

AMERICAN UNIVERSITY OF BEIRUT

THE RELATION BETWEEN ACT PROCESSES AND
POSTTRAUMATIC STRESS AND GROWTH IN LEBANON

by
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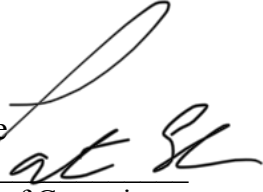
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ABSTRACT

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Acceptance and commitment therapy (ACT) is a third wave behavioural intervention which comprises of six components including acceptance, defusion, self-as-context (SAC), committed action (CA), values, and mindfulness, all of which also fall under the term of psychological flexibility (PF) (Ren et al., 2019). PF, the core treatment outcome of ACT, refers to one's ability to stay in the present moment, to experience unwanted internal thoughts and feelings, and to consciously adjust actions in line with one's goals and values, rather than give up or engage in maladaptive behaviors (Meyer et al., 2019; Yu, Norton, & McCracken, 2017). PF has been studied in relation to posttraumatic outcomes including post-traumatic stress (PTS) and growth (PTG). However, there is a dearth of empirical research investigating the components of psychological flexibility separately in relation to these outcomes of trauma (Scott, McCracken and Norton, 2016). The aims of the study were to investigate the influence of each of the 6 ACT components on posttraumatic growth and stress in Lebanon. This was the first study that examined the six components separately in relation to PTS and PTG. One hundred seventy-seven Lebanese participants participated in the present study from the general community and AUB. A hierarchical multiple regression analysis was conducted to examine the association between the 6 ACT components, PTS and PTG, while controlling for income and gender. Results of the hierarchical multiple regression indicated that among the six predictors, only committed action, self as context, and values were found to be significant predictors of post-traumatic growth, and low acceptance and mindfulness were found to be significant predictors of post-traumatic stress. The findings emphasize the importance of targeting these factors when tackling and providing interventions that address traumatized population in Lebanon.

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CHAPTER I

INTRODUCTION

ACT is a ‘third wave’ behavioral therapy that was developed in 1989 (Hayes et al. 1989), following nearly a decade of research that supported its primary mechanisms of change. ACT encompasses the following six components: acceptance, cognitive defusion, being present, self-as-context, values, and committed action which together are presumed to comprise psychological flexibility (PF) (Hayes et al. 1989).

Psychological flexibility (PF) is a term that emerged in the ACT clinical literature to highlight one’s ability to remain active and committed to one’s values and goals even in the face of distress, burden, illness, or pain. The capacity to become psychologically flexible promises that human beings can withstand difficulty without succumbing to feelings of helplessness and hopelessness. Hayes et al. (2006) defined psychological flexibility as the capacity to stay in the present moment, to experience unwanted internal processes, and to consciously adjust actions in line with one’s goals and values, rather than give up or engage in maladaptive behaviors (Meyer et al., 2019; Yu, Norton, & McCracken, 2017). Therefore, PF is the core treatment outcome of Acceptance and Commitment Therapy (ACT) (Richardson & Jost, 2019) such that when a patient with trauma history is undergoing ACT therapy, their PF is expected to improve.

Following the conclusion that tackling the different ACT components in therapy would improve PF, researchers were further interested in understanding PF’s relationship, and by extension the 6 ACT components, to a number of clinical outcomes including depression, anxiety, posttraumatic stress and growth. Generally, research has demonstrated that psychological flexibility was associated with lower psychological distress including depression (Meyer et al., 2019; Richardson & Jost, 2019) and anxiety

(Masuda & Tully, 2012). For example, Yasinski et al. (2019) suggested that facilitating PF was associated with decreased depressive symptoms in treatment-resistant depressed patients. In trauma patients, PF was associated with lower post-traumatic stress (Dutra & Sadeh, 2018; Richardson & Jost, 2019; Meyer et al., 2019), and higher post-traumatic growth (Boykin, Anyanwu, Calvin, & Orcutt, 2019; Kashdan & Kane, 2011).

Limitations in the literature were noted nonetheless. For example, PF was measured directly by using the Acceptance and Action Questionnaire (AAQ-II) or the Psychological Flexibility Inventory (PFI). The AAQ II, the most commonly used PF measure, was criticized for having validity problems and for ignoring the ‘value’ component which is an integral element in ACT (Doorley, Goodman, Kelso, & Kashdan, 2020). As to PF, it was generally measured by choosing specific ACT components but not others, without presenting a clear rationale behind this (Åkerblom, Perrin, Rivano Fischer, & McCracken, 2018; Ren et al., 2019). To date, no studies have explored the impact of values on PTS or PTG (Doorley, Goodman, Kelso, & Kashdan, 2020). This study aims at examining the relationship between each of the ACT components on the one hand and PTS and PTG on the other hand in a sample of traumatized Lebanese participants.

