

AMERICAN UNIVERSITY OF BEIRUT

THE RELATIONSHIP BETWEEN MINDFULNESS AND
DEPRESSION AMONG UNIVERSITY STUDENTS IN
LEBANON

by
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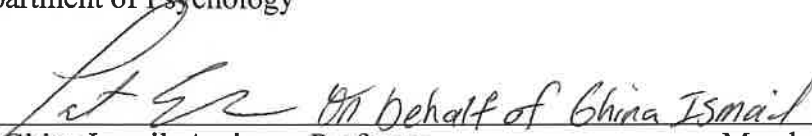
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I have been preparing to write this page for years...

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To all the students who may be reading this in preparation of their theses, have no doubt that you will be able to make it – as impossible as it may seem at times.

AN ABSTRACT OF THE THESIS OF

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Mindfulness involves paying attention to one's experience, nonjudgmentally, and in the present moment. Recently, mindfulness has been investigated as a treatment for depression. Being one of the largest contributors to non-fatal loss of health, depression has a prevalence rate of 4.4% worldwide (World Health Organization, 2017). This study examined the mechanisms involved in the relationship between mindfulness and depression, using cognitive processes that have been associated with depression (i.e., rumination, self-criticism, and general self-efficacy). We surveyed 217 undergraduate students enrolled in introductory to psychology classes at the American University of Beirut. The prevalence of depressive symptoms in our sample was approximately 38%. A hierarchical multiple regression analysis identified the mindfulness facets of describing, acting with awareness, and nonjudging as significant predictors of depression, along with reflection, self-criticism, and general self-efficacy, after controlling for gender, socioeconomic status, and meditative practice. A parallel multiple mediation analysis identified rumination, self-criticism, and general self-efficacy as significant mediators of the relationship between mindfulness and depression. The findings highlight the different processes that may play a key role in maintaining and exacerbating depression. Clinical and theoretical implications were discussed. Future studies can build on the current study's limitations by using experimental or longitudinal designs in order to establish causal or temporal mediation associations.

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DEDICATION

To my father, Reda Hussein Safieddine, and mother, Nadia Mohammad Hammoud.

The Relationship Between Mindfulness and Depression Among University Students in Lebanon

Psychological approaches influenced by spirituality, such as mindfulness, have been gaining popularity in practice and research. Mindfulness is a person-centered approach that is grounded in centuries of spiritual practices in Buddhism (Kabat-Zinn, 2003). The concept of mindfulness also has some similarities to meditative practices in Christianity (Trammel, 2017) and Sufism (al-Daghistani, 2018). However, over time, the concept of mindfulness underwent a secularization process that stripped it from any religious practices or spiritual thought in order to make the practice of mindfulness accessible to all (Brazier, 2016; Brown, 2016). Newer definitions of mindfulness include the processes of directing attention and awareness to internal and external experiences without judgement (Brown et al., 2007), without any reference to a unifying source, or a higher self or power, often found in spiritual, meditative practices. Mindfulness-based training has emerged in the past decade as a possible intervention for treating depression, with research examining mindfulness both as a main intervention or an adjunct component to existing psychological interventions, such as cognitive therapy (Segal et al., 2013). Around 300 million people in the world suffer from depression, which constitutes 4.4% of the total world's population (World Health Organization, 2017). Globally, depressive disorders are considered to be the largest contributor to non-fatal loss of health, and several types of interventions have been investigated in relation to reducing depression. In fact, research shows that several cognitive factors play a role in the development, maintenance, and recurrence of depression, such as rumination (Nolen-Hoeksema, 2000; Nolen-Hoeksema, 2004), self-criticism (Dunkley et al., 2009; Ehret et al., 2015; Franche & Dobson, 1992), and

general self-efficacy (Kavanagh, 2014; Maddux & Meier, 1995; Muris et al., 2016; Tahmassian & Jalali Moghadam, 2011). The current study aimed to investigate the predictive role of mindfulness and other variables including brooding, reflection, self-criticism, and general self-efficacy, in relation to depression, after controlling for gender, socioeconomic status, and meditative practice among undergraduate students in Lebanon. The study contributes to the literature by examining the meditating role of the cognitive mechanisms of rumination, self-criticism, and general self-efficacy in the relationship between mindfulness and depression.

Mindfulness

Mindfulness is a concept that evolved from Buddhist spirituality but has more recently been integrated into the psychological literature (Baer, 2003; Kabat-Zinn, 2003; Shapiro et al., 2006). The practice of mindfulness also overlaps with concepts and elements from mystic Christianity (Trammel, 2017) and Sufism (al-Daghistani, 2018). For example, Buddhist, Christian, and Sufi traditions view mindfulness as a means to experience transcendence and reach higher truths in religion. Practices in Buddhism and Christianity include awareness, regulating emotions using deep breathing, tranquility, and listening (Trammel, 2017). Additionally, practices in Buddhism and Sufism highlight self-awareness and introspection in relation to a higher power (al-Daghistani, 2018). The original concept of mindfulness gradually underwent a secularization process that stripped it from religious practices and packaged it as contemporary and universal practice that could attract individuals of all belief systems (Brazier, 2016; Brown, 2016). The contemporary definition of mindfulness refers to “the awareness that emerges through paying attention [purposefully], in the present moment, and

nonjudgmentally to the unfolding of experience moment by moment” (Kabat-Zinn, 2003, p. 145).

Mindfulness involves two processes of consciousness: awareness and attention. Attention involves the initial observation of one’s surrounding, whereas awareness involves the conscious recording of stimuli from the senses and the processes of the mind (Brown et al., 2007). Both attention and awareness play an important role in shaping the quality of perception and action. Usually, direct stimuli from the environment are briefly held in focused attention before emotional and cognitive responses are made. Those responses evaluate the stimulus, connect it to previous experience, and assimilate it into cognitive schemas. This type of processing would result in the imposition of automatic ideas, labels, and judgments on experiences. It is undeniable that this process of perception is adaptive. Nevertheless, it also means that stimuli would rarely be observed objectively, and individuals might perceive the reality in a distorted manner and react accordingly.

On the other hand, a mode of processing that is led by mindfulness would involve more objective awareness and less judgement of observed experience (Brown et al., 2007). As such, the individual would spend more time being consciously present in reality using attention and awareness and less time reacting to or processing stimuli. During this mode of processing, the individual’s cognitive and emotional reactions would be observed as components of the “ongoing stream of consciousness” (Brown et al., 2007, p. 212). Mindfulness allows the individual to directly experience events in the environment without being altered or judged. Therefore, the individual would experience a clearer consciousness, allowing the individual to engage in flexible and neutral cognitive, emotional, and behavioral reactions.

The nature of mindfulness has been examined at two different levels in previous literature: traits and states (Eisenlohr-Moul et al., 2016). The traits level conceptualizes mindfulness as a naturally occurring ability to engage in mindfulness processes that varies between individuals regardless of meditation experience (Brown, Ryan, et al., 2011). However, the states level assumes that mindfulness is a process that is maintained through practice (Bishop et al., 2004). It also assumes that there are within-individual variabilities in the engagement in mindfulness, due to engaging in mindfulness practices with the aim of improving mindfulness skills (Bishop et al., 2004). While appreciating that the two levels of mindfulness may co-exist and/or interact, for the purpose of the current examination, mindfulness was conceptualized as a trait that naturally varies between individuals regardless of any mindfulness training.

Several studies examined the factor structure of mindfulness (Baer et al., 2004; Baer et al., 2006; Brown & Ryan, 2003; Chadwick et al., 2008; Walach et al., 2006). Some measured mindfulness as a unidimensional construct while others measured it as bi-dimensional or multidimensional (Park et al., 2013). Existing self-report mindfulness questionnaires operationalized mindfulness differently. Those questionnaires include the Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the Freiburg Mindfulness Inventory (FMI; Walach et al., 2006), the Kentucky Inventory of Mindfulness Skills (KIMS; Baer et al., 2004), the Cognitive and Affective Mindfulness Scale (CAMS; Feldman et al., 2004, as cited in Baer et al., 2006), and the Mindfulness Questionnaire (MQ; Chadwick et al., 2008). The MAAS, FMI, CAMS, and MQ yielded single-factor structures, while the KIMS yielded a four-factor structure and was based on dialectical behavioral therapy conceptualization. Additionally, the FMI was designed for experienced meditators, while the MQ was designed to assess mindfulness in the

context of distress. To obtain a comprehensive multi-faceted mindfulness construct, Baer et al. (2006) combined all the items from the existing self-report questionnaires and explored their factor structure. The resulting mindfulness construct consisted of five different but related facets: a) observing, b) describing, c) acting with awareness, d) nonjudging, and e) nonreactivity (Baer et al., 2006). Consequently, Baer et al. (2006) constructed the Five Facet Mindfulness Questionnaire (FFMQ). Observing refers to noticing or attending to different stimuli including internal and external processes (Baer et al., 2004; Baer et al., 2008). Describing refers to briefly labeling observed internal and external processes using words. Acting with awareness refers to acting while engaging in the activity with undivided attention in the present moment. Nonjudging refers to holding an objective and non-evaluative stance towards present-moment experience. Nonreactivity refers to allowing thoughts and feelings come and go without getting preoccupied by or reacting to them.

In two studies, the FFMQ was found to have a good model fit for the five facet structure and the overall scale structure in a mixed sample of meditators and nonmeditators (Christopher et al., 2012) and in a sample of adults with mild to moderate symptoms of depression and/or anxiety (Bohlmeijer et al., 2011). Moreover, a short version of the FFMQ was found to have an acceptable model fit for the five facet structure and a good model fit for the overall scale structure in a sample of adults with mild to moderate symptoms of depression and/or anxiety and in a sample of patients with fibromyalgia (Bohlmeijer et al., 2011).

Baer et al. (2006) conducted a factor analysis for the FFMQ on two separate groups, meditators and non-meditators. The results indicated that the FFMQ appeared to have a differential factor structure depending on meditation experience (Baer et al.,

2006). The results showed that the mindfulness facets loaded better on the overall mindfulness factor when the observing facet was excluded in non-meditators. The authors suggested that this might be due to the significant negative correlation between the observing and nonjudging facets among non-meditators (Baer et al., 2004). Baer et al. (2006) explained that among non-meditators, individuals might observe their experiences by adding judgment to them, whereas among meditators, individuals would be able to observe their experiences in a nonjudgmental manner. This was confirmed by the finding that all five mindfulness facets loaded well on the overall mindfulness factor among meditators. Given the interaction between observing and the low likelihood of undergraduate students to be experienced meditators, the present study controlled for meditative practice and observing was not included as a separate subscore in the main analyses.

In practice, mindfulness has been incorporated into third wave behavioral therapies to target psychological symptoms. Historically, behavior therapy has emerged through three consecutive waves that evolved from one another (Brown, Gaudiano, et al., 2011; Hayes et al., 2016). The first wave focused on modifying observable behavior to reduce maladaptive behavior and increase adaptive behaviors. The second wave incorporated targeting dysfunctional cognitions to relieve psychological symptoms and maladaptive behaviors. The third wave of behavior therapies that emerged focused on meta-cognitive processes to improve wellbeing. In this third wave, mindfulness and acceptance of internal experiences were incorporated into behavior therapy. Such third wave behavioral therapies include dialectical behavior therapy, acceptance and commitment therapy, and mindfulness-based cognitive therapy, among others.

Depression

Depression is a mental health disorder that impacts individuals from all ages and cultures. According to the American Psychiatric Association (APA, 2013), symptoms of depression include dysphoric mood, diminished interest or pleasure in most or all activities, significant weight or appetite change, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or energy loss, feelings of worthlessness or inappropriate guilt, indecisiveness or diminished ability to concentrate, and recurrent thoughts of death or suicide. The duration and severity of this disorder can vary across individuals. Depression can significantly impact individuals' social, academic, and occupational functioning. As compared to the lifetime prevalence rates of depression among adults in the United States at 6.7% (Center for Behavioral Health Statistics and Quality, 2017), the lifetime prevalence of any major depressive disorder among the adult Lebanese population is 9.9% (Karam et al., 2008), and the risk of depression is even higher among individuals experiencing poverty, unemployment, and stressful life events (World Health Organization, 2017).

Depression can be defined in relation to different characteristics that include a negative alteration in mood, a negative self-concept, regressive and self-punitive wishes, vegetative changes, and a change in activity level (Beck & Alford, 2009). According to the American Psychiatric Association (APA, 2013), symptoms of depression include dysphoric mood, diminished interest or pleasure in most or all activities, significant weight or appetite change, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or energy loss, feelings of worthlessness or inappropriate guilt, indecisiveness or diminished ability to concentrate, and recurrent thoughts of death or suicide.

The American College Health Association (ACHA, 2018) reported that depression was among the top factors that negatively impacted college students' academic performance. In a 2015 study, Kronfol et al. (2018) examined the frequency of depression among university students in Lebanon and Qatar as compared to the United States. The results showed that the prevalence of depression among the two Arab countries was 34.6% as compared to 12.8% in the United States. In the American University of Beirut (AUB) specifically, the prevalence of depression was 38.6% in a sample of 167 undergraduate students. Among those AUB students, 15% reported experiencing very difficult functional impairments caused by depression. Significant individual predictors of depression in Lebanon and Qatar included experiencing financial difficulties, having low academic performance, and being female, whereas significant protective factors included being in a relationship and being religious.

Cognitive Theories of Depression

There are several cognitive theories of depression, namely Beck's cognitive model, the reformulated learned helplessness theory, and the ruminative response style theory. Beck's cognitive model of depression includes three main concepts: the cognitive triad, schemas, and cognitive errors (Beck et al., 1979). First, the cognitive triad involved in depression consists of individual's negative self-evaluation, negative interpretation of experience, and negative evaluation of the future (Beck & Alford, 2009). These negative evaluations are related to the distinctive affective and motivational depressive symptoms. For instance, individuals with depression are more likely to interpret challenging events with a sense of loss or failure, which leads to sadness. Those individuals are also more likely to negatively evaluate the present and future, which might generate unrealistic expectations and feelings of hopelessness.

Beck and Alford (2009) argued that this cognitive triad leads to affective and motivational changes that might encourage avoidance of unpleasant situations, intensify dependency, and might trigger the need to escape through suicide. A second major concept in the cognitive model is schemas, which are stable cognitive patterns that dictate how individuals perceive and respond to similar types of events (Beck et al., 1979). In depression, individuals' understanding of certain situations is altered to match with dysfunctional schemas. Third, cognitive errors in depression refer to the activation of distinctive cognitive patterns that divert individuals' thinking from reality (Beck & Alford, 2009). As such, individuals with depression often make misinterpretations and negative judgments. These errors maintain the depressed individuals' belief in the validity of their negative cognitions even with contradictory evidence (Beck et al., 1979).

Another cognitive theory of conceptualizing depression stems from the reformulated learned helplessness theory. This theory describes how certain cognitive factors determine whether an individual becomes helpless or depressed after experiencing a negative event (Abramson et al., 1978). Specifically, this theory assumes that individuals make causal attributions or formulate explanations of the possible causes of an event (Peterson & Seligman, 1984). As such, individuals who frequently explain or judge negative events by causes that are internal, stable, and global are more likely to blame themselves for these events, expect negative events to occur in the future, and expect to experience negative events in different areas in their lives. Such an explanatory style is said to be depressive (Peterson & Seligman, 1984). Over time, having such expectations would put individuals at risk for developing learned helplessness, low self-esteem, and depression.

