the high levels of stress experienced by this population and the detrimental effects of anxiety and depression on quality of life and academic achievement, studies investigating the role of these constructs are of utmost importance from a public health perspective, for science and society. Ultimately, research on the role of mindfulness related constructs could help to find targets for interventions in Universities aimed to reduce stress and promote mental well-being of international students. Further, this could add to the literature comparing these concepts with each other to identify which factors are the most important targets for interventions and whether they could be consolidated into a single intervention.

Therefore, the aim of the present study is to investigate the relationships between perceived academic stress, mindfulness related constructs (i.e. mindfulness, self-compassion, psychological flexibility) and mental health in international university students. Here, mental health is operationalized as the severity of anxious and depressive symptoms. The first study question is: To what extent is perceived academic stress in international university students related to mental health symptoms? It is hypothesized, that a significant amount of variance in mental health symptoms will be explained by perceived academic stress. Specifically, higher

levels of perceived academic stress are expected to be associated with more anxious and depressive symptoms. The second study question is: To what extent do mindfulness, self-compassion and psychological flexibility explain variance in mental health, over and above those of perceived academic stress in international university students? It is hypothesized, that the three mindfulness-related constructs will explain a significant amount of variance over and above that of perceived academic stress. Specifically, higher levels of mindfulness and self-compassion and lower levels of psychological inflexibility are expected to be associated with less anxious and depressive symptoms. The third study question is: Is the relationship between academic stress and mental health moderated by mindfulness, self-compassion, and psychological flexibility? Thus, based on preliminary research the possibility will be explored whether on top of the direct effects, the five facets of mindfulness, self-compassion and psychological flexibility will moderate the relationship between academic stress and mental health in such a way, that the relationship between higher levels of academic stress and severity of mental health symptoms is weakened for those high in psychological flexibility, mindfulness and self-compassion and strengthened for those low in concepts related to mindfulness.

2. Method

2.1 Participants

The participants consisted of 190 international students recruited from different Universities in the Netherlands (i.e. Leiden University, Erasmus University, Hogeschool Rotterdam, Hanze University Groningen, Radboud University Nijmegen, Tilburg University, University of Amsterdam, Utrecht University). These 190 participants concerned 81.1% female and 17.9% male students (two participants had missing data on gender) aged 18 to 43 years (mean age 22.86; $SD=3.33$). Participants were from 53 different nationalities, with German (30.5%), Greek (6.3%) and Chinese (5.3%) being the most frequent. The students were recruited from various study categories, with most students being enrolled in gamma studies (e.g. psychology, politics, sociology, economics) (87.4%), followed by alpha studies (e.g. language, anthropology, history, religion, philosophy, law, performing arts) (6.8%), beta studies (e.g. natural sciences, medicine, engineering, informatics) (2.8%), and other studies (5.8%).

2.2 Procedure and Design

This study was a cross-sectional, empirical quantitative research conducted with an online questionnaire. Inclusion criteria were being an international student currently enrolled at a Dutch University. International students studying in a different country than the Netherlands and Dutch students following an international program were not eligible to participate. In the period between March to May 2019 an online questionnaire was available on Qualtrics. Participants were recruited via personal network, by distributing flyers with a QR code and weblink to the survey, by direct inquiry on campus (Leiden University and Erasmus University Rotterdam), by Facebook announcements and students of the Clinical Psychology Master's Program of Leiden University were contacted via their student e-mail addresses. At the beginning of the questionnaire participants were informed that the questionnaire would take approximately 15 minutes and that participation was voluntary and anonymous. Participants filled out an informed consent form. This was followed by several self-report measures. The study was approved by the Leiden University ethics committee. A total of 249 students initially filled out the questionnaire of which 190 students met the inclusion criteria and had sufficiently completed the survey (>80%), to be used for statistical analyses.

2.3 Measures

2.3.1 *Perceived academic stress*

Perceived academic stress was assessed via the Law Student Perceived Stress Scale (LSPSS; Bergin & Pakenham, 2014). It was adjusted to be applicable to students from various study categories by substituting terms like "law school" or "law students" with more general terms. The LSPSS is a 24-item self-report questionnaire consisting of the following four dimensions of academic stress: academic demands, social isolation, career pressure and study/life imbalance. The instruction to participants stated: "The following items are possible sources of stress related to studying. Indicate for each item to what extent this is stressful for you". Responses were given on a five point response scale from 1 = *not at all stressful* to 5 = *very stressful*. Individual scores were obtained by summing up all the items to obtain a total score. Higher scores on this measure refer to a greater appraisal of university stressors as stressful. Internal reliability of the LSPSS has been shown to be high with Cronbach's alpha of .89 and the face validity, convergent validity and criterion validity of the LSPSS have been supported (Bergin & Pakenham, 2014).

2.3.2 Mindfulness

To measure how mindful the students were the FFMQ (Baer et al., 2006) was used. The FFMQ consists of 39 items and was developed by integrating items from five independent mindfulness questionnaires, resulting in the five facets of mindfulness (observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience). The following instruction was given: “Please rate each of the following statements with the number that best describes your own opinion of what is generally true for you.”. Responses were given on a Likert scale ranging from 1 = *never or very rarely true* to 5 = *very often or always true*. Reverse scored items (all of the acting with awareness and nonjudging items and two of the describing items) were recoded. The conceptualization of mindfulness as a multifaceted construct has been supported (Baer et al., 2008). Here, individual subscale scores for each of the five facets of mindfulness were obtained by summing up the items corresponding to a particular subscale. Higher scores on each subscale indicate higher levels of mindfulness. The five factors have been shown to have acceptable to good psychometric properties with alpha coefficients ranging from .67 to .92 (Baer et al., 2008).