CHAPTER II

LITERATURE REVIEW

After introducing ACT and PF, this section will review the current literature on the relationship between PF on the one hand and posttraumatic stress and growth on the other hand. It will then delve into the literature related to each of the six ACT processes. Specifically, studies that examine the relationship between each of the ACT processes on the one hand and PTS and PTG on the other hand will be reviewed. This will pave the grounds for highlighting the hypothetical framework for this study.

A. Psychological Flexibility and ACT

Though Acceptance and Commitment Therapy (ACT) is a ‘third wave’ behavioral therapy that was developed in 1989 (Hayes et al. 1989), which primarily targets the inflexibility underlying experiential avoidance. The latter is the reluctance to experience particular unwanted thoughts, feelings, and bodily sensations, which further inhibits value-driven and goal-directed behavior. Hence, ACT works by creating a conscious contact with the present and identifying actions according to a set of determined goals. It also promotes accepting what the person cannot control, including thoughts and feelings, and encourages the person to choose value-directed behaviors (Kashdan & Kane, 2011).

The ACT clinical literature introduced Psychological flexibility (PF) as the term to highlight one’s ability to remain active and committed to one’s values and goals even in the face of distress, burden, illness or pain. Moreover, PF is the core of ACT (Meyer et al., 2019; Richardson & Jost, 2019) and it is conceptualized as the ability to adapt to

situations through fully accepting and experiencing ongoing thoughts and unwanted emotions following a stressor (Richardson & Jost, 2019), and by flexibly adjusting and shifting one's behavior in accordance to different conditions, while relying on a framework of values (Meyer et al., 2019). PF and ACT are used interchangeably in the literature, as PF is thought to include the six ACT components: 1) acceptance of unwanted thoughts and feelings, 2) cognitive defusion, defined as the ability to perceive thoughts as experiences and to separate oneself from those thoughts, 3) self-as-context or allowing the individual to observe personal experiences without over-identifying with them, 4) awareness of the present through the bodily senses, 5) identification of core values, and 6) committed actions that align with one's values (Ren et al., 2019). These six different processes are presumed to be important for the understanding of mental health, psychological illnesses, and recovery in therapy (Gloster, Klotsche, Chaker, Hummel, & Hoyer, 2011).

B. Psychological Flexibility and Post-Traumatic Stress

Psychological trauma was defined as experiencing an extreme stressor that deteriorates one's emotional or physical well-being. A trauma can overwhelm a person's capacity to cope and cause a range of feelings including distress and helplessness (Ruglass & Kendall-Tackett, 2014). Traumatic events do not only involve a threat to one's life or safety. For instance, any event that one could subjectively experience as emotionally overwhelming could be considered traumatic, such as being bullied during childhood or adolescence, the death of a parent, sibling, or close friend, severe rejection or failure in a relationship... Trauma can shatter one's sense of self and core beliefs, impact one's appraisal of themselves and others, and increase emotional

distress (Boykin, Anyanwu, Calvin, & Orcutt, 2019). In addition, individuals can develop post-traumatic stress disorder (PTSD) as a result of trauma. In the DSM 5, symptoms of PTSD comprise of four categories: negative internal experiences such as intrusive memories known as flashbacks, physiological hyper-arousal, avoidance of traumatic stimuli and symptoms relating to alterations in negative cognitions and mood.

PF has been the target of several recent studies aimed to improve functioning in people experiencing physical and mental health challenges associated to posttraumatic stress (Boykin, Anyanwu, Calvin, & Orcutt, 2019; Meyer et al., 2019). Studies also investigated PF as a protective factor against psychological problems and relational difficulties in individuals who were negatively impacted by early life traumas (Richardson & Jost, 2019). For example, Meyer et al. (2019) studied PF, personality traits and trait resilience in relation to resilience, which was operationalized as a 'lower than expected severity level' of PTSD after trauma. Results showed that only PF turned out to be a significant predictor of PTSD resilience, aside from the baseline severity of PTS. Therefore, interventions that enhance PF to promote resilience may be useful for trauma survivors. Furthermore, Richardson and Jost (2019) investigated PF, early life trauma (ELT) and their negative psychological consequences (depression, anxiety, substance abuse, and PTSD) in a sample of undergraduate participants who have experienced at least one traumatic event before the age of 18. Results showed that a higher PF level was associated with lower levels of depression and PTSD symptoms.