A third cognitive theory of depression is the response style theory (Nolen-Hoeksema, 1991). This theory suggests that the way that individuals respond to their depressed mood impacts the duration of such moods. Nolen-Hoeksema (1991) argued that individuals who respond to depressed mood with a ruminative style are more likely to experience more extended periods of depressed mood. A ruminative response style includes thoughts and behaviors that focus an individual's attention on being depressed, symptoms of depression, and the causes, meanings, and consequences of the symptoms of depression. Nolen-Hoeksema (1991) described that the content of ruminative responses may resemble that of negative automatic thoughts and schemas (Beck et al., 1979). However, a ruminative response style involves a process of thinking that is perseverative about the individual's depression (Nolen-Hoeksema et al., 2008).

The Relationship Between Mindfulness and Depression

Mindfulness involves a mode of awareness that can serve to prevent and reduce the cognitions experienced in depression. Mindfulness involves active awareness and attention in the present moment, while maintaining a nonjudgmental and nonreactive stance (Brown et al., 2007). As such, mindful individuals would be more likely to have neutral and flexible cognitive reactions, and less likely to be preoccupied with their thoughts. Mindfulness would help individuals engage in more neutral evaluations and accurate interpretations of their experiences. Such cognitions are in direct contrast to those described in Beck's cognitive model of depression (Beck et al., 1979; Beck & Alford, 2009). Additionally, mindfulness is thought to prevent individuals from engaging in the depressive explanatory thinking styles that were described in the reformulated learned helplessness theory (Peterson & Seligman, 1984). Moreover,

mindfulness would help individuals become less inclined to ruminate in response to depressed mood, as described in the response style theory (Nolen-Hoeksema, 1991).

Baer et al. (2006) examined the relationship of mindfulness to depression and found that four out of the five mindfulness facets (describing, acting with awareness, nonjudging, and nonreactivity) were significantly negatively correlated with psychological symptoms of depression in an undergraduate student sample. However, observing was unexpectedly positively correlated with psychological symptoms, such that a greater observing of internal and external experiences predicted higher symptoms of depression. This finding is consistent with those described above in indicating a possible interaction between observing and meditative practice that impacts observing's relationship with other variables. In a multiple regression analysis, acting with awareness, nonjudging, and nonreactivity were significant negative predictors of psychological symptoms of depression, supporting a link between mindfulness and depression. More recent studies examined the relation between mindfulness and depression (Desrosiers, Klemanski, et al., 2013; Medvedev et al., 2018; Schut & Boelen, 2017; Soysa & Wilcomb, 2013). Schut and Boelen (2017) examined mindfulness, measured using the MAAS, as a predictor of depressive symptoms among undergraduate students in a longitudinal design over the course of one year. Other predictor variables included rumination and experiential avoidance. The results showed that mindfulness was negatively correlated with depression. Mindfulness was the only unique significant predictor of depressive symptoms at the one-year follow-up, even after controlling for baseline depressive symptoms. As such, mindfulness may also play a protective role over time with depression.

Furthermore, Desrosiers, Klemanski, et al. (2013) examined the unique relation between the different facets of mindfulness (observing, describing, nonjudging, acting with awareness, and nonreactivity), measured using the FFMQ, and two dimensions of depression, namely general distress and anhedonia, in a sample of adults seeking outpatient psychiatric treatment. Again, the results showed that all the mindfulness facets, except for observing, were significantly negatively correlated with the two dimensions of depression. A path analysis, controlling for intercorrelations among the variables, showed that nonreactivity and nonjudging were significantly negatively associated with the depression dimensions. That is, higher levels of nonjudging and nonreactivity were associated with lower levels of depression.

Medvedev et al. (2018) examined the relationship between mindfulness facets, measured using FFMQ, and depression among student and general populations. The results showed that nonjudging and nonreactivity were significant negative predictors of depression among both samples. Similarly, Soysa & Wilcomb (2013) examined whether the facets of mindfulness (describing, acting with awareness, and nonjudging), measured using the FFMQ, predicted depression among undergraduate students. The results indicated that the three facets were significant negative predictors of depression (Soysa & Wilcomb, 2013). In summary, the role of multiple mindfulness facets has been examined as predictors of depressive symptoms. Specifically, describing, acting with awareness, nonjudging, and nonreactivity were found to be significant predictors of depression (Baer et al., 2006; Medvedev et al., 2018; Soysa & Wilcomb, 2013).

Even though the present study is not interventional, it is important to examine the findings of interventional studies to better understand the relationship between mindfulness and depression, particularly in terms of the involved cognitive

mechanisms. Mindfulness-based interventions have been found to reduce depressive symptoms (Hofmann et al., 2010; Strauss et al., 2014). In a meta-analytic review, Hofmann et al. (2010) examined the efficacy of mindfulness-based therapies on depressive symptoms in samples of individuals with depression, generalized anxiety disorder, cancer, and other psychiatric and medical conditions. In the overall sample, the results showed that mindfulness-based therapies were moderately effective in improving mood symptoms from pre-treatment to post-treatment phases; however, mindfulness-based interventions were particularly highly effective in improving mood symptoms among patients with anxiety disorders and/or depression. These effects were maintained over time regardless of number of treatment sessions. The results of this study indicate that mindfulness-based therapies are effective in improving mood symptoms across various disorders, and they are highly effective when treating depression. This suggests that mindfulness-based therapies target cross-diagnostic evaluative and affective processes. Similarly, in another meta-analysis, Strauss et al. (2014) examined the effect of mindfulness-based interventions for participants who met full criteria of a current depressive episode. The results also indicated that mindfulness-based interventions were effective in reducing depressive symptoms severity in this sample.

A third-wave behavioral intervention that specifically targets depression is mindfulness-based cognitive therapy (MBCT). MBCT incorporates mindfulness practices with the cognitive theory of depression. According to MBCT, depressed individuals perceive themselves as inadequate, blameworthy, and worthless, and these self-perceptions are considered accurate presentations of reality (Segal et al., 2013). Given this, the theory behind MBCT seems to borrow aspects from Beck's cognitive

theory of depression, where underlying negative automatic thoughts and beliefs influence thoughts, feelings, and body sensations. The main focus of MBCT is to prevent depression relapse, which is considered a consequence of the automatic reactivation of negative cognitive patterns, by helping depressed individuals radically change the thoughts, feelings, and physical sensations that are associated with the relapse (Segal et al., 2013). Specifically, MBCT aims to improve individuals' awareness of the cognitive and emotional patterns that contribute to depression relapse and depression maintenance. MBCT also encourages individuals to mindfully engage in new practices that help them in shifting their focus and disengaging from those cognitive and emotional patterns. The results of two meta-analyses revealed that MBCT was effective in improving depressive symptoms in clinical groups (Hofmann et al., 2010) and in reducing the risk of depression relapse among patients with a history of three or more episodes of depression (Piet & Hougaard, 2011). Therefore, mindfulness may have an impact on the cognitions that are experienced in depression.

Mediating Variables

Rumination

According to the response styles theory of depression, individuals with a ruminative response style are more likely to experience extended periods of depressed mood (Nolen-Hoeksema, 1991). Rumination is a persistent cognitive process that involves passive thinking about symptoms, causes, and consequences of depression (Lyubomirsky & Nolen-Hoeksema, 1993; Nolen-Hoeksema, 2004; Nolen-Hoeksema et al., 2008). Rumination, as a response to depressive symptoms, places individuals at a cognitive vulnerability to experience more intense or chronic depressive symptoms that might develop into episodes of clinical depression (Nolen-Hoeksema, 2004).

Rumination is past- and present-oriented and focuses on issues of self-worth, meaning, and themes of loss (Nolen-Hoeksema et al., 2008). Rumination plays a role in the onset, maintenance, and recurrence of depression by increasing negative thinking, interfering with effective problem-solving, hindering goal-oriented behavior, and impairing social relationships (Nolen-Hoeksema, 2004). Previous findings indicate that rumination significantly positively predicted depressive symptoms and the occurrence of depressive disorders (Nolen-Hoeksema, 2000), such that higher levels of rumination were associated with more depressive symptoms and more frequent incidents of depression.

There has been a debate in the literature on whether rumination is adaptive or maladaptive (Nolen-Hoeksema, 2004). Treynor, Gonzalez, and Nolen-Hoeksema (2003) described rumination as a multidimensional construct that includes two components: brooding and reflection. Brooding rumination involves a passive comparison between an individual's condition and unattained standards, whereas reflective rumination involves active introspection and cognitive problem solving to improve depressive symptoms. Studies showed that one type of rumination is more adaptive than the other in relation to depression. In a longitudinal study, Treynor et al. (2003) examined the relationship between brooding, reflection, and depression in an adult community sample. The results showed that baseline depression significantly positively predicted brooding and reflective rumination at baseline. In addition, baseline brooding rumination significantly positively predicted prospective depression, whereas baseline reflective rumination significantly negatively predicted prospective depression. These results are consistent with the notion that brooding and reflection function differently in relation to depression over time (Treynor et al., 2003). Brooding is a maladaptive form of rumination that is associated with higher levels of depression concurrently and over

time. On the other hand, reflection is a more adaptive form of rumination that is associated with lower levels of depression over time.

On the one hand, the process of rumination engages individuals in an automatic, persistent, and maladaptive pattern of thinking about their depressive condition, and on the other hand, the practice of mindfulness requires individuals to have a nonjudgmental and non-reactive awareness of their experiences. In fact, mindfulness-based interventions, such as MBCT, aim at targeting such dysfunctional cognitive patterns that maintain and exacerbate depression in order to prevent depression relapse. The results of a systematic review on MBCT showed that rumination was one of the mechanisms of change in the treatment of recurrent depression (van der Velden et al., 2015). Out of seven randomized controlled trials, three found that reductions in rumination were associated with reductions in depressive symptoms, while one study did not find significant results. In addition, two studies found that reductions in rumination mediated the effects of MBCT on depressive symptoms, while one study did not establish mediational effects.

Several other studies examined the relation between rumination, depressive symptoms, and mindfulness (Desrosiers, Vine, et al., 2013; Jury & Jose, 2019; Svendsen et al., 2017). In a longitudinal study, mindfulness, measured using FFMQ, was a significant negative predictor of rumination in a non-clinical adult sample over a period of 6 months (Jury & Jose, 2019). Additionally, rumination significantly mediated the relationship between mindfulness and depressive symptoms. Specifically, the relationship between three facets of mindfulness (i.e., acting with awareness, nonjudging, and nonreacting) and depressive symptoms was mediated by rumination.

These findings suggest that certain components of mindfulness might work on reducing rumination, which in turn improve depressive symptoms.

Similarly, rumination significantly mediated the relation between mindfulness, measured using FFMQ, and depressive symptoms in a clinical sample (Desrosiers, Vine, et al., 2013) and among university students (Svendsen et al., 2017). Svendsen et al. (2017) suggested that mindfulness might enable individuals to be aware of and to respond to their depressive thoughts and emotions with an intentional self-compassionate manner instead of engaging in automatic rumination. This might reduce the effect of rumination on the maintenance of depression (Desrosiers, Vine, et al., 2013).

Several studies examined the relation between subtypes of rumination, depressive symptoms, and mindfulness (Alleva et al., 2012; Kearns et al., 2016; Schut & Boelen, 2017). In a longitudinal study, brooding rumination and mindfulness, measured using MAAS, were significant negative and positive predictors of depression respectively at one year among undergraduate students (Schut & Boelen, 2017), while reflective rumination was not a significant predictor of depression. The results indicated that higher levels of mindfulness were associated with lower levels of depression and that higher levels of brooding rumination were associated with higher levels of depression. Moreover, brooding rumination no longer predicted depression after accounting for mindfulness. This suggests that individuals with high mindfulness abilities are less likely to engage in the process of rumination and therefore experience less depression over time.

Alleva et al. (2012) also examined whether brooding and reflective rumination mediated the relation between mindfulness, measured using KIMS, and depressive

symptoms in a nonclinical university sample. The results showed that brooding rumination mediated the relation between mindful awareness and depressive symptoms and between mindful acceptance without judgment and depressive symptoms. In addition, reflective rumination mediated the relation between mindful observing and depressive symptoms. Thus, higher levels of mindfulness factors were associated with lower levels of depressive symptoms through the reduction of brooding and reflective rumination.

Moreover, Kearns et al. (2016) examined whether rumination mediates the relation between mindfulness and depression relapse in a sample of non-depressed individuals with a history of recurrent depression (i.e., at least 3 previous episodes of depression), who participated in a randomized controlled trial of MBCT, over a 2-year follow-up period. The results showed that baseline mindfulness, measured using the FFMQ, negatively predicted rumination and depression relapse. However, baseline rumination did not predict depression relapse or mediate the relationship between mindfulness and depression relapse. The results suggest that mindfulness is a protective factor for depression relapse, but rumination is not a mediator of those effects. These findings are expected, given that rumination functions as a maintaining and exacerbating factor of depression, and not a cause of depression or depression relapse.

In summary, rumination significantly positively predicted depressive symptoms and the occurrence of depressive disorders (Nolen-Hoeksema, 2000). Specifically, brooding rumination significantly positively predicted prospective depression (Schut & Boelen, 2017; Treynor et al., 2003), whereas reflective rumination significantly negatively predicted prospective depression (Treynor et al., 2003). Additionally,

rumination significantly mediated the relationship between mindfulness and depressive symptoms (Desrosiers, Vine, et al., 2013; Jury & Jose, 2019; Svendsen et al., 2017).

Self-Criticism

Beck's cognitive model of depression described a cognitive triad that includes negative cognitions related to the self (e.g., *I am a failure*), which resemble the negative self-evaluation that is involved in self-criticism (Shahar, 2015). Self-criticism has been defined as "a response style to perceived failure that is characterized by negative self-judgement and self-evaluation" (Ehret et al., 2015, p. 1496). As such, self-criticism involves an intense and repetitive self-talk that is characterized by hostility towards the self in response to personal shortcomings (Shahar, 2015). Additionally, some researchers conceptualized self-criticism as a phenomenological experience of depression that is characterized by troubled self-concepts and self-esteem, including feelings of inferiority, guilt, and worthlessness and by self-punishment for inadequacy (Blatt et al., 1982; Blatt et al., 1995). Beck and Alford (2009) described that depressed individuals tend to evaluate themselves harshly according to internal standards that are rigid and perfectionistic. Such individuals are more likely to engage in self-criticism when they perceive flaws in personality or behavioral traits.

Franché and Dobson (1992) found that depressed and remitted patients had significantly higher levels of self-criticism than healthy controls. Additionally, Ehret et al. (2015) examined whether self-criticism predicted depression status after controlling for potential correlates of depression such as rumination. The authors compared groups of individuals who were never depressed, were experiencing depression, and ones with remitted depression. Results showed that self-criticism was a significant predictor of concurrent depression status after controlling for rumination and other variables.

Individuals who were experiencing depression and others with remitted depression had higher self-criticism than individuals who were never depressed. Moreover, Dunkley et al. (2009) found that baseline self-criticism significantly predicted depressive symptoms and major depression after four years in a clinical sample, after controlling for baseline symptoms of major depression. The above findings suggest that high self-criticism is a risk factor for the development and recurrence of depression.