2.3.3 Self-compassion

To measure self-compassion the newly developed four-item self-compassionate coping measure (SCCM; Garnefski & Kraaij, 2019) was used. The following instruction was provided: “Everyone gets confronted with negative or unpleasant events now and then and everyone responds to them in his or her own way. By the following questions you are asked to indicate what you generally do, when you experience negative or unpleasant events.”. Answers were given on a Likert scale ranging from 1 = *almost never* to 5 = *almost always*. Individual scores were obtained by making sum scores of the items (possible range: 4 to 20). Higher scores on the SCCM are associated with higher self-compassionate coping. The SCCM has been shown to have a high alpha reliability (.91) (Garnefski & Kraaij, 2019). Further, it has been shown to be strongly related to each of the subscales of the self-compassion scale (SCS; Neff, 2003), suggesting high construct validity and to have moderately high criterion validity (Garnefski & Kraaij, 2019).

2.3.4 Psychological flexibility

The AAQ-II (Bond et al., 2011) includes seven self-report items that measure psychological inflexibility. The following instruction was given: “Below you will find a list of statements.

Please rate how true each statement is for you by using the scale below to fill in your choice.” The responses were rated on a seven-point scale ranging from 1 = *never true* to 7 = *always true*. The scale is scored by summing the seven items. Higher scores refer to greater levels of psychological inflexibility and thus lower levels of psychological flexibility. The AAQ-II has demonstrated good internal consistency with a mean alpha reliability of .84 (.78-.88) in six different samples (Bond et al., 2011). The test-retest reliabilities of the AAQ-II were .81 (at three month) and .79 (at 12 month). Further, the convergent and discriminant validity of the AAQ-II have been established.

2.3.5 Mental health

Symptoms of anxiety and depression were assessed with the Generalized Anxiety Disorder Scale (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) and the Patient Health Questionnaire for Depression (PHQ-9; Kroenke, Spitzer, & Williams, 2001). These self-report questionnaires are based on the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) criteria for generalized anxiety disorder and major depression. The GAD-7 consists of seven items measuring the presence and severity of anxiety. The following instruction was given: “Over the past two weeks, how often have you been bothered by any of the following problems?”. Responses were given on a four-point Likert scale from 0 = *not at all* to 3 = *nearly every day*. Individual scores were obtained by summing up the items (possible range: 0 to 21). Higher scores on this measure represent greater levels of anxious symptoms with more functional impairment and more days on which anxious symptoms are experienced. Internal consistency of the GAD-7 has been demonstrated to be excellent with Cronbach’s alpha of .92 and it has been proven to have good criterion and construct validity (Spitzer et al., 2006).

The PHQ-9 consists of 9 items measuring the presence and severity of depression. The instructions was the same as for the GAD-7. It is scored on a four-point Likert scale ranging from 0 = *not at all* to 3 = *nearly every day*. Individual scores were obtained by making a sum score (possible range: zero to 27). Higher scores on this measure represent greater presence and severity of depressive symptoms. Internal reliability of the PHQ-9 was excellent with Cronbach’s alpha of .89 and it demonstrated good criterion and construct validity (Kroenke et al., 2001).

2.3.6 Negative life events

The presence of negative life events was controlled for by using an adjusted version of the negative life event scale (available at www.cerq.leidenuniv.nl). The following 16 life events were measured: divorce of parents, divorce/breakup of longstanding relationship, long lasting and/or severe physical illness of a significant other, long lasting and/or severe physical illness of self, death of significant other, severe psychological problems of significant other, suicide (attempt) of significant other, violence within family home or partner relationship, alcohol or drug abuse within family home or partner relationship, been a victim of bullying, been victim of discrimination, unwanted pregnancy, been a victim of crime, been a victim of a serious accident, been a victim of sexual abuse, been a victim of physical abuse. The instruction was: “Have you experienced the following events in the past year or before that? Select *no* if you have not experienced the event. If you have experienced an event, check the box for the period in which the event happened. If the event happened in both periods, please check the boxes under both periods for this event.”. If a negative life event happened in any of the periods a score of 1 was given, leading to a total number of negative life events (possible range: 0 to 16). Higher scores refer to a higher presence of negative life events.

2.4 Statistical analysis

A filter variable was created to exclude cases who had completed less than 80% of the questionnaire and who did not meet the inclusion criteria. Alpha reliabilities, means, standard deviations and ranges of the study variables (perceived academic stress, subscales of mindfulness, self-compassion, psychological flexibility, anxiety, and depression) were calculated. Further, the number of negative life events was examined. In addition, Pearson Correlations between the mindfulness related constructs (mindfulness subscales, self-compassion, psychological inflexibility) and perceived academic stress and anxiety and depression were calculated to determine relationships between them.