Dutra and Sadeh (2018) examined whether PF could decrease one's tendency to act rashly in distressful situations, which is a personality trait known as negative urgency, in a sample of 93 trauma-exposed male veterans. They hypothesized that at high levels of PF, PF moderates the relationship between negative urgency and

externalizing behavior by decreasing the effect of negative urgency on externalizing behavior (such as substance abuse). Results confirmed that when PF was high, negative urgency has a weaker effect on externalizing behaviors. When individuals resort to aggressive behavior as an attempt to regulate trauma related negative emotions, PF could be a helpful target in therapy. For instance, PF comprises one's ability to hold negative feelings such as anger, staying in the present moment, not behaving impulsively, and remaining committed to values-committed actions during distress (Dutra & Sadeh, 2018).

Furthermore, Åkerblom, Perrin, Rivano Fischer, and McCracken (2018) were interested in studying the mediating role of PF on the relationship between PTSD and chronic pain. Instead of measuring PF directly, researchers measured its components (by measuring cognitive fusion, pain acceptance, committed actions, and values-based actions) and chronic pain (by measuring pain severity and pain interference) in a sample of 315 adults with trauma history who were seeking treatment for chronic pain, with and without PTSD. Researchers did not mention why they resorted to these specific ACT components and not others to measure PF. They expected that participants with PTSD would show increased chronic pain, and decreased PF, while those without PTSD would show the opposite results (decreased chronic pain and increased PF). Results were consistent with the hypotheses and revealed that pain-related acceptance, committed action, and cognitive fusion were significant and separate mediators of the relationship between PTSD and chronic pain (indicated by pain severity and pain interference). Yet, values-based action did not show any significant mediating effect. Overall, the present results suggest that lower levels of acceptance and committed

action and higher levels of cognitive fusion lead to increased pain severity and pain interference in people with PTSD.

C. Psychological Flexibility and Post-Traumatic Growth

PF was not only studied in relation to posttraumatic stress symptoms, but also in service of promoting growth. PTG was defined historically as ‘benefit-finding’ and ‘stress-related growth’ (Jayawickreme & Blackie, 2014). The most dominant model, developed by Tedeschi and Calhoun (Jayawickreme & Blackie, 2014), conceptualizes PTG as a positive change that occurs after trauma in five distinct domains: life satisfaction, relationships, personal strength, spirituality, and recognition of new paths in one’s life. The importance of experiencing stress after a trauma to promote growth is supported in the literature (Hijazi, Keith, & O'Brien, 2015; Joseph, Murphy, & Regel, 2012; Kashdan & Kane, 2011). In other words, the degree to which a trauma challenges the person to re-examine his or her core beliefs, determines the likelihood of developing PTG (Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012).

Studies have shown that increased PF predicted greater reported posttraumatic growth (PTG) (Boykin, Anyanwu, Calvin & Orcutt, 2019; Kashdan & Kane, 2011). Kashdan and Kane (2011) studied the moderating role of experiential avoidance (EA) conceptualized in their study as the lack of psychological flexibility, in relation to posttraumatic reactions. The researchers measured EA using the Acceptance and Action Questionnaire (AAQ) among 176 college students who reported at least one traumatic event. They suggested that individuals who showed high posttraumatic stress and high PF (low EA) were more prone to developing higher posttraumatic growth. Similarly, high posttraumatic stress along with low PF (high EA), was associated with decreased

growth and well-being. Results suggested that the trauma aftermath depended on the degree to which people relied on EA to deal with their posttraumatic distress, which is congruent with the proposed hypotheses. Thus, when trauma survivors showed flexibility and openness to unwanted thoughts, feelings, and physical sensations, they were more likely to experience growth after trauma.

Boykin, Anyanwu, Calvin and Orcutt (2019) also studied the moderating effect of PF on event centrality, in relation to PTS and PTG. In other words, researchers examined whether differences in PF levels could alter posttraumatic outcomes, including growth, as event centrality increased. Using the Acceptance and Action Questionnaire (AAQ) to measure PF, researchers found that increased PF predicted greater PTG, in a population of 125 college students with history of highly centralized traumatic incidents. Only this and Kashdan and Kane's study (2011) highlighted the role of PF in relation to perceived PTG after trauma.