While on the one hand, self-criticism involves focusing on and judging negative aspects of the self, on the other hand, the practice of mindfulness requires individuals to focus their attention on the present without holding a judgmental stance towards their experience. In fact, mindfulness was significantly negatively correlated with self-criticism among adolescents (Cunha & Paiva, 2013). Johnson et al. (2018) examined the effect of a mindfulness-based intervention on self-criticism and depressive symptoms among African American adults. The results showed that reductions in self-criticism significantly predicted improvements in depressive symptoms and the effect of the mindfulness-based intervention on depressive symptoms was mediated by changes in self-criticism. Therefore, reducing self-criticism is a mechanism of change in the amelioration of depressive symptoms in the context of mindfulness-based interventions.

Moreover, Azam et al. (2016) examined the effects of a mindfulness meditation program on depressed mood among university students across one academic year. The results showed that participants had significant improvement in depressed mood after completing the program. Additionally, baseline self-criticism was a significant negative predictor of reductions in depressed mood at the end of the study. Thus, those with high self-criticism benefited from the mindfulness meditation program through reductions in depressed mood. Furthermore, Halamová et al., (2018) examined the effects of an

online mindfulness-based intervention on self-criticism in an adult non-clinical sample over 15 days. The results indicated that self-criticism significantly improved at the end of the program and at the 2-month follow-up. These findings suggest that mindfulness-based interventions may be helpful in reducing self-criticism in non-clinical populations.

In summary, self-criticism has been shown to be another significant predictor of depression (Azam et al., 2016; Dunkley et al., 2009) that is positively impacted by mindfulness (Halamová et al., 2018; Johnson et al., 2018). Studies have shown that mindfulness may exert an indirect effect on depression through self-criticism (Azam et al., 2016; Johnson et al., 2018).

General Self-Efficacy

According to the reformulated learned helplessness theory of depression, individuals with a depressive explanatory style are more likely to blame themselves for negative events and expect negative events to occur in the future, resulting in increased helplessness (Peterson & Seligman, 1984) and lower self-efficacy. General self-efficacy has been defined as a general belief or confidence about an individual's own ability to perform certain behaviors across different tasks or situations (Bandura, 1977; Bandura, 1982; Schwarzer & Jerusalem, 1995). Bandura (1977) argued that general self-efficacy is a product of learning, by observing and interacting with others, and that general self-efficacy would influence the decision of individuals to initiate and persist in performing coping behaviors. Bandura (1982) argued that individuals who have strong general self-efficacy are more likely to employ great efforts to deal with difficult situations. Among university students, general self-efficacy was associated with achievement, motivation, self-regulation, and strategy use (Bartimote-Aufflick et al., 2016). On the other hand,

individuals, who negatively evaluate their abilities, are more likely to exert less effort or surrender (Bandura, 1982). The dimensions of general self-efficacy include self-depreciative thoughts, perceived ability to cope, and the initiation and maintenance of coping behaviors. Those dimensions may negatively influence mood, and depression is thought to arise from poor general self-efficacy or poor outcome expectancy of valued outcomes (Maddux & Meier, 1995). Specifically, depressive mood might develop when individuals believe that they are unable to meet standards of performance, to develop and maintain satisfying relationships, and to control negative depressive thought (Maddux & Meier, 1995). Depressive mood might also develop when individuals believe that desirable outcomes are unattainable or when they believe that they are incapable of performing behaviors to attain feasible desirable outcomes. In relation to the reformulated learned helplessness theory, low self-efficacy consists of low confidence in personal ability and high outcome expectations (i.e., personal helplessness) or low outcome expectations (i.e., universal helplessness), which makes individuals vulnerable to depression (Abramson et al., 1978; Peterson & Seligman, 1984).

Self-efficacy is thought to be a factor that interferes with motivation in individuals with depression (Ritschel et al., 2013). For instance, individuals who are depressed believe that they are unable to complete tasks. This diminished self-efficacy is a negative evaluation of the self that falls under cognitive distortions in the cognitive theory of depression. Consequently, individuals with low self-efficacy are less likely to engage in different tasks of daily life. Kavanagh (2014) argued that low self-efficacy is both a contributing factor and a consequence of depression. More specifically, depressed mood may negatively influence individuals' cognitions about their efficacy,

and low self-efficacy may exacerbate depressed mood. In a clinical sample of individuals with major depressive disorder, Milanovic et al. (2018) found that self-efficacy negatively predicted adaptive and interpersonal functional impairment after controlling for depressive symptoms. Moreover, studies found that general self-efficacy negatively predicted symptoms of depression among non-clinical samples of adolescents (Muris et al., 2016), high school students (Tahmassian & Jalali Moghadam, 2011), and adult diabetic patients (Aflakseir & Malekpour, 2014). That is, higher general self-efficacy was associated with lower levels of depression.

While self-efficacy relies on how individuals attribute their abilities to their outcome performance (Bandura, 1977), the practice of mindfulness enables individuals to refrain from negative self-evaluation. As such, mindfulness might allow individuals to make more positive or more realistic attributions about their abilities (Charoensukmongkol, 2014). In fact, Brown et al. (2007) found that mindful observing and nonjudging of internal experiences were associated with realistic evaluations of those internal experiences. Charoensukmongkol (2014) found that there was a positive indirect relationship between mindfulness meditation and general self-efficacy that was mediated by emotional intelligence (i.e., individuals' ability to monitor their emotions and use them to guide their thoughts and behaviors). That is, the practice of mindfulness meditation improved individuals' emotional awareness and regulation, which enabled more optimistic perceptions and enhanced beliefs of personal efficacy (Charoensukmongkol, 2014).

However, limited studies investigated the relationship between general self-efficacy and mindfulness. To our knowledge, Soysa and Wilcomb (2013) was the only study that examined whether the facets of mindfulness (describing, acting with

awareness, and nonjudging), measured using the FFMQ, and general self-efficacy were predictors of depression among undergraduate students. General self-efficacy was a significant negative predictor of depression. However, general self-efficacy no longer predicted depression after controlling for the mindfulness facets. Therefore, general self-efficacy may play a role in the relationship between mindfulness and depression.

In summary, general self-efficacy negatively predicted symptoms of depression in different populations (Aflakseir & Malekpour, 2014; Muris et al., 2016; Tahmassian & Jalali Moghadam, 2011). However, general self-efficacy did not predict depression after controlling for mindfulness facets (Soyso & Wilcomb, 2013). Exploratory mediation analyses may be helpful in better understanding the role of general self-efficacy in the relationship between mindfulness and depression.

Demographic Variables: Gender and Socioeconomic Status

The link between depression and different sociodemographic risk factors has been examined in recent literature. Per Friedman (2014), sociodemographic factors that are associated with an increased risk of depression in the United States include female gender and lower income. Regarding gender, females approximately have double the lifetime prevalence of depressive disorders of males (Denko & Friedman, 2014). The results of the STAR*D study showed that females experienced greater symptom severity as compared to males, whereas males experienced more episodes of depression as compared to females. Factors that contribute to gender differences in depression include psychological and biological factors (Denko & Friedman, 2014; Nolen-Hoeksema & Hilt, 2009). In fact, these gender differences are most prominent within the periods of menarche and menopause (Denko & Friedman, 2014), and they are present across different racial and ethnic groups (Nolen-Hoeksema & Hilt, 2009). In

countries including Lebanon, the results of a cross-national epidemiological study showed that the females were twice as likely as males to experience a major depressive episode (Bromet et al., 2011). Being female was also a significant predictor of depression among undergraduate students in Lebanon (Kronfol et al., 2008).

Regarding socioeconomic status, lower family income was a predictor of longer recovery time after a relapse in depression (Boland & Keller, 2009). Additionally, the prevalence of depression among youth across different ethnic groups may vary according different factors such as household income (Kaslow et al., 2009). The results of a cross-national epidemiological study indicated that individuals within the lowest income group in high-income countries were twice as likely as those within the highest income group to experience a major depressive episode (Bromet et al., 2011). In low to middle income countries including Lebanon, experiencing financial difficulties was a significant predictor of depression among undergraduate students in Lebanon regardless of income (Kronfol et al., 2018). In summary, the prevalence of depression appears to vary across gender and income in different cultures.

Aims and Contribution

The practice of mindfulness plays a significant role in mental health, such that paying attention to one's experience nonjudgmentally in the present moment. Recent mindfulness literature showed that mindfulness facets predicted depression.

Additionally, cognitive processes (i.e., rumination, self-criticism, and self-efficacy) were also shown to be predictors of depression. Since the prevalence of depression is influenced by gender and socioeconomic status, these variables were controlled for in the study. In addition, since there was an interaction between mindfulness facets and meditation experience, meditative practice was controlled for in the study. Therefore,

the primary aim of the study was to investigate the predictive role of mindfulness in relation to depression after controlling for gender, socioeconomic status, and meditative practice.

Cognitive processes such as rumination, self-criticism, and general self-efficacy play a key role in maintaining and exacerbating depression. Therefore, the second aim of the study was to examine the mechanisms involved in the relationship between mindfulness and depression, using cognitive processes that have been associated with depression (i.e., rumination, self-criticism, and general self-efficacy). While rumination was found to be a mediating factor in this relationship, self-criticism and general self-efficacy are known predictors of depression, and yet these constructs have not been investigated as mediating factors in the relationship between mindfulness and depression. This is the first study to examine the role of the mechanisms of rumination, self-criticism, and general self-efficacy in the relationship between mindfulness and depression.

Hypotheses

Acting with awareness, nonjudging, and nonreactivity were significant negative predictors of depression (Baer et al., 2006; Medvedev et al., 2018). In addition, describing, nonjudging, and acting with awareness were significant negative predictors of depression (Soysa & Wilcomb, 2013).

Hypothesis 1A

Describing will be a significant negative predictor of depression, after controlling for gender, socioeconomic status, and meditative practice; that is, higher levels of describing will be associated with lower levels of depression.

Hypothesis 1B

Acting with awareness will be a significant negative predictor of depression, after *controlling* for gender, socioeconomic status, and meditative practice; that is, higher levels of acting with awareness will be associated with lower levels of depression.

Hypothesis 1C

Nonjudging will be a significant negative predictor of depression, after controlling for gender, socioeconomic status, and meditative practice; that is, higher levels of nonjudging will be associated with lower levels of depression.

Hypothesis 1D

Nonreactivity will be a significant negative predictor of depression, after controlling for gender, socioeconomic status, and meditative practice; that is, higher levels of nonreactivity will be associated with lower levels of depression.

Brooding rumination was a significant positive predictor of depression among undergraduate students in a longitudinal study (Schut & Boelen, 2017). Baseline brooding rumination significantly positively predicted prospective depression (Treyner et al., 2003).

Hypothesis 2A

Brooding rumination will be a significant positive predictor of depression, after controlling for gender, socioeconomic status, and meditative practice; that is, higher levels of brooding rumination will be associated with higher levels of depression.

Baseline reflective rumination significantly negatively predicted prospective depression (Treyner et al., 2003). However, reflective rumination was not a significant predictor of depression among undergraduate students in a longitudinal study (Schut & Boelen, 2017).

Exploratory Hypothesis 2B

There will be a significant relation between reflective rumination and depression, after controlling for gender, socioeconomic status, and meditative practice.

Self-criticism was a significant predictor of concurrent depression status (Ehret et al. 2015). Self-criticism significantly predicted depressive symptoms and major depression after four years in a clinical sample, after controlling for baseline symptoms of major depression (Dunkley et al., 2009).

Hypothesis 3

Self-criticism will be a significant positive predictor of depression, after controlling for gender, socioeconomic status, and meditative practice; that is, higher levels of self-criticism will be associated with higher levels of depression.

General self-efficacy significantly negatively predicted symptoms of depression (Muris et al., 2016; Tahmassian & Jalali Moghadam, 2011).

Hypothesis 4

General self-efficacy will be a significant negative predictor of depression, after controlling for gender, socioeconomic status, and meditative practice; that is, higher levels of general self-efficacy will be associated with lower levels of depression.

Rumination significantly mediated the relationship between mindfulness and depressive symptoms (Desrosiers, Vine, et al., 2013; Jury & Jose, 2019; Svendsen et al., 2017).

Hypothesis 5

Rumination will mediate the relation between mindfulness and depression. That is, higher levels of mindfulness will be associated with lower levels of rumination, and lower levels of rumination will be associated with lower levels of depression.

In a mindfulness-based intervention studies, reductions in self-criticism significantly predicted improvements in depressive symptoms (Azam et al., 2018; Johnson et al., 2018). In addition, the effect of the mindfulness-based intervention on depressive symptoms was mediated by changes in self-criticism.

Hypothesis 6

Self-criticism will mediate the relation between mindfulness and depression. That is, higher levels of mindfulness will be associated with lower levels of self-criticism, and lower levels of self-criticism will be associated with lower levels of depression.

General self-efficacy negatively predicted symptoms of depression in different populations (Aflakseir & Malekpour, 2014; Muris et al., 2016; Tahmassian & Jalali Moghadam, 2011). However, general self-efficacy did not predict depression after controlling for mindfulness facets (Soysa & Wilcomb, 2013). Exploratory mediation analyses may be helpful in better understanding the role of general self-efficacy in the relationship between mindfulness and depression.

Exploratory Hypothesis 7

General self-efficacy will mediate the relation between mindfulness and depression. That is, higher levels of mindfulness will be associated with higher levels of general self-efficacy, and higher levels of general self-efficacy will be associated with lower levels of depression.

Method

Participants

To be included in the study, participants had to be undergraduate students at AUB who were attending a Psychology 101 or 201 course and were 18 to 25 years of

age. A total of 247 students participated in the study. The final sample retained for the analyses was 217. This sample size was above the number required for a regression analysis based on Tabachnik and Fidell's (2012) recommendation of $N \geq 50 + 8m$ ($50 + 12 * 8 = 146$) and $N \geq 104 + m$ ($104 + 12 = 116$), where m is the number of predictor variables (the study has 12 predictors). However, the sample size was lower than the minimum number required for a reliable factor analysis based on Tabachnik and Fidell's (2012) recommendation of 300 participants.

In the final sample, 51.6% (111) participants identified as females, 47.9% (104) identified as males, and .01% (2) identified as other, including one participant who identified as non-binary. The average age of the participants was 19.02 years ($SD = 1.32$), with a range from 18 to 24 years of age. Most of the participants were enrolled in the sophomore year (52.1) and preferred not to report their monthly household income (43.4%) (see Appendix A). Regarding meditative practice, most of the participants (86.2%) did not engage in meditative practice. Of the minority who did engage in meditative practice (13.8%), only 7.14% reported engaging in meditative practice did so daily. According to the previously mentioned cut-off score for depression, the rate for major depression was 37.8% in the current sample. With regard to functional impairment, the majority of the participants (53.9%) indicated that their depression symptoms made it "somewhat difficult" to do their work, take care of things at home, or get along with other people (see Appendix A).