To answer the study questions whether there is a direct effect of perceived academic stress on mental health and whether concepts related to mindfulness explain variation in anxiety and depression over and above those of perceived stress hierarchical multiple regression analyses were performed. Separate analyses were performed for each outcome variable (anxiety and depression). It was controlled for age, gender and negative life events. In the first step the control variables were entered into the model. In the second step the total score of perceived stress was added. In the third step the five facets of mindfulness (observing, describing, acting with awareness, nonjudging, nonreactivity) were added. In the

fourth step the total score of self-compassion was added and in the fifth step the total score of psychological inflexibility was added. In that way, the independent contribution of each construct in explaining mental health outcome could be seen. Prior to analyses assumptions of linearity, multicollinearity, independent errors, homoscedasticity and normally distributed errors were tested. All assumptions were met. In addition, to determine possible outliers or influential cases Cook's distance and case wise diagnostics were checked. No outliers or influential cases were identified.

To determine possible moderating effects of the mindfulness subscales, self-compassion and psychological inflexibility interaction terms between perceived academic stress and the mindfulness related constructs and the potential moderator variables (observing, describing, acting with awareness, nonjudging, nonreactivity, self-compassion, and psychological inflexibility) were examined for each outcome measure (anxiety and depression) separately, resulting in 14 moderation analyses. Moderation analyses were performed via PROCESS in SPSS (Hayes, 2017). Variables were mean centered prior to analyses.

A two-tailed alpha level of $p < .05$ was used for all analyses. All statistical analyses were performed with IBM SPSS Statistics (version 24).

3. Results

3.1 Descriptive statistics

Examination of the life events that the participants experienced revealed, that on average they reported three life events ($SD=2.84$). Table 1 shows the Cronbach's alpha (internal reliability) and descriptive statistics of the study variables (total perceived stress, mindfulness subscales, self-compassion, psychological inflexibility, anxiety and depression). The Cronbach's alpha reliabilities of the assessed outcome measures ranged between .82 and .91.

Table 1

Cronbach's alpha, means, standard deviations and ranges of the study variables (n=190)

Variables	Cronbach's alpha	M	SD	Range
Total perceived stress	.87	53.86	10.29	24-80
Mindfulness subscales				
Observing	.82	25.60	5.89	10-39
Describing	.89	27.27	6.19	13-40
Acting with awareness	.90	24.95	6.38	8-40
Nonjudging	.88	25.52	6.70	8-39
Nonreactivity	.77	19.13	4.43	9-30
Self-compassion	.91	11.22	4.05	4-20
Psychological inflexibility	.91	23.52	9.56	7-49
Anxiety	.89	14.74	5.17	7-28
Depression	.88	17.48	6.07	9-36

3.2 Correlation

The bivariate Pearson correlations between all study variables are shown in Table 2.

Perceived academic stress was significantly positively related to anxiety and depression, with a large effect size (Cohen, 1977). Of the five facets of mindfulness, the observing facet showed a weak positive relationship to anxiety and depression while describing, acting with awareness, nonjudging and nonreactivity were negatively related to anxiety and depression with effect sizes ranging between .10 and .54. Nonjudging showed the strongest negative relationships with anxiety and depression. Self-compassion showed a significant negative relationship to anxiety and depression, with a moderate effect size (Cohen, 1977).

Psychological inflexibility was positively related to anxiety and depression and the magnitude of this effect was large (Cohen, 1977).

3.3 Hierarchical multiple regression

The results of the two separate hierarchical regression analyses for anxiety and depression as the dependent variable are given in Table 3. The predictors were entered into the model in the order as displayed in the table.

Table 2

Bivariate Pearson correlations of the study variables

	1	2	3	4	5	6	7	8	9	10
1. Total Perceived stress	-									
2. Observing	-.09	-								
3. Describing	-.18*	.27***	-							
4. Acting with awareness	-.34***	-.02	.24**	-						
5. Nonjudging	-.49***	-.11	.22**	.57***	-					
6. Nonreactivity	-.23**	.38***	.22**	.13	.16*	-				
7. Self-compassion	-.25**	.33***	.25**	.16*	.24**	.44***	-			
8. Psychological inflexibility	.49***	-.02	-.22**	-.54***	-.67***	-.24**	-.42***	-		
9. Anxiety	.61***	.11	-.13	-.40***	-.54***	-.24**	-.33***	.65***	-	
10. Depression	.51***	.06	-.10	-.43***	-.48***	-.16*	-.35***	.64***	.76***	-

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 3
Hierarchical multiple regression analyses of perceived academic stress on anxiety and depression

	Anxiety			Depression		
	<i>B</i>	<i>SEB</i>	β	<i>B</i>	<i>SEB</i>	β
<i>Step 1</i>						
Age	-.01	.08	-.00	-.18	.10	-.10
Gender	.24	.68	.02	1.07	.88	.07
Negative life events	.25	.09	.14**	.37	.12	.17**
<i>Step 2</i>						
Perceived stress	.19	.03	.38***	.13	.04	.23**
<i>Step 3</i>						
Observing	.19	.05	.21***	.11	.06	.10
Describing	.01	.05	.01	.07	.06	.07
Acting with awareness	-.04	.05	-.05	-.15	.07	-.16*
Nonjudging	-.02	.06	-.03	.03	.07	.03
Nonreactivity	-.13	.07	-.11	-.07	.09	-.05
<i>Step 4</i>						
Self-compassion	-.13	.08	-.10	-.20	.10	-.13*
<i>Step 5</i>						
Psychological inflexibility	.18	.04	.34***	.24	.05	.37***