D. Measuring PF

The PF's most widely used measure, the Acceptance and Action Questionnaire (AAQ-II), has been criticized for its many limitations (Boykin, Anyanwu, Calvin, & Orcutt, 2019; Doorley, Goodman, Kelso, & Kashdan, 2020; Meyer et al., 2019). For instance, the AAQ-I was initially developed to measure experiential avoidance. Its updated version (the AAQ-II) still showed validity problems as it is highly correlated with other measures of psychological distress. Most importantly, even though the AAQ-II claims to cover the six ACT components, it does not assess one's response to distress in an action-based value context, even though it includes an element tackling values, without directly referring to context sensitivity ("my painful experiences and memories

make it difficult for me to live a life that I would value”) (Doorley, Goodman, Kelso, & Kashdan, 2020). In other words, it does not address how one’s behavior may be flexible to change depending on the context (Meyer et al., 2019). The same limitation applies to another PF measure, the Multidimensional Psychological Flexibility Inventory (PFI) which mentions values abstractly but without reference to pursuing a valued goal either (e.g., “Negative experiences derailed me from what's really important”) (Doorley, Goodman, Kelso, & Kashdan, 2020).

Therefore, the current measures of PF present with multiple challenges. As a broad construct that captures several core processes of flexibility, the current assessment tools of PF are deemed insufficient because of their falling short of covering all components of PF (Dutra & Sadeh, 2018; Meyer et al., 2019; Richardson & Jost, 2019). Specifically, the value component was consistently ignored, which is crucial to explain why respondents would intend to be flexible when facing distress rather than sticking to maladaptive and rigid behaviors (Doorley, Goodman, Kelso, & Kashdan, 2020).

E. ACT Core Processes

More recent studies examined the individual ACT components, rather than the 6 components simultaneously, in relation to psychological distress and mental health, to further understand the impact of the separate underlying processes of ACT (Levin, Hildebrandt, Lillis, & Hayes, 2012).

1. Acceptance

Acceptance is a component of the PF model that focuses on allowing our feelings and thoughts to come and go as they are. It encourages us to open up and make room for these experiences, rather than struggle with them (Harris & Hayes, 2019). Acceptance comprises abandoning maladaptive ways to alter internal events or control them by being experientially and fully open to the present moment (Kollman, Brown, & Barlow, 2009). Acceptance was also conceptualized as the willingness to experience pain and discomfort, when change attempts don't work (Vowles, Sowden, & Ashworth, 2014), and to acknowledge and deal with unwanted internal feelings, thoughts, and physical experiences (Scott, McCracken, & Norton, 2016). In the context of trauma, acceptance is considered to be a significant component of PF- meaning that when targeted in therapy, it could directly promote change in the frequency or intensity of distressing internal experiences (Levin, Hildebrandt, Lillis, & Hayes, 2012). Contrary to acceptance, experiential avoidance was defined as the avoidance of internal experiences including one's emotions, bodily sensations, thoughts, and memories.

In the literature, many studies have highlighted the role of ACT acceptance, in relation to stress (Grau, McDonald, Clark, & Wetterneck, 2020; Thompson, Arnkoff, & Glass, 2011) and growth (Kashdan & Kane, 2011) after trauma, depression (Dinis, Carvalho, Pinto Gouveia, & Estanqueiro, 2015) and alcohol use (Meyer et al., 2018).

Marx and Sloan (2005) investigated the relation between PTSD symptoms (dissociation) and experiential avoidance. The sample comprised of 185 college students who were assessed at the initiation of the study as a form of baseline, then 4 weeks later. They filled self-reported surveys measuring PTSD symptoms, experiential avoidance, and retrospective reports of peritraumatic dissociative experiences.

Regression analysis showed that PTSD symptoms at baseline could be predicted by both the experiential avoidance and peritraumatic dissociation. This study highlights the role of experiential avoidance in predicting PTSD symptoms. However, participants' PTSD severity levels were low which limits the study, in addition to the use of self-report measures (Marx & Sloan, 2005).