Procedure

After obtaining approval from the AUB Institutional Review Board (IRB), the participants were recruited from the undergraduate introductory psychology class at the American University of Beirut. Data collection started on April 18, 2019 and ended on

April 24, 2019, and it followed the procedure set by the Interim Guidance for Access to the Psychology (101/201) Student Pool for Research that has been approved by the AUB Human Research Protection Program. Students from the Psychology (101/201) Student Pool for Research, who were interested in earning up to 3 percentage points that are added to their final course grade, were given the choice to participate in this research study or to write a report on a psychological article. This study was among other studies that the students had the choice to participate in. Students in PSYC 101 and 201 classes received an invitation script (see Appendix C) regarding the research, which includes brief information on the purpose of the study and how to participate in the study. Interested students were able to access the LimeSurvey link on Moodle forum. This link allowed them access to the survey that contains an informed consent (see Appendix D), instructions (see Appendix E), followed by the scales and questionnaires (see Appendices F-K), and an information sheet (see Appendix L).

The informed consent form briefly presented the thesis research topic and explained the voluntary nature of the participation. The informed consent also included information on the anonymity of the participant and confidentiality of the research data. The informed consent covered the benefits and potential risks that might result from participating in the research project. The informed consent also provided participants with the counseling center's location and contact information at the university, in case any distress emerges during or after their participation. In addition, it provided the contact information of the AUB Department of Psychiatry and Family Medicine clinics, which provide services with student HIP coverage. The form also included contact information of the primary investigator, the co-investigator, and the IRB. Upon consent, the participants were asked to fill in the questionnaire battery. The survey concluded

with a sheet that includes information on how to receive the extra credit on their course. Upon completion, each participant received a code. Participants emailed the generated codes to their Psychology 101/201 instructors and received 1% point on their final course grade.

Variables and Measures

Demographics

The demographic questionnaire includes items about the participant's age, gender, academic year, and socioeconomic status, followed by questions about meditation practice (See Appendix F).

Patient Health Questionnaire – 9 (PHQ-9)

The PHQ-9 (Kroenke et al., 1999) measures depression severity over the past two weeks and consists of 9 items and one item about affected functionality (see Appendix G). Sample items include “feeling down, depressed, or hopeless” and “poor appetite or overeating”. Items are scored on a 4-point Likert scale ranging from 0 to 3. Research has shown that this scale has good internal consistency with a Cronbach's alpha of .89 (Kroenke et al., 2001). For a cut-off point of 10, this scale has 88% sensitivity and 88% specificity for detecting major depressive disorder (Kroenke et al., 2001). In the current study, the PHQ-9 demonstrated good internal consistency with a Cronbach's alpha of .87.

Five Facet Mindfulness Questionnaire – Short Form (FFMQ-SF)

The FFMQ-SF (Bohlmeijer et al., 2011) measures mindfulness and consists of 24 items (see Appendix H). This scale consists of five subscales, which are Observing, Describing, Acting with Awareness, Nonjudging of Inner Experience, and Nonreactivity to Inner Experience. A sample item is “it seems I am running on

automatic without much awareness of what I'm doing". Participants are asked to answer based on their experience during the past month. Items are scored on a 5-point Likert scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*).

Research showed that the facets of the scale showed good internal consistency with Cronbach's alpha ranging from .81 to .87 (Bohlmeijer et al., 2011). The scale demonstrated convergent and discriminant validity (Bohlmeijer et al., 2011). In the current study, FFMQ-SF demonstrated good internal consistency with a Cronbach's alpha of .74 and its subscales had satisfactory to good internal consistency ranging from .65 to .83 (see Table 3). For the purpose of this study, observing was not examined as a separate subscore. Therefore, four subscale scores were used for the multiple regression analysis and the mindfulness composite score was used for the multiple mediation analysis.

A Short Form of the Ruminative Response Scale (RRS)

The short form of the RRS (Treynor et al., 2003) measures rumination and includes two subscales with a total of 10 items (see Appendix I). It has been formed from the original 22-item version of the RRS (Nolen-Hoeksema & Morrow, 1991). The Brooding subscale is comprised of 5 items and a sample item is "think what am I doing to deserve this?". The Reflection subscale is comprised of 5 items and a sample item is "analyze your personality to try to understand why you are depressed." The items are scored on a 4-point Likert scale ranging from 1 (*almost never*) to 4 (*almost always*). The short form of the RRS is highly correlated with the original version, $r = .90$, and has good internal consistency with Cronbach's alpha of .85 (Erdur-Baker & Bugay, 2010). The Brooding subscale has good internal consistency with Cronbach's alpha of .77 and good test-retest reliability, $r = .62$ (Treynor et al. 2003). The Reflection subscale has

good internal consistency with Cronbach's alpha of .72 and good test-retest reliability, $r = .60$ (Treyner et al., 2003). In the current study, a short form of the RRS, Brooding subscale, and Reflection subscale demonstrated good internal consistency with Cronbach's alpha scores of .76, .77, and .78 respectively. For the purpose of this study, the subscale scores were used for the multiple regression analysis and the composite score was used for the multiple mediation analysis.

Levels of Self-Criticism Scale (LOSC)

The LOSC (Thompson & Zuroff, 2004) measures two forms of negative self-evaluation, namely comparative self-criticism and internalized self-criticism (see Appendix J). This scale includes two subscales with a total of 22 items. The Comparative Self-Criticism subscale is comprised of 12 items (items 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 21, and 22) and a sample item is "I often worry that other people will find out what I'm really like and be upset with me". The Internalized Self-Criticism subscale is comprised of 10 items (items 1, 3, 5, 7, 9, 11, 13, 15, 17, and 19) and a sample item is "I am very frustrated with myself when I don't meet the standards I have for myself". Items on the scale are scored on a 7-point Likert scale from 1 (*not at all*) to 7 (*very well*). The LOSC showed good evidence for convergent and discriminant validity (Thompson & Zuroff, 2004). Both the Comparative Self-Criticism subscale and the Internalized Self-Criticism subscale have been shown to have good internal consistency with Cronbach's alpha scores of .84 and .88 respectively (Thompson & Zuroff, 2004). For the purpose of this study, one composite score for self-criticism was used since both types of self-criticism are similarly associated with depression (Joeng & Turner, 2015). In the current study, the LOSC demonstrated good internal consistency with a Cronbach's alpha of .88.

General Self-Efficacy Scale – 12 items (GSES-12)

The GSES-12 (Bosscher & Smit, 1998) measures general perceived self-efficacy and includes three subscales with a total of 12 items (see Appendix K). The Initiative subscale is comprised of 3 items and a sample item is “I avoid trying to learn new things when they look difficult”. The Effort subscale is comprised of 5 items and a sample item is “If I can’t do a job the first time, I keep trying until I can”. The Persistence subscale is comprised of 4 items and a sample item is “When unexpected problems occur, I don’t handle them very well”. Items on this scale are on a 4-point Likert scale ranging from 1 (*not at all*) to 4 (*exactly true*). This scale has been shown to have satisfactory internal consistency with Cronbach’s alpha of .69 (Bosscher & Smit, 1998). In the current study, the GSES-12 demonstrated good internal consistency with a Cronbach’s alpha of .85. For the purpose of this study, the total score of this measure was used.

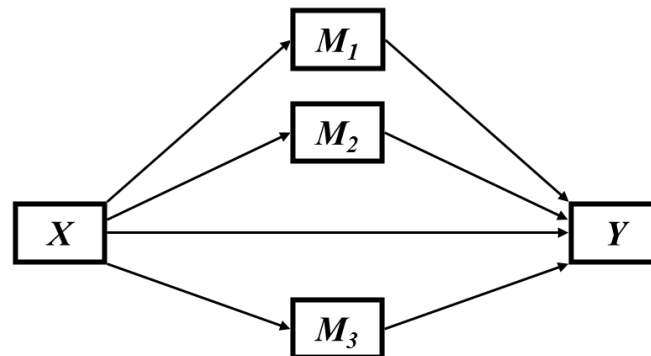
Pilot Study

After receiving IRB approval on April 10, 2019, the questionnaires were pilot tested with 10 undergraduate students from the American University of Beirut on April 11, 2019. The students were invited to voluntarily participate in the pilot study, read, and approve the informed consent form (see Appendix M), and complete the survey on a laptop in the graduate seminar room in Jesup Hall. Exclusion criteria for the pilot study were students in the Psychology (101/201) Student Pool for Research and students that are under 18 years old or above 25 years old. The average time needed to complete the questionnaire ranged between 10 and 16 minutes. The participants reported that the measures were clear. They pointed out two typographical errors in items 3 and 4 of the RRS. Appendix F was modified accordingly. The participants also

reported that some questionnaire items needed rewording to enhance understanding. The changes had to do with understanding the meanings of words and included finding synonyms for some words in item 3 from the FFMQ-SF and items 2, 13, and 20 from LOSC. Appendix H and J were modified accordingly. Data collected from the pilot surveys was not included in the larger study or in the data analysis.

Data Analyses

Factor analyses and reliability analyses were conducted on the FFMQ-SF and short form of the RRS questionnaires since we were interested in examining the subscale scores. A hierarchical regression was conducted to investigate whether some facets of mindfulness (describing, nonjudging, awareness, and nonreactivity), rumination (brooding and reflection), self-criticism, and general self-efficacy predicted depression after controlling for gender, socioeconomic status, and meditative practice. Also, a parallel multiple mediation analysis was conducted using PROCESS macro version 3.3 on IBM SPSS Statistics version 24. The chosen model for the analysis was model 4 (Hayes, 2018; see Figure 1). that depicts the mediation of the effect of X (mindfulness) on Y (depression) by M_1 (rumination), M_2 (self-criticism), and M_3 (general self-efficacy).

Figure 1*Statistical model*

Results

Preliminary Analysis

Preliminary analyses were conducted prior to examining the main analyses. The preliminary analyses involved missing values analysis, factor analyses, analysis of univariate and multivariate outliers, and normality analysis.

Missing Value Analysis

The data from six participants were excluded because of failure to meet the inclusion criterion for age. The data from five participants were excluded because they did not complete any part of the survey. The data from 19 students were excluded due to large amounts of missing data, because they omitted two or more full scales. A missing value analysis was conducted on 217 participants. It revealed that all the variables had less than 5% missing values. To test whether the data were missing completely at random, Little's MCAR test was conducted. Little's MCAR was statistically non-significant, $\chi^2(69, N=217) = 60.179, p > .05$, indicating that the data was missing at random.

Factor Analyses of the Five Facet Mindfulness Questionnaire-Short Form (FFMQ-SF)

A factor analysis using a principal components analysis (PCA) was conducted on the Five Facet Mindfulness Questionnaire-Short Form (FFMQ-SF), which consists of 24 items that examine the dimensions of mindfulness. It is supposed to measure 5 facets of mindfulness: observing, describing, acting with awareness, nonjudging, and nonreactivity. PCA was used because we have an idea about possible underlying dimensions and want to reduce the scale to its principal components. Prior to carrying out the factor analysis, the assumptions of sample size, multicollinearity, singularity, and the factorability of the correlation matrices were examined.

Sample Size. Tabachnick and Fidell (2014) recommend a sample size of at least 300 cases to ensure that the correlations are reliably estimated. The current sample size of $N = 217$ is well below the recommended 300. Therefore, our sample is not large enough that the estimations of correlations be reliable. Nevertheless, the factor structure of the FFMQ-SF was examined.

Multicollinearity and Singularity. To check for issues of multicollinearity and singularity, the determinant obtained was .000. This value is below .00001, which indicates a potential problem in our data. However, there were no correlations above .80 in our correlation matrix; therefore, multicollinearity and singularity among the items were not problematic.

Factorability of the Correlation Matrices. The Kaiser-Meyer-Okin (KMO) measure, which tests for the factorability of the data, was equal to .775. This value exceeds the recommended value of .60 and is good according to Field (2009). This

means that for this dataset, a factor analysis would be appropriate as the data is factorable.

Measure of Sampling Adequacy. The MSA identifies if the specific items of the dataset should be included in the analysis. This is tested by looking at the anti-image correlation matrix in the output of the analysis. Based on the diagonal of values in the matrix, the values were well above .50, indicating that none of the variables needed exclusion from the analysis.

Bartlett's Test of Sphericity. Bartlett's test of Sphericity tests the null hypothesis that the correlation in a correlation matrix is zero. For these data, Bartlett's Test of Sphericity was significant, $\chi^2 (276) = 1692.63, p < .05$, which indicates that the correlations within the R-matrix are sufficiently different from zero. Therefore, factor analysis is appropriate for this dataset.

Principal Components Analysis (PCA). A factor analysis using PCA was conducted on the 24 items of the FFMQ-SF. The number of factors was analyzed using Kaiser's criteria of eigenvalues. An oblique rotation (direct oblimin) was used because the dimensions were assumed to be correlated with one another.

The analysis revealed the presence of 5 components with eigenvalues exceeding 1. These factors in combination explained a total of 56.31% of the variance. Furthermore, after inspecting the scree plot, we observed three inflection point, which indicates the possibility of having five factors (see Figure B1).

According to the item clustering that was observed in the pattern matrix, (see Table 1), the items 1, 2, 5, 11, and 16 that loaded on factor 1 measured the dimension Describing in the original scale. Thus factor 1 represents the dimension of Describing. Two items loaded negatively on factor 1, which indicates that the items are worded

negatively in relation to the rest of the items. The items 8, 12, 17, 22, and 23 that loaded on factor 2 measured the dimension Acting with Awareness in the original scale. Thus factor 2 represents the dimension of Acting with Awareness. The items 6, 10, 15, and 20 that loaded on factor 3 measured the dimension Observing in the original scale. Thus factor 3 represents the dimension of Observing. The items 4, 7, 14, 19, and 24 that loaded on factor 4 measured the dimension Nonjudging in the original scale. Thus factor 4 represents the dimension of Nonjudging. The items 3, 9, 13, 18, and 21 that loaded on factor 5 measured the dimension Nonreactivity in the original scale. Thus factor 5 represents the dimension of Nonreactivity.

In sum, the scale measuring the dimensions of mindfulness has the underlying dimensions that the scale is supposed to measure. Thus, the scale does truly reflect the five dimensions mentioned above in the sample under study.

Table 1

Factor Loadings for Principle Component Analysis with Oblimin Rotation with Kaiser Normalization of the Five Facet Mindfulness Questionnaire – Short Form

Items	Components				
	1	2	3	4	5
1. I'm good at finding words to describe my feelings.	.87				
2. I can easily put my beliefs, opinions, and expectations into words.	.79				
3. I track my feelings without getting carried away by them.					.60
4. I tell myself I shouldn't be feeling the way I'm feeling.				.78	
5. It's hard for me to find the words to describe what I'm thinking.	-.73				
6. I pay attention to physical experiences, such as the wind in my hair or sun on my face.			.81		
7. I make judgments about whether my thoughts are good or bad.				.47	

8. I find it difficult to stay focused on what's happening in the present moment.	.59	
9. When I have distressing thoughts or images, I don't let myself be carried away by them.		.63
10. Generally, I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.	.76	
11. When I feel something in my body, it's hard for me to find the right words to describe it.	-.60	
12. It seems I am "running on automatic" without much awareness of what I'm doing.	.74	
13. When I have distressing thoughts or images, I feel calm soon after.		.64
14. I tell myself that I shouldn't be thinking the way I'm thinking.		.80
15. I notice the smells and aromas of things.	.77	
16. Even when I'm feeling terribly upset, I can find a way to put it into words.	.76	
17. I rush through activities without being really attentive to them.	.70	
18. Usually when I have distressing thoughts or images I can just notice them without reacting.		.74
19. I think some of my emotions are bad or inappropriate and I shouldn't feel them.		.69
20. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.	.72	
21. When I have distressing thoughts or images, I just notice them and let them go.		.72
22. I do jobs or tasks automatically without being aware of what I'm doing.	.86	
23. I find myself doing things without paying attention.	.88	
24. I disapprove of myself when I have illogical ideas.		.35

Note. Factor loadings >.35 are included. The rotation converged in 7 iterations.