Note. The values for Beta indicate Bs after Step 5

*** $p < .001$, ** $p < .01$, * $p < .05$

In the regression analysis with anxiety as the dependent variable, the control variables age, gender and negative life events were entered in the first step and together accounted for a significant proportion of variance in anxiety, $R^2=.07$, $F(3,175)=4.20$, $p=.007$. Perceived academic stress was entered in the second step and led to a significant change in R^2 , explaining an additional 35.1% of variance in anxiety $F(1,174)=31.30$, $p<.001$. Next, the five facets of mindfulness were entered into the model and together accounted for a significant increase in R^2 , explaining an additional 11.7% of variance in anxiety $F(9,169)=21.61$, $p<.001$. Entering self-compassion into the model, in the fourth step, led to a significant change in R^2 and accounted for an additional 2.4% of variance in anxiety scores, $F(10, 168)=21.29$, $p<.001$. In the fifth step, psychological inflexibility was entered into the model and led to a significant change in R^2 , accounting for an additional 4.7% of variance in anxiety $F(11,167)=23.37$, $p<.001$. The final model explained 60.6% of the variance and was a significant predictor of anxiety $F(11,167)=23.37$, $p<.001$. Perceived academic stress explained a significant amount of variance in anxiety in the final model. Over and on top of this effect, of the five facets of mindfulness, the observing facet was a significant positive unique contributor to variance in anxiety, i.e. the more this strategy was used the more symptoms of anxiety were reported. Additionally, psychological inflexibility, was a significant positive predictor of variance in anxiety, i.e. the more psychologically inflexible an individual was the more symptoms of anxiety were reported. The other facets of mindfulness, as well as self-compassion did not significantly contribute to variance in anxiety in the final model. Concerning the control variables, age and gender were not significant while the amount of life events experienced explained a significant amount of variance in anxiety.

In the regression model with depression as the dependent variable, the variables were entered in the same sequence as in the regression model with anxiety as the dependent variable. Introduction of the control variables, age, gender and life events in the first step together accounted for a significant proportion of variance in depression, $R^2=.07$, $F(3,175)=6.55$, $p<.001$. Entering perceived academic stress in the second step led to a significant change in R^2 , explaining an additional 21.6% of variance in depression $F(4,174)=20.14$, $p<.001$. The addition of the five facets of mindfulness accounted for a significant increase in R^2 , explaining an additional 11.7% of variance in depression $F(9,169)=14.37$, $p<.001$. Entering self-compassion into the model, led to a significant change in R^2 and accounted for an additional 3.5% of variance in depression scores, $F(10, 168)=14.78$, $p<.001$. Including psychological inflexibility, in the fifth step led to a significant

change in R^2 , accounting for an additional 5.8% of variance in depression $F(11,167)=16.84$, $p<.001$. The final model explained 52.6% of the variance and was a significant predictor of depression $F(11,167)=16.84$, $p<.001$. Findings showed that perceived academic stress also explained a significant amount of variance in depression in the final model. Over, and above this effect, the acting with awareness subscale of the five facets of mindfulness was a significant independent negative contributor to variance in depression, i.e. those that indicated to act with awareness reported less symptoms of depression. In addition, the total score of self-compassionate coping was a significant negative predictor of the model, i.e. those who reported to be more self-compassionate reported less symptoms of depression. Further, psychological inflexibility significantly positively contributed to variance in depression, i.e. those that indicated to be more psychologically inflexible reported more symptoms of depression. Age and gender were not significant predictors. The total sum of experienced life events significantly contributed to variance in depression.

3.4 Moderation

Next, separate moderation analyses between perceived academic stress and the mindfulness facets, self-compassion and psychological flexibility were performed for anxiety and depression as the dependent variable. Thus, the two-way interactions between perceived stress by describing, perceived stress by acting with awareness, perceived stress by nonjudging, perceived stress by nonreactivity, perceived stress by self-compassion and perceived stress by psychological inflexibility were tested for each outcome measure. In total there were 14 analyses. Neither, for depression, nor for anxiety as the dependent variable any of the interaction terms reached statistical significance and thus provided evidence that these concepts moderated the relationship between perceived academic stress or anxiety. Detailed results are given in Table A in the Appendix.

4. Discussion

In an attempt to identify possible targets for mental health interventions in international university students, this study investigated the role of mindfulness, self-compassion and psychological flexibility in the relationship between perceived academic stress and mental health (i.e. anxiety and depression symptoms) in a sample of international students from different Universities in the Netherlands. In line with hypotheses, this study confirmed direct relationships between perceived academic stress and mental health. Over and on top of this, as

expected, this study found that certain facets of mindfulness, specifically observing and acting with awareness as well as self-compassion and psychological inflexibility explained variance in mental health. Anxiety was significantly related to the observing facet and psychological inflexibility and depression was significantly related to the acting with awareness facet, self-compassion and psychological inflexibility. In contrast to our hypothesis, that mindfulness self-compassion, and psychological flexibility would moderate the relationship between anxiety and depression no evidence was found for this in the current study. These results were obtained controlling for age, gender, and the number of negative life events. Of these variables only the number of negative life events experienced explained a significant amount of variance in anxiety and depression.

The finding that academic stress explained a significant amount of variance in mental health with greater appraisal of university as stressful being associated with more reported symptoms of anxiety and depression was in line with those of Bergin and Pakenham (2015) who demonstrated this relationship in a sample of law students. This study expanded their results to students from various study categories (i.e. alpha, beta, gamma) and shows that perceived academic stress measured as a unidimensional construct is associated with mental health in international university students. This highlights the importance to identify resources with which international university students can cope with the academic challenges that going abroad to pursue academic careers entail.