Likewise, Grau, McDonald, Clark, and Wetterneck (2020) measured experiential avoidance, along with two ACT processes (cognitive fusion and valued living) in relation to PTSD and depressive symptoms, in a sample of 272 traumatized patients. Results supported the positive association between the severity of PTSD symptoms presentation and EA. This shows that an increased acceptance of negative life events is related to less severe PTSD symptoms. The researchers also assessed the effect of the three separate ACT processes on stress. Results showed that EA was the most significant and stable predictor of PTSD symptom severity and depression, above and beyond both CF and valued living (Grau, McDonald, Clark, & Wetterneck, 2020).

Experiential avoidance was also studied in relation to depression. For instance, Dinis, Carvalho, Pinto Gouveia, and Estanqueiro (2015) measured EA, in addition to cognitive fusion, in relation to shame memories and depressive symptoms in a sample of 181 participants from the general population. Results indicated that experiential avoidance mediated the relationship between memories of early shame experiences with caregivers and depressive symptoms. As per the ACT approach, inappropriate behaviors and verbal processing would promote the reluctance to face one's private experiences which leads to psychopathology and highlights the role of experiential avoidance. This supports the researchers' predictions and suggests that cognitive fusion would influence depression through experiential avoidance. In other words, the unwillingness to

acknowledge and face internal processes such as the thoughts, feelings and memories, and the efforts one put to avoid them, would exacerbate the psychopathology (Dinis, Carvalho, Pinto Gouveia, &Estanqueiro, 2015).

Experiential avoidance was also investigated in relation to growth after trauma and conceptualized the same as the lack of psychological flexibility (Kashdan & Kane, 2011). Researchers collected their data from a sample of 176 college students who were exposed to at least one traumatic event. Participants were recruited through an online advertisement, and were asked to complete surveys measuring their EA, PTG and posttraumatic distress symptoms. Results showed that in the absence of EA, distress and growth were positively correlated. However, in the presence of EA, PTS was linked to less growth (Kashdan & Kane, 2011). This study highlights the role that EA plays as a moderator to posttraumatic outcomes and suggests that low EA, and therefore high acceptance, could serve as a catalyst for finding benefit after hardships, and as a link that explains when distress could lead to either adaptive or maladaptive results (Kashdan & Kane, 2011).

2. Event Centrality, Decentering and Self-As-Context

Self-as-context (SAC) is the part of the mind that neither thinks, feels nor analyzes, but notices and observes (Harris & Hayes, 2019). SAC is one's experience of taking a perspective, from which to observe a psychological experience from a distance (Yu, Norton, & McCracken, 2017). A major feature of SAC is called 'decentering', which is the ability to 'distance' from one's personal experiences (Yu, Norton, & McCracken, 2017). In the context of trauma, SAC is important in that it allows 'decentralization' of the traumatic incident from the individual's perceived identity.

Researchers showed that enhancing PF reduced event centrality by facilitating ‘decentralization’ of the trauma from the individual’s identity, and by broadening their self-concept. On the other hand, event centrality is the extent to which a traumatic event is fused with one’s perception of the world, and to his or her own identity. Thus, event centrality and self-as-context (SAC) are two constructs that are negatively associated (Boals & Murrell, 2016), and that have been studied in relation to PF and trauma outcomes (Boykin, Anyanwu, Calvin, & Orcutt, 2019). Moreover, event centrality significantly predicts PTSD symptoms (Boykin, Anyanwu, Calvin, & Orcutt, 2019; Boals & Murrell, 2016).

In the literature, there were no studies that directly measured SAC in relation to outcome variables; researchers either measured event centrality (Boykin, Anyanwu, Calvin, & Orcutt, 2019; Boals & Murrell, 2016) or defusion (Luciano et al., 2011) to tap into SAC due to the lack of measures to assess this ACT component. However, such measures exist now through the Self-Experience Questionnaire (Yu, McCracken, & Norton, 2016). For instance, Yu, McCracken, and Norton (2016) examined the association between SAC in people with chronic pain undergoing ACT treatment, and outcome variables including pain intensity and pain acceptance, pain related interference, work and social adjustment and depression. Results showed that ACT treatment was associated with increased SAC, and changes in the latter were also associated with changes in all outcome variables except for pain intensity and pain acceptance. This also supports the researchers’ hypothesis on a positive association between SAC and wellbeing (Yu, McCracken, & Norton, 2016).