Factor Analyses of a Short Form of the Ruminative Response Scale (RRS)

A factor analysis using a principal components analysis (PCA) was conducted on a short form of the Ruminative Response Scale (RRS), which consists of 10 items that examine the dimensions of rumination. It is supposed to measure 2 types of rumination: brooding and reflection. PCA was used because we have an idea about

possible underlying dimensions and want to reduce the scale to its principal components. Prior to carrying out the factor analysis, the assumptions of sample size, multicollinearity, singularity, and the factorability of the correlation matrices were examined.

Sample Size. Tabachnick and Fidell (2014) recommend a sample size of at least 300 cases to ensure that the correlations are reliably estimated. The current sample size of $N = 217$ is well below the recommended 300. Therefore, our sample is not large enough that the estimations of correlations be reliable. Nevertheless, the factor structure of a short form of the RRS was examined.

Multicollinearity and Singularity. To check for issues of multicollinearity and singularity, the determinant obtained was .053. This value is greater .00001, which indicates that there is no multicollinearity among the variables. Furthermore, after inspecting the correlation matrix, there were no correlations above .80; therefore, multicollinearity and singularity among the items was not a problem.

Factorability of the Correlation Matrices. The Kaiser-Meyer-Okin (KMO) measure, which tests for the factorability of the data, was equal to .795. This value exceeds the recommended value of .60 and is good according to Field (2009). This means that for this dataset, a factor analysis would be appropriate as the data is factorable.

Measure of Sampling Adequacy. The MSA identifies if the specific items of the dataset should be included in the analysis. This is tested by looking at the anti-image correlation matrix in the output of the analysis. Based on the diagonal of values in the matrix, the values were well above .50, indicating that none of the variables needed exclusion from the analysis.

Bartlett's Test of Sphericity. Bartlett's test of Sphericity tests the null hypothesis that the correlation in a correlation matrix is zero. For these data, Bartlett's Test of Sphericity was significant, $\chi^2(45) = 622.44, p < .05$, which indicates that the correlations within the R-matrix are sufficiently different from zero. Therefore, factor analysis is appropriate for this dataset.

Principal Components Analysis (PCA). A factor analysis using PCA was conducted on the 10 items of a short form of the RRS. The number of factors was analyzed using Kaiser's criteria of eigenvalues. An oblique rotation (direct oblimin) was used because the dimensions were assumed to be correlated with one another.

The analysis revealed the presence of 2 components with eigenvalues exceeding 1. These factors in combination explained a total of 54.70% of the variance. Furthermore, after inspecting the scree plot, we observed one inflection point, which indicates the possibility of having two factors (see Figure B2).

According to the item clustering that was observed in the pattern matrix, (see Table 2), the items 1, 2, 3, 4, and 5 that loaded on factor 1 measured the dimension Brooding in the original scale. Thus factor 1 represents the dimension of Brooding. The items 6, 7, 8, 9, and 10 that loaded on factor 2 measured the dimension Reflection in the original scale. Thus factor 2 represents the dimension of Reflection.

In sum, the scale measuring the types of rumination has the two underlying dimensions that the scale is supposed to measure. Thus, the scale does truly reflect the two types of rumination mentioned above in the sample under study.

Table 2

Factor Loadings for Principle Component Analysis with Oblimin Rotation with Kaiser Normalization of a Short Form of the Ruminative Response Scale

Items	Components	
	1	2
1. Think “What am I doing to deserve this?”	.66	
2. Think “Why do I always react this way?”	.69	
3. Think about a recent situation, wishing it had gone better	.74	
4. Think “Why do I have problems other people don’t have?”	.75	
5. Think “Why can’t I handle things better?”	.76	
6. Analyze recent events to try to understand why you are depressed		.64
7. Go away by yourself and think about why you feel this way		.75
8. Write down what you are thinking and analyze it		.67
9. Analyze your personality to try to understand why you are depressed		.82
10. Go someplace alone to think about your feelings		.71

Note. Factor loadings $>.35$ are included. The rotation converged in 6 iterations.

Reliability Analyses

Reliability analyses were conducted for all the scales after the appropriate items of the FFMQ-SF, LOSC, and GSES-12 were reverse coded. All the scales showed to have high internal consistencies since their Cronbach’s alpha values were above .70 except for the *Nonjudging* scale of the FFMQ-SF, which had a Cronbach alpha value of .65, which is satisfactory (see Table 3). However, this value did not significantly increase when any of the items in the *Nonjudging* scale were deleted.

Table 3*Reliability of the Scales and Subscales: Cronbach's Alpha*

Scales and Subscales	Cronbach's alpha	N of items
Patient Health Questionnaire – 9 (PHQ-9)	.87	9
Five Facet Mindfulness Scale – Short Form (FFMQ-SF)	.74	24
Observing	.77	4
Describing	.83	5
Acting with Awareness	.82	5
Nonreactivity	.70	5
Nonjudging	.65	5
A Short Form of the Ruminative Response Scale (RRS)	.76	10
Brooding	.77	5
Reflection	.78	5
Levels of Self-Criticism (LOSC)	.88	22
General Self-Efficacy Scale – 12 (GSES-12)	.85	12

Influential cases

Influential cases were examined by looking at Cook's distance. All cases had values for Cook's distance that were less than one, which indicates that there are no influential cases in the dataset.

Univariate and Multivariate Outliers

Univariate outliers were inspected through z-scores. Any z-score with a value above the absolute value of 3.29 was considered a univariate outlier. One univariate outlier was found for the general self-efficacy variable with case number 208. Multivariate outliers were inspected through Mahalanobis distance. No multivariate outliers were found in the dataset. No cases were found to be both univariate and multivariate outliers. Therefore, all cases were retained for the analyses.

Outliers in the Solution

To examine the presence of outliers in the solution, standardized residuals were used (Field, 2013). Cases with standardized residuals above the absolute value of 3.29

were considered outliers in the solution. In the current analysis, the standardized residuals ranged between -2.16 and 2.72, indicating that the data did not include outliers in the solution.

Normality

Normality of the variables was tested by examining the z-scores of skewness. A z-skew value above the absolute value of 3.29 was used as a marker for significant skewness and violation of normality. None of the scores on the variables of brooding, reflection, describing, acting with awareness, nonjudging, nonreactivity, self-criticism, and general self-efficacy showed to have a z-skewness greater than the +3.29 or less than -3.29, which indicates that they were normally distributed. However, the scores on the variable of depression had a z-skewness of 5.37, which indicates that the scores are significantly positively skewed. This suggests that the assumption of normality was violated for the dependent variable. Normality of the variables is not a requisite for the main analysis needed in this study. Therefore, this did not pose a problem. Nevertheless, the results were interpreted with caution.

Scale Descriptives

The calculated mean for the dependent variable of depression ($M = 8.48$, $SD = 5.72$) was found to be below the cut-off point of 10, which indicates that the participants generally did not experience depression or had subthreshold levels of depression. Concerning mindfulness, the mean score obtained ($M = 75.53$, $SD = 10.56$) was around the midpoint of 75.50, which indicates that the participants generally had average levels of mindfulness. Concerning subscales, the mean scores on describing ($M = 16.59$, $SD = 4.35$) and acting with awareness ($M = 17.92$, $SD = 4.36$) were relatively higher than the scale midpoints of 15 and 15.50 respectively, which indicates that the participants

experienced relatively high levels of labeling observed internal and external experiences and engaging in activities with undivided attention. In addition, the mean score for nonjudging ($M = 13.77$, $SD = 3.69$) was slightly below the midpoint of 14, indicating that the participants generally engaged in a judgmental stance towards present-moment experience. The mean score for nonreactivity ($M = 14.45$, $SD = 3.76$) was around the midpoint of 14.5, indicating that, on average, the participants were able to experience their thoughts and feelings without getting preoccupied by them.

Moreover, the mean scores of rumination ($M = 2.42$, $SD = .54$) and brooding ($M = 2.57$, $SD = 2.60$) were around the midpoints of 2.45 and 2.6, which indicates that the participants in this sample had average levels of rumination and brooding. Regarding reflection, the mean score ($M = 2.27$, $SD = .70$) was well below the midpoint of 2.5, indicating that the participants did not generally engage in introspection.

Furthermore, regarding self-criticism, the mean score ($M = 4.05$, $SD = .94$) was above the midpoint of 3.93, indicating that the participants engaged in negative self-evaluation as a response to perceived failure. Regarding general self-efficacy, the mean score ($M = 2.98$, $SD = .53$) was well above the midpoint of 2.59, indicating that the participants had high confidence in their ability to perform activities.

Refer to Table 4 for descriptive statistics on the variables under study.

Table 4*Scale Descriptives*

Scales and Subscales	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Patient Health Questionnaire – 9 (PHQ-9)	217	8.48	5.72	0	27
Five Facet Mindfulness Scale – Short Form (FFMQ-SF)	217	75.53	10.56	50	101
Describing	217	16.59	4.35	5	25
Acting with Awareness	217	17.92	4.36	6	25
Nonjudging	217	13.77	3.69	5	23
Nonreactivity	217	14.45	3.76	5	24
A Short Form of the Ruminative Response Scale (RRS)	217	2.42	.54	1.1	3.8
Brooding	217	2.57	.69	1.2	4
Reflection	217	2.27	.70	1	4
Levels of Self-Criticism (LOSC)	217	4.05	.94	1.45	6.41
General Self-Efficacy Scale – 12 (GSES-12)	216	2.98	.53	1.17	4

Correlation Between Predictor Variables and Depression

The correlations between the predictor variables of describing, acting with awareness, nonjudging, nonreactivity, brooding, reflection, self-criticism, and general self-efficacy and depression were tested using Spearman's rho coefficient because the assumption of normality for the dependent variable of depression was violated (Field, 2009). The correlations among the normally distributed predictor variables was tested using Pearson's *r* coefficient (see Table 5).

The variables of describing, acting with awareness, nonreactivity, and general self-efficacy showed significant negative correlations with the outcome variable of depression. The variables of brooding, reflection, and self-criticism showed significant positive correlations with the outcome variable of depression. The largest correlation

was between brooding and depression, where the two variables were significantly positively correlated with one another ($r_s = .50, p < .01$, large effect size), and between depression and general self-efficacy, where the two variables were significantly negatively correlated with one another ($r_s = -.50, p < .01$, large effect size). The former suggests that as individuals engage in more brooding, they may be more likely to experience depression, whereas the latter suggests that as individuals have higher general self-efficacy, they may be less likely to experience depression. The second highest correlation was between self-criticism and depression ($r_s = .48, p < .01$, medium-large effect size), indicating that as individuals experience more self-criticism, they may be more likely to experience depression. The third highest correlation was between acting with awareness and depression ($r_s = -.44, p < .01$, medium-large effect size), indicating that as individuals engage their awareness more while performing actions, they may be less likely to experience depression. The weakest correlation was between nonreactivity and depression ($r_s = -.18, p < .01$, small effect size), which suggests that as individuals react to or get preoccupied less by thoughts and emotions, they may be less likely to experience depression. There was no significant association between nonjudging and depression.

A noteworthy relationship was shown between brooding and self-criticism ($r = .71, p < .01$, large effect size), indicating that as individuals engage in more brooding and self-comparison with unattained standards, they may be more likely to experience self-criticism. Furthermore, acting with awareness was significantly positively correlated with general self-efficacy ($r = .50, p < .01$, large effect size), indicating that as individuals engage more in activities with undivided attention, they may be more likely to have confidence in their ability to perform certain activities or vice versa.

There were no significant association between acting with awareness, nonjudging, and nonreactivity.

Table 5

Zero Order Correlation Matrix

	1	2	3	4	5	6	7	8	9
1. Depression	-	-.32**	-.44**	-.08	-.18**	.50**	.30**	.48**	-.50**
2. Describing		-	.30**	-.02	.27**	-.30**	.12	-.28**	.39**
3. Acting with Awareness			-	.11	.02	-.39**	-.26**	-.35**	.50**
4. Nonjudging				-	-.02	-.36**	-.27**	-.33**	.60
5. Nonreactivity					-	-.36**	.06	.31**	.29**
6. Brooding						-	.21**	.71**	-.48**
7. Reflection							-	.20**	-.07
8. Self-criticism								-	-.44**
9. General self-efficacy									-

Note. The unbolded numbers correspond to Pearson's r correlations and the bolded numbers correspond to Spearman's ρ correlations.

****** $p < .01$ (two-tailed)

Main Analyses: Hierarchical Multiple Regression

A hierarchical multiple regression was conducted to test hypotheses 1 through 4. The variable of socioeconomic status was recoded into three categories: Low, Medium, and High. Those who reported having a monthly household income of less than 500,000 LBP, between 500,000 LBP and 750,000 LBP, or between 750,000 LBP and 1,500,000 LBP were recoded into the category of Low Socioeconomic Status. Those who reported having a monthly household income of between 1,500,000 and 3,000,000 LBP or between 3,000,000 LBP and 7,500,000 LBP were recoded into the category of Medium Socioeconomic Status. Those who reported having a monthly household income of more than 7,500,000 LBP were recoded into the category of High Socioeconomic Status. Those who reported preferring not to answer the question were not recoded into a different category. Since the nominal variables that are to be entered into the

regression analysis are to be dichotomous, the variable of socioeconomic status was further recoded into three dummy variables with *prefer not to say* as the reference category. For the purpose of the regression analyses, only the female and male genders were entered into the regression equation.

The control variables of gender, the three dummy variables of socioeconomic status, and meditative practice were entered into the first block using the forced entry method, and the predictor variables of describing, acting with awareness, nonjudging, nonreactivity, brooding, reflection, self-criticism, and general self-efficacy were entered into the second block using the forced entry method as well.

Assumptions of Regression

The assumptions of multicollinearity, normality of residuals, independence of errors, and homoscedasticity of the regression slope were examined.

Level of Measurement. All the variables were scale variables except for gender, the three dummy variables of socioeconomic status, and meditative practice that were nominal.

Ratio of Cases to Independent Variables. Tabachnick and Fidell (2012) recommend that for a medium sized relationship between the independent variable and dependent variable when conducting a multiple regression, the sample size must be larger or equal to $50 + 8m$, where m is the number of independent variables. Furthermore, when testing individual predictors, the sample size must be larger than $104 + m$. Our sample was composed of 217 participants and had 13 predictors. Therefore, both conditions were met where $50 + 8(13) = 154$ and $104 + 13 = 117$.

Multicollinearity. To check for multicollinearity, two methods were utilized: checking the correlation matrix between predictors and the Variance Inflation Factor

(VIF) values. In the current study, all correlations between the independent variables were below .80 and all VIF values were below 10. Therefore, the assumption of multicollinearity was met.

Normality of Residuals. The residuals of the model should be normally distributed with a mean of zero. The assumption of normality of residuals for depression was assessed through its histogram. Upon observation, the distribution was significantly different from that of the normal bell-shaped curve (see Figure B3). Therefore, the assumption of normality of residuals was violated. As such, the regression analysis was run using the bootstrapping method because it is a robust method against violations of normality and thus allows us to generalize the results from our sample to the general population (Field, 2009).