With regard to the relationship between the five facets of mindfulness and mental health, in contrast to predictions, the observing facet was significantly positively related to anxiety with higher levels of the observing facet being related to higher levels of anxiety. This unexpected finding was consistent with previous studies showing a weak positive correlation between the observing facet, worry and rumination (Barcaccia et al., 2019) and a significant positive relationship to anxiety (Bergin & Pakenham, 2016). Thus, this study extended the line of reasoning, that an increased observation of one's internal and external experiences may not be beneficial for anxiety. Perhaps, the mere observation of one's experiences without adequate skills to cope with them might make individuals more anxious of their experiences instead of bringing improvement. Results of the present study showing a significant negative relationship between the acting with awareness facet and depression were in line with previous research (Barcaccia et al., 2019; Cash & Whittingham, 2010). This provides further evidence, that individuals who pay attention to their activities rather than performing them automatically are less likely to experience symptoms of depression. While Barcaccia et al. (2019) also established a significant relationship between the acting with awareness facet and

anxiety this could not be replicated in the present study. Previous studies found that also the non-judgmental facet of mindfulness and the nonreactivity facet play a particular important role in predicting anxiety and depression (Baer et al., 2006; Barcaccia et al., 2019; Cash & Whittingham, 2010; Woodruff et al., 2014). However, no significant relationships were established here. In line with previous research, this study also did not find a significant relationship between the describing facet and mental health (Barcaccia et al., 2019; Cash & Whittingham, 2010).

In addition, this study revealed that self-compassion was significantly positively related to depression, with higher levels of self-compassion being significantly associated with less depressive symptoms. This finding extended previous studies showing a positive association between self-compassion and better mental health (MacBeth & Gumley, 2012; Trompetter et al., 2017; Zessin et al., 2015) by adding that this relationship was also evident when measured with a shorter, to the point coping measure, the SCCM (Garnefski & Kraaij, 2019), instead of the widely used SCS (Neff, 2003). Hence, this study provides evidence that, self-compassion measured as being nice to oneself, giving oneself loving attention, being understanding to oneself and saying friendly things to oneself (Garnefski & Kraaij, 2019, p.75) is positively related to decreased depressive symptoms. However, in contrast to expectations and previous research (MacBeth & Gumley, 2012; Trompetter et al., 2017; Zessin et al., 2015) self-compassion was not significantly related to anxiety in the present study.

The finding that higher levels of psychological inflexibility, as measured with the AAQII, were related to more depressive and anxious symptoms was in line with previous studies (Bond et al., 2011; Hayes et al., 2006; Kashdan & Rottenberg, 2010; Levin et al., 2014; Masuda & Tully, 2012). Depression and anxiety are both disorders, characterized by decreased flexibility (Kashdan & Rottenberg, 2010). For instance, people with depression use inflexible response styles like rumination and have a diminished ability to derive pleasure from activities. People with anxiety often engage in experiential avoidance, defined as not wanting to experience unpleasant experiences (e.g. cognitions, emotions, bodily sensations) and making an effort to change how often or in which form they occur (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Thus, acting according to one's inner experiences (e.g. avoidance of thoughts and feelings) instead of acting according to one's goals and values is associated with psychopathology. Promoting a flexible attitude towards one's present experiences by contacting the present moment fully with all the cognitions and emotions this

entails while acting in consistence with personal values can thus be considered as an important target to increase mental health.

Thus, this study replicated previous studies showing that concepts related to mindfulness explain variance in mental health (Van Dam et al., 2011; Woodruff et al., 2014). Additionally, this study explored the possibility that mindfulness, self-compassion, and psychological flexibility could act as potential moderators in the relationship between perceived academic stress and mental health in international university students. On the basis of preliminary evidence of buffering effects of these concepts (Allen & Leary, 2010; Bergin & Pakenham, 2016; Bränström et al., 2011; Ciesla et al., 2012; Gloster et al., 2017; Marks et al., 2010; Trompetter et al., 2017) it was expected, that the relationship between perceived academic stress and mental health symptoms would be attenuated for those high in psychological flexibility, mindfulness and self-compassion and strengthened for those low in these concepts. However, no such effect could be found in the present study. Even though, Bergin & Pakenham (2016) found that total mindfulness and the observing and describing facet buffered against stress, they discovered that this effect was more pronounced at high levels of stress compared to low levels of stress. In addition, there are inconsistent results regarding which facets of mindfulness moderate the relationship between stress on anxiety and depression (Bergin & Pakenham, 2016). Another point is, that many of the studies investigating the moderating role of mindfulness, self-compassion and psychological flexibility used different measures of stress (i.e. daily hassles) or different predictors (i.e. negative affect) (e.g. Gloster et al., 2017; Trompetter et al., 2017). Thus, considering the rather limited research on the moderating role of these concepts, inconsistent findings in previous studies regarding which facets of mindfulness moderate the relationship, differences in measures of stress and different predictors used, as well as the fact that the effects might only emerge at high levels of stress, it might be that the effects were too little or hard to detect in the present study.

There are several limitations of this study that need to be addressed. First, the sample used here was a convenience sample of international students from different Universities in the Netherlands. The overrepresentation of female, highly educated individuals and the high proportion of students in gamma studies (e.g. psychology) limits generalizability to males, people from lower economic classes, and other study programs. Although, this study included a nationally diverse sample, a high proportion of participants were from Germany which limits generalizability to international students from other nationalities. Further, the results cannot be generalized to international students in different countries. Considering the large

amount of variables included, the sample size was rather small. Second, the method of self-report used here, is susceptible to bias. For example, the self-reports might be influenced by a lack of awareness (i.e. inaccurate perception or recall of behavior) or social desirability bias (i.e. answering in a way that they believe is more socially acceptable) (Passer, 2014).