In a trauma intervention study by Boals and Murrell (2016), researchers were interested in SAC among other components of PF because it directly addresses ‘event

centrality'. Participants with trauma history were divided into two groups that received treatment as usual (TAU) or ACT sessions that were heavily focused on achieving SAC. Researchers were interested in measuring PTSD symptoms and event centrality as primary outcomes and depression as a secondary outcome. Results showed that participants who received the SAC focused ACT sessions reported less symptoms of PTSD, depression, and less event centrality. On the other hand, event centrality was not affected by the TAU alone. This suggested that ACT sessions that emphasized the SAC component affected the way individuals with trauma perceive and understand themselves as separate from their traumatic experience, which is consistent with the literature supporting the role of event centrality, hence SAC, in relation to PTSD. However, more research is still needed to support the causality between the two variables, considering the limitations of this study. For example, random assignment was not applied, thus differences in the results could be due to preexisting individual differences among participants such as having high SAC levels prior to the intervention.

Moreover, Boykin, Anyanwu, Calvin, and Orcutt (2019) investigated the moderating effect of PF on event centrality in relation to PTS and PTG. Researchers also believed that event centrality is conceptually similar to the SAC component of ACT, in a way that increasing PF would reduce event centrality by facilitating decentralization, a major component of SAC. Results supported the researchers' predictions by showing that lower PF was associated with higher PTS as event centrality increased on one hand. On the other hand, results did not show a significant interaction between event centrality and PF on the PTG levels, however each variable alone predicted greater PTG. Only this study, in addition to Kashdan and Kane study

(2011) showed the effect of PF on PTG. Yet, researchers did not directly measure SAC, and they relied on the AAQ-II which has been criticized as a measure for PF.

The present study is the first to measure SAC directly in relation to stress and growth after trauma.

3. *Committed Action*

Committed action, a third component of PF, comprises the ability to commit to behaviors despite hardship, distress, or pain. Individuals are often able to commit to actions they may find difficult if they are directed by specific values and goals, and, if the behaviors are ineffective in achieving those goals, the behaviors are then altered (McCracken, 2013). These behavioral patterns are persistent and flexible; they integrate the willingness to identify failure and experience discomfort, along with the ability to shift into a goal focused strategy and to do what it takes to have a meaningful life (Harris & Hayes, 2019). Committed action was studied and found to have a negative relationship with shame and depression (Ferreira, Marta-Simões, Trindade, & Mendes, 2017), self-reported procrastination (Gagnon, Dionne, & Pychyl, 2016) chronic pain (McCracken, 2013; O'carroll, Godfrey, & Wileman, 2017), experiential avoidance and anxiety (Coutinho, Trindade, & Ferreira, 2019).

For example, McCracken's (2013) study of CA in a group of individuals with chronic pain found that CA contributed significantly to depression, social functioning, mental health, vitality, and general health which only emphasized the role of Committed Action component of the PF model. However, there are no studies that examine the relationship between committed action and PTS or PTG.

4. Mindfulness

Mindfulness, also referred to as being in the ‘present moment’ is an ACT process that focuses on teaching the individual to stay grounded in ‘the here and now’ (Germer, Siegel & Fulton, 2013). It directs one’s ability to be aware of his or her present moment, rather than being stuck in the past or worrying about the future (Harris & Hayes, 2019). Mindfulness was associated with successful therapeutic interventions for anxiety, psychological distress, depression, and trauma (Germer, Siegel, & Fulton, 2013). It has also been studied in relation to spirituality (Garland et al. 2007), and personal strength (Kurash & Schaul, 2006). The construct of mindfulness has been studied as either a state (i.e., a state of awareness) or as a trait (i.e., a dispositional tendency that one could develop through practice; Hanley et al., 2015). ACT theorists operationalized mindfulness along five facets: (1) observing one’s internal and external experiences, (2) describing and labelling emotions, (3) acting with awareness and focusing on one thing at a time, (4) accepting the present moment and the experiences it brings without judgment, and (5) nonreactivity to aversive thoughts and emotions (Hanley et al., 2015; Walser & Hayes, 2006).

Chopko & Schwartz (2013)’s study on the relation between mindfulness and posttraumatic stress showed that mindfulness was a significant predictor of PTS. This was done using the Kentucky Inventory of Mindfulness Skills (KIMS), an assessment designed to measure mindfulness dimensions such as ‘observing’, ‘describing’, ‘acting with awareness’, and ‘accepting without judgement’ in a sample of 183 police officers. In specific, the ‘accepting without judgment’ component of mindfulness was the most significant predictor of traumatic stress symptoms, such as less severe PTSD intrusion, avoidance, and hyperarousal symptoms. Researchers also showed that accepting

without judgment and mindfulness-related acting with awareness are both predictors of intrusion symptoms. In terms of therapy, non-judgmental acceptance helps trauma-exposed patients deal with judgmental feelings that usually occurs after a trauma, such as shame and guilt.