Independence of Errors. In a multiple regression analysis, the residuals of the involved variables should be independent of each other. To test this, the Durbin-Watson value was examined. Its value for depression was 2.004, which is close to the recommended value of 2 (Tabachnick & Fidell, 2012). This indicates that the assumption of independence of errors was met.

Homoscedasticity of Regression Slopes. At each level of predictors, variance of residuals should be constant. To test this, the residuals scatterplot (ZPRED vs. ZRESID) was examined (Field, 2009). The assumption was violated since the dots in the scatterplot are funneling out (see Figure B4). This is a clear violation of homoscedasticity and thus, the data are said to be heteroscedastic. We continued our analysis; however, the results of this multiple regression should be interpreted with caution.

Hierarchical Multiple Regression

A hierarchical multiple regression was used to examine the contribution of the predictor variables of describing, acting with awareness, nonjudging, nonreactivity, brooding, reflection, self-criticism, and general self-efficacy after controlling for the influence of gender, socioeconomic status, and meditative practice. As previously mentioned, the regression analysis was run using the bootstrapping method based on 1000 bootstrap samples with 95% confidence intervals and with bias corrected and accelerated. Due to the violation of the assumption of homoscedasticity of regression slopes, the results of this analysis should be interpreted with caution.

Gender, the three dummy variables of socioeconomic status, and meditative practice were entered into the first block at Step 1 using the forced entry method and explained 3% of the variance in depression with none of the variables appearing as significant predictors of the outcome variable (see Table 6). After entering describing, acting with awareness, nonjudging, nonreactivity, brooding, reflection, self-criticism, and general self-efficacy into the second block at Step 2 also using the forced entry method, the total variance explained by the model as a whole was 48%, $F(13, 200) = 14.31, p < .001$. The variables of interest explained an additional 45% of the variance in depression, after controlling for gender, socioeconomic status, and meditative practice, $\Delta R^2 = .46, F \text{ change } (8, 200) = 22.01, p < .001$ (see Table 6).

Table 6*R, R Square, Adjusted R Square, SE of the Estimate, and Change Statistics*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimates	R Square Change	Change Statistics			
						F Change	df1	df2	Sig. F Change
1	.16	.03	.00	5.67	.03	1.09	5	208	.37
2	.69	.48	.45	4.22	.46	22.01	8	200	.00

In the second model, describing, acting with awareness, nonjudging, reflection, self-criticism, and general self-efficacy appeared as significant predictors of depression (see Table 7). General self-efficacy had the largest association with depression ($B = -2.35, p < .001, \text{BCa CI} [-3.94, -.91]$) followed by reflection ($B = 1.77, p < .001, \text{BCa CI} [.85, 2.63]$), self-criticism ($B = 1.58, p < .001, \text{BCa CI} [.71, 2.37]$), nonjudging ($B = .20, p < .05, \text{BCa CI} [.01, .39]$), acting with awareness ($B = -.19, p < .05, \text{BCa CI} [-.37, -.01]$), and describing ($B = -.17, p < .05, \text{BCa CI} [-.35, -.01]$), thus confirming hypotheses 1A, 1B, 2B, 3, and 4. Even though nonjudging was a significant predictor of depression, the sign of the relationship was positive. Still, hypothesis 1C was not supported. Brooding and nonreactivity were not significant predictors in the model, and thus hypotheses 1D and 2A were not supported.

Table 7*Regression Parameters with Bootstrapping*

Model		B	Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval	
						Lower	Upper
1	(Constant)	6.43	.02	1.30	.00	3.79	9.13
	Gender	1.56	-.01	.79	.05	.08	3.10
	Low SES	-1.09	.03	1.28	.39	-3.32	1.59
	Medium SES	-.36	-.02	1.00	.71	-2.34	1.43
	High SES	.01	.01	.98	.99	-1.96	2.03
	Meditative Practice	-1.37	.01	1.01	.17	-3.73	.72
2	(Constant)	2.75	-.09	4.78	.55	-7.37	12.20
	Gender	1.03	-.01	.57	.07	-.02	2.16
	Low SES	-.13	-.02	1.02	.91	-2.18	1.96
	Medium SES	-.23	.03	.76	.77	-1.71	1.23
	High SES	1.48	.00	.83	.08	-.18	3.17
	Meditative Practice	-.79	.00	.81	.34	-2.39	.91
	Describing	-.17	.00	.08	.04	-.35	-.01
	Acting with Awareness	-.19	.00	.08	.03	-.37	-.01
	Nonjudging	.20	.00	.10	.03	.01	.39
	Nonreactivity	.08	.00	.09	.35	-.11	.28
	Brooding	1.11	.08	.68	.10	-.36	2.69
	Reflection	1.77	-.02	.47	.00	.85	2.63
	Self-criticism	1.58	-.04	.47	.00	.71	2.37
	General self-efficacy	-2.35	-.01	.73	.00	-3.94	-.91

Note. Bootstrap results are based on 1000 bootstrap samples. SES = Socioeconomic Status.

Main Analyses: Parallel Multiple Mediation Analysis

A parallel multiple mediation analysis was conducted to examine the indirect effect of mindfulness on depression through rumination, self-criticism, and general self-efficacy (hypotheses 5 through 7). Model 4 of the PROCESS macro version 3.3 was

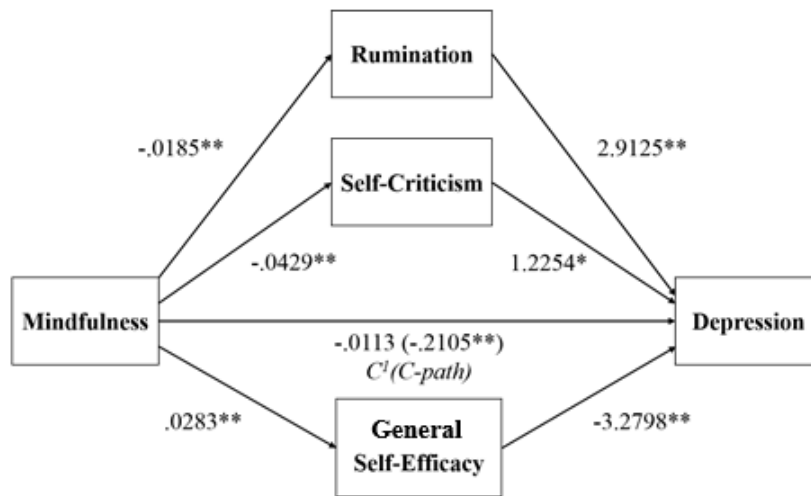
used (Hayes, 2018). Mindfulness was entered as the independent variable X , depression was entered as the dependent variable Y , and rumination, self-criticism, and general self-efficacy were entered as mediators M_1 , M_2 , and M_3 respectively. Bootstrapping method was used because it is a robust method against violations of normality and thus allows us to generalize the results from our sample to the general population (Field, 2009).

Results based on 5000 bootstrapped samples with 95% confidence intervals showed that the total effect of mindfulness on depression was significant ($b = -.21$, $p < .001$, 95% CI [-.28, -.14]; see Figure 2). However, the total direct effect of mindfulness was not significant and indirect effects were present.

All three mediators were found to significantly contribute to the overall indirect effect, thus confirming hypotheses 5 through 7. Specifically, there was a significant indirect effect of mindfulness on depression through rumination ($b = -.05$, 95% CI [-.09, -.02]), self-criticism ($b = -.05$, 95% CI [-.10, -.01]), and general self-efficacy ($b = -.09$, 95% CI [-.14, -.05]) supporting hypotheses 5, 6, and 7 (see Table 8). Specific indirect effect contrasts between the proposed mediators do not show statistically significant differences between the indirect effects of rumination, self-criticism, and general self-efficacy (see Table 8).

Figure 2

Parallel Multiple Mediation Model



Note. Parallel mediation model ($N = 216$). Indirect effects of mindfulness on depression through rumination, self-criticism, and general self-efficacy. The effects on the direct path from mindfulness to depression depict the direct effect (C^1) and the total effect (C).

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

Table 8

Parallel Multiple Mediation Parameters

	Effect	Std. Error	Bootstrapping	
			95% Confidence Interval	
			Lower	Upper
Indirect Effects				
Rumination	-.0539	.0175	-.0912	-.0228
Self-criticism	-.0525	.0226	-.0998	-.0118
General self-efficacy	-.0928	.0224	-.1384	-.0512
Total	-.1992	.0281	-.2556	-.1451
Contrasts				
Rumination vs. Self-criticism	-.0014	.0326	-.0643	.0645
Rumination vs. General self-efficacy	.0389	.0319	-.0261	.0998
Self-criticism vs. General self-efficacy	.0402	.0330	-.0266	.1036

Note. Bootstrap results are based on 5000 bootstrap samples.

Discussion

This study investigated the predictive role of mindfulness and brooding, reflection, self-criticism, and general self-efficacy in relation to depression after controlling for gender, socioeconomic status, and meditative practice among undergraduate students in Lebanon. The study also examined the mediating role of rumination, self-criticism, and general self-efficacy in the relationship between mindfulness and depression.

Main Findings of the Study

The prevalence of depressive symptoms in our university sample was approximately 38%, and this rate is consistent with results found by Kronfol et al., (2018) in the same population of Lebanese university students. Additionally, two out of the four facets of mindfulness, describing and acting with awareness, that were examined in this study, as well as reflection, self-criticism and general self-efficacy all predicted depression as hypothesized. The strongest predictor of depression was general self-efficacy followed by reflection, self-criticism, and then the facets of mindfulness, nonjudging, acting with awareness, and describing. Our results indicated that the predictor variables explained a large proportion of the variance in depression in our undergraduate student sample, suggesting that those variables are relevant to the population under study. Moreover, the mediating roles of rumination, self-criticism, and general self-efficacy in the relationship between mindfulness and depression were confirmed, supporting our hypotheses.

General self-efficacy was the strongest predictor of depression in our study. Confirming our hypothesis, general self-efficacy was negatively associated with depression both at the bivariate and multivariate levels. This is consistent with previous

literature that examined the relationship between general self-efficacy and depression (Muris et al., 2016; Soysa & Wilcomb, 2013; Tahmassian & Jalali Moghadam, 2011).

In contrast to Soysa and Wilcomb (2013), general self-efficacy in our sample continued to significantly predict depression even after accounting for different facets of mindfulness, including describing, acting with awareness, and nonjudging. This empirically supported hypothesis suggests that high levels of general self-efficacy may play a protective role against depression among undergraduate students in Lebanon.

Regarding rumination, the roles of reflection and brooding were examined in relation to depression. Reflection significantly predicted depression, confirming our hypothesis, while brooding did not. In fact, reflection was found to be significantly positively associated with depression both at the bivariate and multivariate levels. This is inconsistent with the results of previous studies that showed that reflection is an adaptive form of rumination that negatively predicted prospective depression (Treyner et al., 2003). A possible explanation for these findings is that reflection may be positively associated with concurrent depression but negatively associated with prospective depression, such that while reflection may increase during a depressive episode, it may also serve to resolve an episode or prevent future relapse. Contrary to our hypothesis, brooding was not a significant predictor of depression, despite being significantly correlated with depression at the bivariate level. It is plausible that other variables better accounted for depression in the final regression model. These findings are consistent with results from previous literature, where brooding no longer predicted depression after accounting for mindfulness among undergraduate students (Schut & Boelen, 2017). This suggests that students with high levels of mindfulness may be less likely to engage in brooding, and therefore experience less depression over time.

Another plausible explanation for the above finding could be the high correlation between brooding and self-criticism in our sample. The relationship between brooding and depression may have been mediated by self-criticism. For example, individuals, who evaluate their situations based on unattained standards, may be more likely to engage in negative self-evaluation and experience higher levels of depression.

Consistent with our hypothesis, self-criticism was significantly positively associated with depression both at the bivariate and multivariate levels. This is consistent with previous literature that examined the relationship between self-criticism and depression (Azam et al., 2018; Ehret et al., 2015; Dunkley et al., 2009). This empirically supported hypothesis suggests that high levels of self-criticism may be a risk factor for depression among undergraduate students in Lebanon.

Regarding mindfulness facets, the roles of describing, acting with awareness, nonjudging, and nonreactivity were examined in relation to depression. Describing and acting with awareness were significant negative predictors of depression, confirming our hypotheses. This finding is consistent with previous literature that examined the relation between describing and depression (Soysa & Wilcomb, 2013). This suggests that being in the present moment such that one is able to label internal and external experiences with words is associated with lower levels of depression. Additionally, this finding is also consistent with previous literature that examined the relation between acting with awareness and depression (Baer et al., 2006; Medvedev et al., 2018; Soysa & Wilcomb, 2013). This suggests that engaging in activities with undivided attention while remaining in the present moment is also associated with lower levels of depression.

Third, nonjudging was found to be a significant predictor of depression; however, the relationship was positive, which is inconsistent with our hypotheses. This result is not in line with previous literature that found nonjudging to be a negative predictor of depression (Baer et al., 2006; Medvedev et al., 2018; Soysa & Wilcomb, 2013). Although difficult to understand, high levels of nonjudging may denote higher levels of avoidance of introspection or self-evaluation. Extreme levels of avoidance of the self can be detrimental to the wellbeing of individuals. However, the above unexpected finding may be more likely accounted by methodology given there was ample confusion related to the nonjudging subscale items during the pilot study. The negatively-worded items in the nonjudging subscale (e.g., “I tell myself I shouldn’t be feeling/thinking the way I’m feeling/thinking”) seem to require a certain level of metacognition (i.e., thinking about thoughts or feelings) compared to other subscale items. Participants during the pilot study also requested clarification for the negatively worded items, which may explain the unexpected results in the main study. Items used to measure other subscales (i.e., describing and acting with awareness) require less complex cognitive processes, such as verbally expressing feelings and thoughts (i.e., describing) and drawing attention to present moment (i.e., acting with awareness). As such, it should also be noted that the nonjudging scale had low internal consistency (i.e., Cronbach’s alpha = .65), which may also account for the unexpected finding.

Lastly, nonreactivity did not emerge as a significant predictor in our sample despite being significantly yet weakly correlated with depression at the bivariate level. This finding is inconsistent with literature that showed that nonreactivity was a significant negative predictor of depression among student and general samples (Baer et al., 2006; Medvedev et al., 2018). It is plausible that the relationship between

nonreactivity and psychological symptoms is more salient for anxiety and stress (Soyza & Wilcomb, 2013). It is also possible that other variables better accounted for depression in the final regression model. Contrary to previous literature (Baer et al., 2006; Baer et al., 2008; Baer et al., 2011), there were no significant correlations between nonreactivity, nonjudging, and acting with awareness in this study. This might indicate a differential relationship between the mindfulness facets across cultures, which may impact the facets' relationships with other variables. The relationship between the mindfulness facets across cultures would be a recommended area for further research.