Accordingly, surveys depend on people's motivation to take the survey seriously and answer it honestly and only reflect their own opinion of their behavior or thought patterns. Third, the cross-sectional nature of the study does not allow for any firm conclusions about causality or directions of influence. Consequently, it might also be that higher levels of anxiety or depression led to decreased mindfulness and self-compassion and increased psychological inflexibility. Similarly, more anxiety and depression might have been associated with more stress. Further, other variables could exist that influence the relationships between the study variables.

Thus, to increase generalizability future studies could repeat this study, with the same concepts, in larger, population based or clinical samples. In addition, this study could be repeated with other methods. As mindfulness, self-compassion and psychological flexibility include interactions of an individual with the environment structured interviews might add to grasp these concepts more fully (Masuda & Tully, 2012). To make conclusions about causality, experimental, longitudinal studies, measuring stress, mindfulness related concepts and mental health at different points in time are needed. In addition, other variables that could influence the relations between these variables should be investigated.

Important practical implications can be drawn on the basis of this study. Since this study aimed to find suggestions for targets for interventions, it might inform and guide the development of interventions to reduce stress and increase mental health of international university students. Some specific suggestions for these interventions can be made. First, as this study revealed that higher levels of the observing facet were associated with increased anxiety, it is not recommended to focus solely on observation of internal experiences. It might be more beneficial to teach this skill in combination with other facets of mindfulness to be better able to respond to one's internal experiences. Second, this study revealed that acting with awareness, focusing on current tasks instead of performing them in "auto mode" could be advocated to increase depressive symptoms. Third, another target for interventions is emphasizing a flexible attitude towards one's unwanted experiences and to act in accordance with one's values. Fourth, fostering a compassionate attitude towards oneself may be especially important in students with depressive symptoms. Since all of these concepts explained unique variance in mental health, this study provides further rationale to base

intervention programs on these concepts. It also adds to the idea that that mindfulness, self-compassion and psychological flexibility might be consolidated into a single factor of “mindful awareness” (Meyer et al., 2018). Perhaps these concepts could be combined together in future interventions as all of them seem to include different albeit important cognitive resources to cope with one’s experiences and emotions.

Overall, this study concludes that there is a strong relationship between perceived academic stress in international university students and mental health and that mindfulness, particularly the facet of acting with awareness and self-compassion might be important targets for interventions to help to decrease symptoms of depression and psychological flexibility to help to decrease symptoms of anxiety and depression in international university students.

References

- Allen, A. B., & Leary, M. R. (2010). Self-Compassion, stress, and coping. *Social and personality psychology compass*, 4(2), 107–118. doi: 10.1111/j.1751-9004.2009.00246.x
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- American College Health Association (2019). *American College Health Association-National College Health Assessment II: Reference Group Executive Summary Spring 2019*. Silver Spring, MD: American College Health Association. Retrieved from: https://www.acha.org/documents/ncha/NCHA-II_SPRING_2019_US_REFERENCE_GROUP_EXECUTIVE_SUMMARY.pdf
- 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(1), 27–45. doi: 10.1177/1073191105283504
- Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., ... Williams, J. M. G. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*, 15(3), 329–342. doi: 10.1177/1073191107313003
- Barcaccia, B., Baiocco, R., Pozza, A., Pallini, S., Mancini, F., & Salvati, M. (2019). The more you judge the worse you feel. A judgemental attitude towards one's inner experience predicts depression and anxiety. *Personality and Individual Differences*, 138(January), 33–39. doi: 10.1016/j.paid.2018.09.012
- Bergin, A. J., & Pakenham, K. I. (2016). The stress-buffering role of mindfulness in the relationship between perceived stress and psychological adjustment. *Mindfulness*, 7(4), 928–939. doi: 10.1007/s12671-016-0532-x
- Bergin, A., & Pakenham, K. (2015). Law student stress: Relationships between academic demands, social isolation, career pressure, study/life imbalance and adjustment outcomes in law students. *Psychiatry, Psychology and Law*, 22(3), 388–406. doi: 10.1080/13218719.2014.960026
- Bond, F. W., & Bunce, D. (2003). The role of acceptance and job control in mental health, job satisfaction, and work performance. *Journal of Applied Psychology*, 88(6), 1057–1067. doi: 10.1037/0021-9010.88.6.1057

- Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., ... Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire-II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy, 42*(4), 676–688. doi: 10.1016/j.beth.2011.03.007
- Bränström, R., Duncan, L. G., & Moskowitz, J. T. (2011). The association between dispositional mindfulness, psychological well-being, and perceived health in a Swedish population-based sample. *British Journal of Health Psychology, 16*(2), 300–316. doi: 10.1348/135910710X501683
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), doi: 10.1037/0022-3514.84.4.822
- Byrd, D. A. R., & McKinney, K. J. (2012). Individual, interpersonal, and institutional level factors associated with the mental health of college students. *Journal of American College Health, 60*(3), 185–193. doi: 10.1080/07448481.2011.584334
- Cash, M., & Whittingham, K. (2010). What facets of mindfulness contribute to psychological well-being and depressive, anxious, and stress-related symptomatology? *Mindfulness, 1*(3), 177–182. doi: 10.1007/s12671-010-0023-4
- Center for Collegiate Mental Health. (2019, January). *2018 Annual Report* (Publication No. STA 19-180). Retrieved from: <https://sites.psu.edu/ccmh/files/2019/01/2018-Annual-Report-1.30.19-ziytkb.pdf>
- Ciesla, J. A., Reilly, L. C., Dickson, K. S., Emanuel, A. S., & Updegraff, J. A. (2012). Dispositional mindfulness moderates the effects of stress among adolescents: rumination as a mediator. *Journal of Clinical Child and Adolescent Psychology, 41*(6), 760–770. doi: 10.1080/15374416.2012.698724
- Dutta, O., & Chye, S. Y. L. (2017). Internet use and psychological wellbeing: A study of international students in Singapore. *Journal of International Students, 7*(3), 825–840. doi: 10.5281/zenodo.570036
- Forbes-Mewett, H., & Sawyer, A. M. (2016). International students and mental health. *Journal of International Students, 6*(3), 661–677.
- Garnefski, N., & Kraaij, V. (2019). The Self-Compassionate Coping Measure (4 items): Psychometric features and relationships with depression and anxiety in adults. *Advances in Health and Behavior, 2*(2), 75–78. doi: 10.25082/ahb.2019.02.001

- Gloster, A. T., Meyer, A. H., & Lieb, R. (2017). Psychological flexibility as a malleable public health target: Evidence from a representative sample. *Journal of Contextual Behavioral Science*, 6(2), 166–171. doi: 10.1016/j.jcbs.2017.02.003
- Grégoire, S., Lachance, L., Bouffard, T., & Dionne, F. (2018). The use of acceptance and commitment therapy to promote mental health and school engagement in university students: A multisite randomized controlled trial. *Behavior Therapy*, 49(3), 360–372. doi: 10.1016/j.beth.2017.10.003
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications.
- Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and Commitment Therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, 44(1), 1–25. doi: 10.1016/j.brat.2005.06.006
- Hayes, S. C., Strosahl, K., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D., ... Mccurry, S. M. (2004). Measuring experiential avoidance: A preliminary test of a working model. *Psychological Record*, 54(4), 553–578. doi: 10.1007/BF03395492
- Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *The Act in Context: The Canonical Papers of Steven C. Hayes*, 64(6), 171–203. doi: 10.4324/9781315745138
- Institute of International Education (2019). *Number of international students in the united states hits all-time high*. Retrieved from: <https://www.iie.org/Why-IIE/Announcements/2019/11/Number-of-International-Students-in-the-United-States-Hits-All-Time-High>
- Kabat-Zinn, J. (1994). *Wherever you go, there you are: Mindfulness meditation for everyday life*. New York: Hyperion.
- Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review*, 30(4), 865–878. doi: 10.1016/j.cpr.2010.03.001
- Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review*, 31(6), 1041–1056. doi: 10.1016/j.cpr.2011.04.006
- Kessler, R. C., Barker, P. R., Colpe, L. J., Epstein, J. F., Gfroerer, J. C., Hiripi, E., ... Zaslavsky,

- A. M. (2003). Screening for serious mental illness in the general population. *Archives of General Psychiatry*, *60*(2), 184–189. doi: 10.1001/archpsyc.60.2.184
- Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606–613. doi: 10.1046/j.1525-1497.2001.016009606.x
- Larcombe, W., Finch, S., Sore, R., Murray, C. M., Kentish, S., Mulder, R. A., ... Williams, D. A. (2016). Prevalence and socio-demographic correlates of psychological distress among students at an Australian university. *Studies in Higher Education*, *41*(6), 1074–1091. doi: 10.1080/03075079.2014.966072
- Levin, M. E., Krafft, J., Pistorello, J., & Seeley, J. R. (2019). Assessing psychological inflexibility in university students: Development and validation of the acceptance and action questionnaire for university students (AAQ-US). *Journal of Contextual Behavioral Science*, *12*(December 2017), 199–206. doi: 10.1016/j.jcbs.2018.03.004
- Levin, M. E., Maclane, C., Da, S., Seeley, J. R., Hayes, S. C., Biglan, A., & Pistorello, J. (2014). Examining psychological inflexibility as a transdiagnostic process across psychological disorders. *Journal of Contextual Behavioral Science*, *3*(3), 155-163. doi: 10.1016/j.jcbs.2014.06.003
- Lin, S. H., & Huang, Y. C. (2014). Life stress and academic burnout. *Active Learning in Higher Education*, *15*(1), 77–90. doi: 10.1177/1469787413514651
- MacBeth, A., & Gumley, A. (2012). Exploring compassion: A meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review*, *32*(6), 545–552. doi: 10.1016/j.cpr.2012.06.003
- Marks, A. D. G., Sobanski, D. J., & Hine, D. W. (2010). Do dispositional rumination and/or mindfulness moderate the relationship between life hassles and psychological dysfunction in adolescents? *Australian and New Zealand Journal of Psychiatry*, *44*(9), 831–838. doi: 10.3109/00048674.2010.487478
- Masuda, A., & Tully, E. C. (2012). The role of mindfulness and psychological flexibility in somatization, depression, anxiety, and general psychological distress in a nonclinical college sample. *Journal of Evidence-Based Complementary and Alternative Medicine*, *17*(1), 66–71. doi: 10.1177/2156587211423400
- Mesidor, J. K., & Sly, K. F. (2016). Factors that contribute to the adjustment of international students. *Journal of International Students*, *6*(1), 262–282.