In terms of growth, Hanley et al. (2015) investigated mindfulness amongst 313 American adults registered to a crowd-sourcing website called Mechanical Turk (MTurk) – a website that compensates participants (10 to 15 cents) who complete online tasks. Participants completed online self-report measures of mindfulness, PTG, and trauma history. Then, they were asked if they are involved in contemplative practice (such as mindfulness meditation and yoga) or not. The individuals were then split into contemplative practitioners (65) and non-practitioners (248). Researchers hypothesized that the association between mindfulness and PTG will differ between participants with contemplative practices and those without. They also predicted that the association between mindfulness and PTG will be stronger for the contemplative group compared to the non-contemplative group. Results showed that contemplative practitioners showed higher levels of trait mindfulness and PTG. More specifically they demonstrated stronger associations between mindfulness and three specific PTG dimensions (life appreciation, new possibilities, and relating to others). Furthermore, the mindfulness dimensions of nonreacting, nonjudging, and acting with awareness also showed strongest associations with the PTG outcomes. Hanley et al. (2015) study contributes to the literature exploring mindfulness and PTG, and investigating the differences between contemplative and non contemplative practices, however many limitations were present. For instance, the number of contemplative practitioners (65) was significantly lower than the number of practitioners (248). Moreover, Mturk

participants do not represent the general population due to financial strain consideration, since they are paid to be part of the study, and they need to be computer literate

Likewise, Lianchao and Tingting (2020) investigated the relationship between mindfulness and PTG and predicted a mediatory role of rumination in this relationship. In a sample of 309 Chinese cancer patients, they measured intrusive rumination, which refers to the negative traumatic thoughts intruding the person's thinking. They also measured deliberate rumination, which refers to purposely retesting the events and pursuing meaning in the trauma. Results supported the positive association between mindfulness and PTG, and showed that only deliberate rumination mediated the relationship between mindfulness and PTG. As deliberate rumination allows individuals to reconstruct their understanding of the trauma and find a positive meaning in their suffering, it promotes self-growth and facilitates the development of PTG (Lianchao & Tingting, 2020). Even though this study supports previous research on mindfulness and PTG (Hanley et al., 2015), it targets Chinese cancer patients, which could limit the generalization of the results to other non-clinical trauma population.

Overall, only one study investigated mindfulness in relation to PTG. And research showing a significant association between mindfulness and PTS presented with several limitations, such as having a small sample size, and not including the other ACT components. The current study will investigate mindfulness in relation to PTS and PTG, in the presence of the other five ACT components.

5. Cognitive Defusion

Cognitive defusion is defined as one's ability to observe the thought as it is, rather than fusing with it. This process highlights the individual's ability to differentiate

between the content of the thoughts, good or bad, without identifying or sticking to them (Harris & Hayes, 2019; Walser & Hayes, 2006). Cognitive fusion was measured as the flip side of the core therapeutic process of ACT defusion (Harris & Hayes, 2019). In fact, when cognitively fused with beliefs, individuals will struggle to accept, observe, and assess their internal and external experiences, hindering their ability to label their thoughts and emotions, which in turn will dominate their behaviors (Cox, Motl, Bakker & Lunt, 2018). In the literature, researchers used the Cognitive Fusion Questionnaire (CFQ) to measure cognitive fusion (Basharpoor, Mehri Mowlaie, & Sarafrazi, 2020; Cox, Motl, Bakker & Lunt, 2018; Nitzan-Assayag et al., 2017).

De Young et al. (2010) investigated a cognitive defusion technique (i.e., the word repeating technique; WRT) in relation to emotional discomfort. This technique asks participants to repeat the word until it loses its meaning to the extent where negative self-referential words resulted in a decreased negative emotional impact. They showed that reduction of discomfort ratings was significantly greater in the WRT group than that of the control group. Similarly, Masuda, Feinstein, Wendell, and Sheehan (2010) showed that cognitive defusion could effectively reduce emotional discomfort and the believability of difficult self-referential thoughts among participants with depression.