Most importantly, the study investigated the role of rumination, self-criticism, and general self-efficacy in mediating the relationship mindfulness and depression. These variables were found to fully mediate the relationship and significantly contribute to the total indirect effect. First, mindfulness was found to have a statistically significant indirect effect on depression through rumination. Specifically, participants who reported higher levels of mindfulness were more likely to have lower levels of rumination. With lower levels of rumination, these participants were more likely to report lower levels of depression. This finding is consistent with the results of previous literature, in which rumination significantly mediated the relation between mindfulness and depressive symptoms (Alleva et al., 2012; Desrosiers, Vine, et al., 2013; Jury & Jose, 2019; Svendsen et al., 2017). This suggests that individuals with higher levels of mindfulness may be protected from rumination, which may contribute to experiencing lower levels of depression. Second, mindfulness had a statistically significant indirect effect on depression through self-criticism. In other words, participants who reported higher levels of mindfulness were more likely to have lower levels of self-criticism. Due to lower levels of self-criticism, they were more likely to report lower levels of depression.

This finding is consistent with the results of previous literature on mindfulness-based interventions, in which the effect of such interventions on depressive symptoms was mediated by changes in self-criticism (Johnson et al., 2018). This suggests that individuals, who are able to stay in the present moment, attentive to their internal and external experiences nonjudgmentally, and act with the same awareness, may be less likely to engage in the evaluative process of self-criticism, which is associated with lower levels of depression. Third, mindfulness had a statistically significant indirect effect on depression through general self-efficacy, such that the participants, who reported higher levels of mindfulness, were more likely to have higher levels of general self-efficacy. With higher levels of general self-efficacy, they were more likely to report lower levels of depression. In fact, Charoensukmongkol (2014) hypothesized that mindfulness enables individuals to make more positive attributions about their abilities in relation to performance outcomes, and this may contribute to lower levels of depression.

The present study supported our mediational hypotheses, which suggests that the capacity for mindfulness may assist individuals at the cognitive level, protecting them from the harmful effects of rumination and self-criticism, and providing a general sense of competence and self-efficacy. Because the relationships are not causal, we can also understand the relationship between depression and mindfulness in opposite direction, such that those who experience less depression may be also more mindful in their day to day life, by experiencing less rumination, less self-criticism, and a greater sense of efficacy. Either way, the positive impact of mindfulness has been substantiated in this study and supports previous literature in having a strong influence on the way we think and the content of that thinking.

Limitations of the Study

The results of this study should be considered in light of its limitations. First, this study is cross-sectional. As such, no causal interpretation or directional inferences can be made. Second, the sample of this study consisted of students that are enrolled in higher education with a narrow age range. Thus, the sample is considered to be a sample of convenience, and the interpretation of the results of this study can only be applied to undergraduate university students and does not generalize to the Lebanese population. Third, although the sample size was adequate for conducting a multiple regression, it was not large enough for conducting factor analyses. Fourth, there was a violation of the assumption of homoscedasticity of regression slopes in the study; therefore, the results of the multiple regression should be interpreted with caution. Fifth, all the study questionnaires relied on self-report, which may result in response biases. Sixth, even though the study relied on a measure of depression that was validated in many countries, it was based on a brief self-report that may not be as accurate as clinical diagnoses.

Implications and Future Considerations

The findings of this study confirmed the mediating effects of several cognitive processes on the relationship between mindfulness and depression. Future studies might benefit from examining the relationship between mindfulness and depression among a sample of individuals who regularly practice mindfulness or meditation and from assessing the quality of formal and informal meditation practiced by the sample. Moreover, even though the design of this study is correlational, the findings can suggest some clinical recommendations. For instance, clinicians or counselors working with students who are experiencing depression may benefit from incorporating mindfulness

techniques that focus on describing and acting with awareness, given that mindfulness-based interventions may directly impact rumination (specifically reflection), self-criticism, and general self-efficacy.

Furthermore, the findings also have theoretical implications. Mindfulness had a significant indirect effect on depression through the cognitive mechanisms of rumination, self-criticism, and general self-efficacy, indicating an important cognitive role of mindfulness. Relating the latter to the cognitive theories of depression, mindfulness, through the acts of describing and acting with awareness, may impact depression by limiting the individuals' engagement in ruminative response styles, negative evaluations of the self or self-criticism, and depressive explanatory styles or low general self-efficacy.

Building on the limitations of this study, future research should examine whether the current findings generalize to clinical populations by examining the impact of a mindfulness intervention on individuals' depression and levels of rumination, self-criticism, and self-efficacy. Such intervention studies or longitudinal research designs would be able to establish causality and temporal mediation. Moreover, brooding and reflection rumination need to be measured in relation to concurrent and prospective depression in Lebanon in order to further replicate and substantiate findings on the role of rumination and depression. It is possible that the relationship between brooding rumination and depression is more prominent among clinical samples.

Conclusion

This was the first known study to examine the relationship of mindfulness on depression through the mediating cognitive processes of rumination, self-criticism, and general self-efficacy. As such, the findings provided a better understanding of the

cognitive mechanisms that are involved in that relationship. Describing, acting with awareness, reflection, self-criticism, general self-efficacy, and nonjudging were found to be predictors of depression, while nonreactivity and brooding did not predict depression. Moreover, rumination, self-criticism, and general self-efficacy were found to be significant mediators of the relationship between mindfulness and depression. Future studies might benefit from experimental or longitudinal designs in order to establish causal or temporal mediation associations.

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Appendix A

Descriptive of the Sample Characteristics

Variables	<i>N</i>	%
Gender		
Males	104	47.9
Females	111	51.6
Non-binary	1	.005
Other	1	.005
Academic Year		
Freshman	27	12.4
Sophomore	113	52.1
Junior	61	28.1
Senior	16	1.4
Socioeconomic Status (Monthly Household Income)		
Less than 500,000 LBP	2	.9
500,000 LBP – 750,000 LBP	7	3.2
750,000 LBP – 1,500,000 LBP	12	5.5
1,500,000 LBP – 3,000,000 LBP	24	11.1
3,000,000 LBP – 7,500,000 LBP	39	18
More than 7,500,000 LBP	39	18
I prefer not to say	94	43.3
Engagement in Meditative Practice		
Yes	30	13.8
No	187	86.2
Frequency of Engagement in Meditative Practice		
Daily	2	7.14
Several times a week	10	35.71
Several times a month	16	57.14
Major Depression (PHQ-9)		
No (0-9)	135	62.2
Yes (≥ 10)	82	37.8
Functional Impairments Caused by Depression		
Not at all difficult	50	23
Somewhat difficult	117	53.9
Very difficult	37	17.1
Extremely difficult	13	6

Appendix B

Figures

Figure B1

Scree Plot of the Five Facet Mindfulness Questionnaire – Short Form

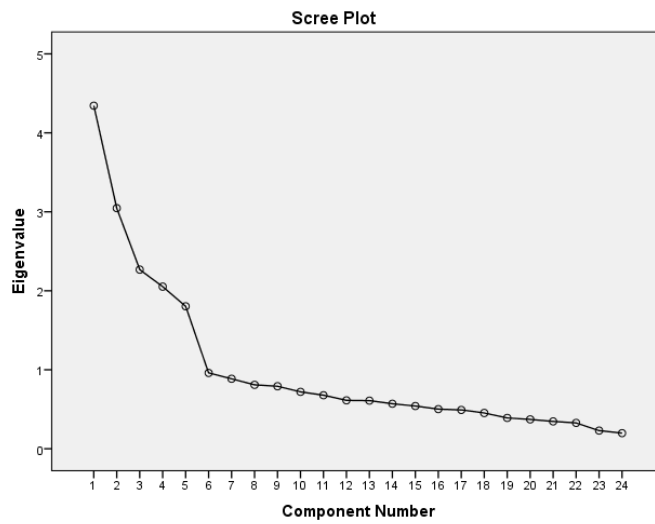


Figure B2

Scree Plot of the Ruminative Response Scale

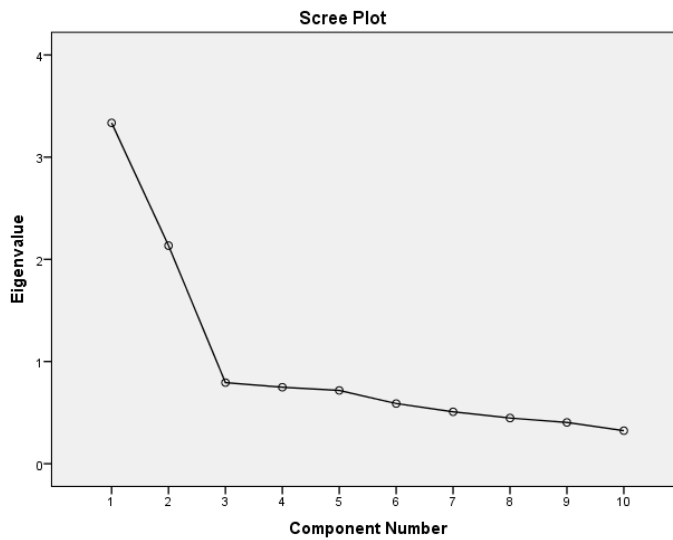


Figure B3

Histogram of Standardized Residuals of the Dependent Variable Depression

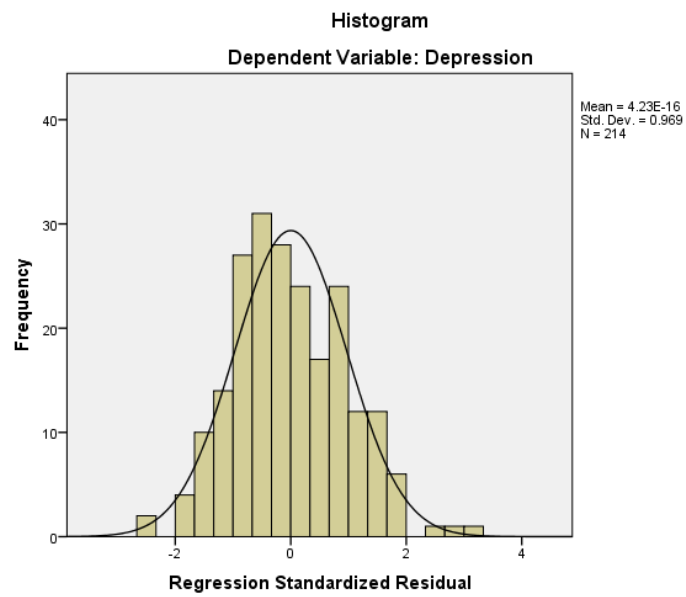
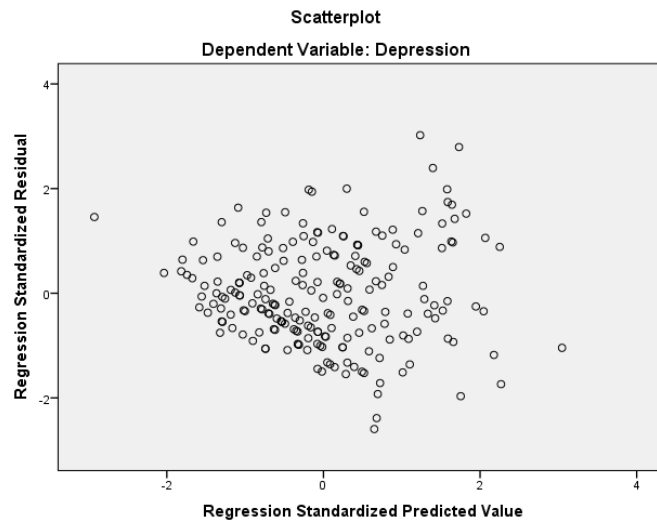


Figure B4

Scatterplot of Z-Resid vs. Z-Pred



Appendix C**Invitation Script****AUB Social & Behavioral Sciences
INVITATION SCRIPT****Invitation to Participate in a Research Study**

This notice is for an AUB-IRB Approved Research Study

for Dr. Fatima El Jamil at AUB.

**American University of Beirut, Jesup 101, 01- 350 000 ext. 4372,
fa25@aub.edu.lb**

It is not an Official Message from AUB

I am inviting you to participate in a research study titled The Relation between Mindfulness and Depression among University Students in Lebanon. This study seeks to examine the relationship between mindfulness and depression in relation to cognitive variables such as rumination, self-criticism, and general self-efficacy.

You will be asked to complete a short survey with demographic information and questions on mindfulness, depression, rumination, self-criticism, and self-efficacy.

You are invited because we are targeting students in PSYC 101 and 201 classes (you are eligible for this study if you are aged between 18 years and 25 years).

The estimated time to complete this survey is approximately 20 minutes.

The research is conducted online and is hosted on an AUB server.

Please read the consent form and consider whether you want to be involved in the study.

If you have any questions about this study, you may contact the research team: Dr. Fatimah El Jamil, fa25@aub.edu.lb, +961-1-350000 ext. 4372 or Batoul Safieddine, brs09@mail.aub.edu.

Version Date March 21, 2016

Version Number 1.1

Appendix D

Consent Form for Psychology 101/201 Students Participating in a Research Project

Project Title: The Relation between Mindfulness and Depression among University Students in Lebanon

Investigator: Dr. Fatimah El Jamil

Address: American University of Beirut, Jesup 101

Phone: 01- 350 000, ext. 4372

Email: fa25@aub.edu.lb

Co-Investigator: Batoul Safieddine, MA Candidate in Clinical Psychology

Email: brs09@mail.aub.edu

Dear participants, we would like to invite you to participate in a Master's thesis research study conducted at the American University of Beirut. The study seeks to examine the relationship between mindfulness and depression. Mindfulness refers to the processes of paying attention to one's experience, nonjudgmentally, in the present moment.

Depression is a mental health disorder that impacts the moods of individuals. The relationship between mindfulness and depression will be examined in relation to cognitive variables such as rumination, self-criticism, and general self-efficacy.

We are targeting students in PSYC 101 and 201 classes to take part in this study. We will recruit students using the Psychology (101/201) Student Pool for Research. To participate, you must be between 18 and 25 years of age. Participants who are under 18 years or above 25 years will be excluded from the study.

As a research participant, you will be asked to read this consent form and respond to a questionnaire. We will be asking 300 participants to complete the study questionnaire. Your participation in this research will take no more than twenty minutes. This is a one-off survey.

All of the data collected will be treated in the strictest **confidence** and only the primary investigator and the co-investigator will have access to it. To ensure **anonymity**, no direct identifying information will be recorded; you will not be asked to give us your name. All data from the study will be maintained on the co-investigator's password-protected computer for a period of three years after which it will be deleted. Records may be audited by the IRB while assuring confidentiality.

Your participation is **voluntary**, you have the right to refuse to participate and to withdraw from the study or discontinue your participation at any time without giving a reason and with no penalties. Your refusal to participate in this study will not affect your relationship with AUB and will not result in the loss of benefits.

The results of the study will allow filling the gaps in the literature on the cognitive model through which mindfulness influences depression. To our knowledge, there are no studies that have examined mindfulness and depression together among individuals in the Arab world. There is no monetary reward for participating in this study. However, you will receive 1% point on your final PSYC 101/201 grade. Should you decide not to participate in this study but still wish to receive extra course credit, you can write a brief report on an article from a psychological journal. If you want to write a brief report instead of participating, please contact your PSYC 101/201 instructor to receive the task.

In case you decide to participate you will receive a code, which you will give to your PSYC 101/201 instructor. This code will not link your responses to you, and will only ensure that you receive credit for your participation.

This study might cause emotional distress. Some of the questions in the survey are sensitive in nature. If you think that you need talk to someone about your feelings, please visit or contact Counseling Center at AUB West Hall, which provides free counseling services to students. Their number is 01-350 000 ext. 3196. You can also contact the Family Medicine Clinic (ext. 3000) or the Department of Psychiatry at AUBMC (ext. 5650) for appointments that qualify for student HIP-coverage. If at any time and for any reason you prefer not to answer any questions, please feel free to skip them.