- Meyer, E. C., Frankfurt, S. B., Kimbrel, N. A., DeBeer, B. B., Gulliver, S. B., & Morrisette, S. B. (2018). The influence of mindfulness, self-compassion, psychological flexibility, and posttraumatic stress disorder on disability and quality of life over time in war veterans. *Journal of Clinical Psychology, 74*(7), 1272–1280. doi: 10.1002/jclp.22596
- Mori, S. (2000). Addressing the mental health concerns of international students. *Journal of Counseling and Development, 78*(2), 137–144. doi: 10.1002/j.1556-6676.2000.tb02571.x
- Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250. doi:10.1080/15298860390209035
- Neff, K. D., & Dahm, K. A. (2015). Self-compassion: What it is, what it does, and how it relates to mindfulness. *Handbook of Mindfulness and Self-Regulation, 121–140*. doi: 10.1007/978-1-4939-2263-5_10
- Regehr, C., Glancy, D., & Pitts, A. (2013). Interventions to reduce stress in university students: A review and meta-analysis. *Journal of Affective Disorders, 148*(1), 1–11. doi: 10.1016/j.jad.2012.11.026
- Rienties, B., & Tempelaar, D. (2013). The role of cultural dimensions of international and Dutch students on academic and social integration and academic performance in the Netherlands. *International Journal of Intercultural Relations, 37*(2), 188–201. doi: 10.1016/j.ijintrel.2012.11.004
- Shadowen, N. L., Williamson, A. A., Guerra, N. G., Ammigan, R., & Drexler, M. L. (2019). Prevalence and correlates of depressive symptoms among international students: Implications for university support offices. *Journal of International Students, 9*(1), 129–doi: 10.32674/jis.v9i1.277
- Sharp, J., & Theiler, S. (2018). A review of psychological distress among university students: pervasiveness, implications and potential points of intervention. *International Journal for the Advancement of Counselling, 40*(3), 193–212. doi: 10.1007/s10447-018-9321-7
- Smeets, E., Neff, K., Alberts, H., & Peters, M. (2014). Meeting suffering with kindness: Effects of a brief self-compassion intervention for female college students. *Journal of Clinical Psychology, 70*(9), 794–807. doi: 10.1002/jclp.22076
- Smith, R. A., & Khawaja, N. G. (2011). A review of the acculturation experiences of international students. *International Journal of Intercultural Relations, 35*(6), 699–713. doi: 10.1016/j.ijintrel.2011.08.004
- Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for

assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, 166(10), 1092–1097. doi: 10.1001/archinte.166.10.1092

Stallman, H. M. (2010). Psychological distress in university students: A comparison with general population data. *Australian Psychologist*, 45(4), 249–257. doi: 10.1080/00050067.2010.482109

Stallman, H. M., & Hurst, C. P. (2011). The factor structure of the frost multidimensional perfectionism scale in university students. *Australian Psychologist*, 46(4), 229–236. doi: 10.1111/j.1742-9544.2010.00010.x

Stallman, H. M., & Hurst, C. P. (2016). The University Stress Scale: Measuring Domains and Extent of Stress in University Students. *Australian Psychologist*, 51(2), 128–134. doi: 10.1111/ap.12127

Trompetter, H. R., de Kleine, E., & Bohlmeijer, E. T. (2017). Why does positive mental health buffer against psychopathology? An exploratory study on self-compassion as a resilience mechanism and adaptive emotion regulation strategy. *Cognitive Therapy and Research*, 41(3), 459–468. doi: 10.1007/s10608-016-9774-0

Van Dam, N. T., Sheppard, S. C., Forsyth, J. P., & Earleywine, M. (2011). Self-compassion is a better predictor than mindfulness of symptom severity and quality of life in mixed anxiety and depression. *Journal of Anxiety Disorders*, 25(1), 123–130. doi: 10.1016/j.janxdis.2010.08.011

Woodruff, S. C., Glass, C. R., Arnkoff, D. B., Crowley, K. J., Hindman, R. K., & Hirschhorn, E. W. (2014). Comparing self-compassion, mindfulness, and psychological inflexibility as predictors of psychological health. *Mindfulness*, 5(4), 410–421. doi: 10.1007/s12671-013-0195-9

Zessin, U., Dickhäuser, O., & Garbade, S. (2015). The relationship between self-compassion and well-being: A meta-analysis. *Applied Psychology: Health and Well-Being*, 7(3), 340–364. doi: 10.1111/aphw.12051

Appendix
Results of the Moderation analyses

Table A

	Anxiety				Depression			
	<i>B</i>	<i>SEB</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>SEB</i>	<i>t</i>	<i>p</i>
Stress x observing	.01	.00	1.43	.1553	.01	.01	1.52	.1311
Stress x describing	.00	.01	.48	.6308	.01	.01	1.04	.3017
Stress x acting with awareness	-.00	.00	-.97	.3323	-.00	.01	-.38	.7041
Stress x nonjudging	-.00	.00	-1.19	.2347	-.00	.01	-.06	.9550
Stress x nonreactivity	.00	.01	.03	.9750	.00	.01	.05	.9598
Stress x self-compassion	-.01	.01	-1.38	.1707	-.00	.01	-.15	.8805
Stress x psychological inflexibility	.00	.00	.28	.7770	.00	.01	.40	.6869