If you have questions about this research study, or if you are interested in learning about the outcome of the study, you may contact **Dr. Fatimah El Jamil**, fa25@aub.edu.lb, +961-1-350000 ext. 4372 or Batoul Safieddine, brs09@mail.aub.edu.

If you have any questions about research or your rights as a participant, you may contact the Social and Behavioral Sciences Institutional Review Board (SBSIRB) at AUB: 01- 350 000 ext. 5445 or 5454 or irb@aub.edu.lb

If you accept the above statements and are willing to participate in this study, please press the ACCEPT button below.

THANK YOU FOR YOUR COOPERATION

Appendix E**Instructions**

The following are questions that may or may not apply to you. *Please read the instructions carefully before each questionnaire and answer the questions that follow.*

Appendix F**Demographics Form**

1. Gender:
 - Male
 - Female
 - Other (If other, specify: _____)
2. Age: _____ [If less than 18 years or more than 25 years, default setting on Lime Survey will be set to redirect participant to the information sheet]
3. Academic year at university
 - Freshman
 - Sophomore
 - Junior
 - Senior
4. Which AUB faculty are you registered in?
 - Faculty of Agricultural and Food Sciences (FAFS)
 - Faculty of Arts and Sciences (FAS)
 - Suliman S. Olayan School of Business (OSB)
 - Maroun Semaan Faculty of Engineering and Architecture (MSFEA)
 - Faculty of Health Sciences (FHS)
 - Rafic Hariri School of Nursing (HSON)
5. Household income:
 - Less than 500,000 L.L per month
 - 500,000 L.L – 750,000 L.L per month
 - 750,000 L.L – 1,500,000 L.L per month
 - 1,500,000 L.L. – 3,000,000 L.L per moth
 - 3,000,000 L.L. – 7,500,000 L.L per month
 - More than 7,500,000 L.L per month
 - I prefer not to say
6. Do you engage in meditative practice?
 - Yes
 - No
7. If you answered yes to question 5, since what age (in years) have you been engaging in meditative practice? _____
8. If you answered yes to question 5, how often to you meditate?
 - Daily
 - Several times a week
 - Several times a month

Note: If you are currently experiencing any distress, please contact the AUB Counseling Center (West Hall, room 210, ext. 3196) for free-of-charge counseling services. You can also contact the Family Medicine Clinic (ext. 3000) or the Department of Psychiatry at AUBMC (ext. 5650) for appointments that qualify for student HIP coverage.

Appendix G

Patient Health Questionnaire – 9 (PHQ-9)

(Kroenke et al., 1999)

Over the last two weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or hurting yourself in some way	0	1	2	3

	Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
If you checked off <u>any</u> problems, how <u>difficult</u> have these problems made it for you to do your work, take care of things at				

home, or get along with other people?				
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Developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke and colleagues, with an educational grant from Pfizer Inc. No permission required to reproduce, translate, display or distribute.

Note: If you are currently experiencing any distress, please contact the AUB Counseling Center (West Hall, room 210, ext. 3196) for free-of-charge counseling services. You can also contact the Family Medicine Clinic (ext. 3000) or the Department of Psychiatry at AUBMC (ext. 5650) for appointments that qualify for student HIP coverage.

Appendix H

Five Facet Mindfulness Questionnaire – Short Form (FFMQ-SF)

(Bohlmeijer et al., 2011)

Below is a collection of statements about your everyday experience. Using the 1–5 scale below, please indicate, in the box to the right of each statement, how frequently or infrequently you have had each experience in the last month. Please answer according to what really reflects your experience rather than what you think your experience should be.

	Never or very rarely true				Very often or always true
1. I'm good at finding words to describe my feelings.	1	2	3	4	5
2. I can easily put my beliefs, opinions, and expectations into words.	1	2	3	4	5
3. I track my feelings without getting carried away by them.	1	2	3	4	5
4. I tell myself I shouldn't be feeling the way I'm feeling.	1	2	3	4	5
5. It's hard for me to find the words to describe what I'm thinking.	1	2	3	4	5
6. I pay attention to physical experiences, such as the wind in my hair or sun on my face.	1	2	3	4	5
7. I make judgments about whether my thoughts are good or bad.	1	2	3	4	5
8. I find it difficult to stay focused on what's happening in the present moment.	1	2	3	4	5
9. When I have distressing thoughts or images, I don't let myself be carried away by them.	1	2	3	4	5
10. Generally, I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.	1	2	3	4	5

11. When I feel something in my body, it's hard for me to find the right words to describe it.	1	2	3	4	5
12. It seems I am "running on automatic" without much awareness of what I'm doing.	1	2	3	4	5
13. When I have distressing thoughts or images, I feel calm soon after.	1	2	3	4	5
14. I tell myself that I shouldn't be thinking the way I'm thinking.	1	2	3	4	5
15. I notice the smells and aromas of things.	1	2	3	4	5
16. Even when I'm feeling terribly upset, I can find a way to put it into words.	1	2	3	4	5
17. I rush through activities without being really attentive to them.	1	2	3	4	5
18. Usually when I have distressing thoughts or images I can just notice them without reacting.	1	2	3	4	5
19. I think some of my emotions are bad or inappropriate and I shouldn't feel them.	1	2	3	4	5
20. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.	1	2	3	4	5
21. When I have distressing thoughts or images, I just notice them and let them go.	1	2	3	4	5
22. I do jobs or tasks automatically without being aware of what I'm doing.	1	2	3	4	5
23. I find myself doing things without paying attention.	1	2	3	4	5
24. I disapprove of myself when I have illogical ideas.	1	2	3	4	5

Note: If you are currently experiencing any distress, please contact the AUB Counseling Center (West Hall, room 210, ext. 3196) for free-of-charge counseling services. You

can also contact the Family Medicine Clinic (ext. 3000) or the Department of Psychiatry at AUBMC (ext. 5650) for appointments that qualify for student HIP coverage.

Appendix I

A Short Form of the Ruminative Response Scale (RRS)

(Treyner et al., 2003)

People think and do many different things when they feel depressed. Please read each of the items below and indicate whether you almost never, sometimes, often, or almost always think or do each one when you feel down, sad, or depressed. Please indicate what you generally do, not what you think you should do. How often do you...

	Almost Never	Sometime s	Often	Almost Always
1. Think "What am I doing to deserve this?"	1	2	3	4
2. Think "Why do I always react this way?"	1	2	3	4
3. Think about a recent situation, wishing it had gone better	1	2	3	4
4. Think "Why do I have problems other people don't have?"	1	2	3	4
5. Think "Why can't I handle things better?"	1	2	3	4
6. Analyze recent events to try to understand why you are depressed	1	2	3	4
7. Go away by yourself and think about why you feel this way	1	2	3	4
8. Write down what you are thinking and analyze it	1	2	3	4
9. Analyze your personality to try to understand why you are depressed	1	2	3	4
10. Go someplace alone to think about your feelings	1	2	3	4

Note: If you are currently experiencing any distress, please contact the AUB Counseling Center (West Hall, room 210, ext. 3196) for free-of-charge counseling services. You can also contact the Family Medicine Clinic (ext. 3000) or the Department of Psychiatry at AUBMC (ext. 5650) for appointments that qualify for student HIP coverage.

Appendix J

Levels of Self-Criticism Scale (LOSC)

(Thompson & Zuroff, 2004)

	Not at all						Very well
1. I am very irritable when I have failed.	1	2	3	4	5	6	7
2. I have a pressing sense of inferiority.	1	2	3	4	5	6	7
3. I am very frustrated with myself when I don't meet the standards I have for myself.	1	2	3	4	5	6	7
4. I am usually uncomfortable in social situations where I don't know what to expect.	1	2	3	4	5	6	7
5. I often get very angry with myself when I fail.	1	2	3	4	5	6	7
6. I don't spend much time worrying about what other people will think of me.	1	2	3	4	5	6	7
7. I get very upset when I fail.	1	2	3	4	5	6	7
8. If you are open with other people about your weaknesses, they are likely to still respect you.	1	2	3	4	5	6	7
9. Failure is a very painful experience for me.	1	2	3	4	5	6	7
10. I often worry that other people will find out what I'm really like and be upset with me.	1	2	3	4	5	6	7
11. I don't often worry about the possibility of failure.	1	2	3	4	5	6	7
12. I am confident that most of the people I care about will accept me for who I am.	1	2	3	4	5	6	7
13. When I don't succeed, I find myself wondering how valuable I am.	1	2	3	4	5	6	7

14. If you give people the benefit of the doubt, they are likely to take advantage of you.	1	2	3	4	5	6	7
15. I feel like a failure when I don't do as well as I would like.	1	2	3	4	5	6	7
16. I am usually comfortable with people asking me about myself.	1	2	3	4	5	6	7
17. If I fail in one area, it reflects poorly on me as a person.	1	2	3	4	5	6	7
18. I fear that if people get to know me too well, they will not respect me.	1	2	3	4	5	6	7
19. I frequently compare myself with my goals and ideals.	1	2	3	4	5	6	7
20. I rarely feel ashamed of myself.	1	2	3	4	5	6	7
21. Being open and honest is usually the best way to keep others' respect.	1	2	3	4	5	6	7
22. There are times that it is necessary to be somewhat dishonest in order to get what you want.	1	2	3	4	5	6	7

Note: If you are currently experiencing any distress, please contact the AUB Counseling Center (West Hall, room 210, ext. 3196) for free-of-charge counseling services. You can also contact the Family Medicine Clinic (ext. 3000) or the Department of Psychiatry at AUBMC (ext. 5650) for appointments that qualify for student HIP coverage.

Appendix K

General Self-Efficacy Scale – 12 Item (GSES-12)

(Bosscher & Smit, 1998)

	Not at all true	Barely true	Moderately true	Exactly true
1. If something looks too complicated, I will not even bother to try it.	1	2	3	4
2. I avoid trying to learn new things when they look too difficult.	1	2	3	4
3. When trying to learn something new, I soon give up if I am not initially successful	1	2	3	4
4. When I make plans, I am certain I can make them work.	1	2	3	4
5. If I can't do a job the first time, I keep trying until I can.	1	2	3	4
6. When I have something unpleasant to do, I stick to it until I finish it.	1	2	3	4
7. When I decide to do something, I go right to work on it.	1	2	3	4
8. Failure just makes me try harder.	1	2	3	4
9. When I set important goals for myself, I rarely achieve them.	1	2	3	4
10. I do not seem capable of dealing with most problems that come up in my life.	1	2	3	4
11. When unexpected problems occur, I don't handle them very well.	1	2	3	4
12. I feel insecure about my ability to do things.	1	2	3	4

Note: If you are currently experiencing any distress, please contact the AUB Counseling Center (West Hall, room 210, ext. 3196) for free-of-charge counseling services. You can also contact the Family Medicine Clinic (ext. 3000) or the Department of Psychiatry at AUBMC (ext. 5650) for appointments that qualify for student HIP coverage.

Appendix L

Information Sheet

Thank you for participating in the study.

If you have questions about this research study, or if you are interested in learning about the outcome of the study, you may contact Dr. Fatimah El Jamil, fa25@aub.edu.lb, +961-1-350000 ext. 4372 or Batoul Safieddine, brs09@mail.aub.edu.

If you have any questions about research or your rights as a participant, you may contact the Social and Behavioral Sciences Institutional review Board (SBSIRB) at AUB: 01- 350 000 ext. 5445 or 5454 or irb@aub.edu.lb

If any information in the survey made you upset and you think you need to talk to someone, please contact the please contact the AUB Counseling Center (West Hall, room 210, ext. 3196) for free-of-charge counseling services. These services are confidential and anonymous. You can also contact the Family Medicine Clinic (ext. 3000) or the Department of Psychiatry at AUBMC (ext. 5650) for appointments that qualify for student HIP coverage.

To gain your 1% extra credit, please write down your code (as below) and give it to your PSYC 101/201 instructor. This code will not link your responses to you.

Appendix M

Consent Form for Students Participating in Pilot Testing of a Research Project

Project Title: The Relation between Mindfulness and Depression among University Students in Lebanon

Investigator: Dr. Fatimah El Jamil

Address: American University of Beirut, Jesup 101

Phone: 01- 350 000, ext. 4372

Email: fa25@aub.edu.lb

Co-Investigator: Batoul Safieddine, MA Candidate in Clinical Psychology

Email: brs09@mail.aub.edu

Dear participants, we would like to invite you to participate in a piloting testing of Master's thesis research study conducted at the American University of Beirut. The study seeks to examine the relationship between mindfulness and depression. Mindfulness refers to the processes of paying attention to one's experience, nonjudgmentally, in the present moment. Depression is a mental health disorder that impacts the moods of individuals. The relationship between mindfulness and depression will be examined in relation to cognitive variables such as rumination, self-criticism, and general self-efficacy.

The pilot testing will be conducted to estimate the time needed to complete all questionnaires and to assess for participants' comprehension of the scales and ease in filling the scales.

We are targeting undergraduate students to take part in this study. To participate, you must be between 18 and 25 years of age. Participants who are under 18 years or above

25 years will be excluded from the study. Participants who are enrolled in PSYC 101/201 classes will be excluded.

As a research participant, you will be asked to read this consent form and respond to a questionnaire. We will be asking 10 participants to complete the study questionnaire. Your participation in this research will take no more than one hour. This is a one-off survey.

All of the data collected will be treated in the strictest **confidence** and only the primary investigator and the co-investigator will have access to it. To ensure **anonymity**, no direct identifying information will be recorded; you will not be asked to give us your name. All data from the study will be maintained on the co-investigator's password-protected computer for a period of three years after which it will be deleted. Records may be audited by the IRB while assuring confidentiality.

Your participation is **voluntary**, you have the right to refuse to participate and to withdraw from the study or discontinue your participation at any time without giving a reason and with no penalties. Your refusal to participate in this study will not affect your relationship with AUB and will not result in the loss of benefits.

The results of the study will allow filling the gaps in the literature on the cognitive model through which mindfulness influences depression. To our knowledge, there are no studies that have examined mindfulness and depression together among individuals in the Arab world. There is no monetary reward for participating in this study.

This study might cause emotional distress. Some of the questions in the survey are sensitive in nature. If you think that you need talk to someone about your feelings, please visit or contact Counseling Center at AUB West Hall, which provides free counseling services to students. Their number is 01-350 000 ext. 3196. You can also

contact the Family Medicine Clinic (ext. 3000) or the Department of Psychiatry at AUBMC (ext. 5650) for appointments that qualify for student HIP-coverage. If at any time and for any reason you prefer not to answer any questions, please feel free to skip them.

If you have questions about this research study, or if you are interested in learning about the outcome of the study, you may contact **Dr. Fatimah El Jamil**, fa25@aub.edu.lb, +961-1-350000 ext. 4372 or Batoul Safieddine, brs09@mail.aub.edu.

If you have any questions about research or your rights as a participant, you may contact the Social and Behavioral Sciences Institutional Review Board (SBSIRB) at AUB: 01- 350 000 ext. 5445 or 5454 or irb@aub.edu.lb

If you accept the above statements and are willing to participate in this study, please press the ACCEPT button below.

THANK YOU FOR YOUR COOPERATION