Cox, Motl, Bakker and Lunt, (2018) studied the association between cognitive fusion, emotion dysregulation (especially, emotional nonacceptance and emotional non-clarity), and post-trauma functioning in trauma-exposed veterans. Results showed that cognitive fusion was associated with reduced emotional clarity and impaired emotional acceptance. Therefore, being cognitively fused with maladaptive thoughts and beliefs and seeing them as reality will hinder one's ability to accomplish goals (Hayes, 2004).

However, having higher defusion levels would help individuals deal with the difficult internal experiences (i.e., being able to accept the anxiety symptoms associated with PTSD) without the urge to avoid or eliminate them.

In addition, Nitzan-Assayag et al., (2017) studied the effect of cognitive defusion on PTS in a general community-sample of adults who were exposed to traumatic events. Researchers measured cognitive fusion, as the flip side of cognitive defusion. In other words, higher cognitive fusion indicated lower cognitive defusion. Results showed that lower levels of cognitive fusion significantly predicted lower levels of PTS. However, this study presented a small sample size of 38 adults, limiting the results' generalizability. Moreover, the traumatic event was not necessarily traumatizing to all of the participants. Hence, further research should examine these variables in a larger traumatized population of adults.

To our knowledge, no studies had actually investigated cognitive defusion in relation to PTG, until recently, when Basharpour, Mehri Mowlaie and Sarafrazi (2020) showed that cognitive fusion mediates the relationship between distress tolerance and PTG in a sample of 190 Iranian individuals who experienced childhood abuse. The results found a positive correlation between distress tolerance and self-compassion with PTG along with a negative correlation with cognitive fusion. The model was then applied to determine whether self-compassion and distress tolerance predicted PTG through cognitive fusion. It was thus found that cognitive fusion mediated the relationship between distress tolerances and PTG. Even though this study added to the literature as it is the first to examine the mediating role of cognitive fusion in the relationships of distress tolerance and self-compassion with PTG, yet a few limitations should be highlighted. For example, the number of female participants are almost the

double of the male participants, which could have impacted the results knowing that females tend to develop PTG more than males after trauma (Morris and Shakespeare-Finch, 2011; Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010). Even though the researchers targeted participants with childhood abuse experience, other traumatic experiences were also present, and not accounted for, such as emotional, physical and sexual abuse which could limit the generalizability of the results to other groups.

6. Values

Values are preferred qualities of ongoing action. In other words, this ACT process emphasizes one's ability to know his/her goals and prospects. Values give us direction and guide our actions and decisions to create a meaningful life (Harris & Hayes, 2019). ACT values-based actions have been also found to be effective in reducing pain intensity. Vowles and McCracken (2008) studied ACT processes including the efficacy of interventions focusing on values in the treatment of chronic pain patients. Results revealed that the sample exhibited significant reductions in depression, pain-related anxiety, and disability, and improved in physical performance after the ACT values focused interventions. In addition, values-based action was found to significantly improve over the three months' period.

While there are many studies that have investigated the effect of values on psychological distress (Cresswell et al., 2005; McCracken and Yang, 2006), no studies have explored the impact of values or values work on PTG. Valued living was investigated in relation to PTSD symptoms, depression and quality of life along with two other ACT processes (cognitive fusion and EA) in a sample of 272 patients with trauma history (Grau, McDonald, Clark, & Wetterneck, 2020). Even though valued

living was a significant predictor of quality of life, it did not account for significant variation in other outcome variables, above and beyond other ACT components.

In the context of trauma, it is essential to associate PTSD symptoms to more than emotional dysregulation, fear, memory reconsolidation, and other concepts that explain this ‘psychopathology’. This does not only decontextualize traumatic experiences socially and culturally, but also makes them disconnected from the individuals’ set of values. Therefore, this PF component, values, is essential in the trauma context (Hopper, 2020). Trauma weakens one’s relationship with his or her values. This is most evident during early life traumas, as individuals withdraw from their social surroundings and finds it difficult to connect with others (Rutkowski, 2007). Moreover, Rutkowski (2007) studied different forms of values in a population of traumatized individuals who had experienced deportation or imprisonment from political reasons. One category of values included the ‘ultimate’ values which are the general ways of behaviors that are helpful during one’s realization of his or her aims. The researcher showed that different types of values are affected by the trauma and the time it occurred. Moreover, people give higher ranks to certain values, which are associated with lost values, such as, freedom (Rutkowski, 2007).

There has been insufficient research that discussed values exclusively in the context of trauma as per the ACT theory, therefore our study intends to measure this ACT process in relation to both stress and growth.

F. Gender

Gender differences were found when examining PTS (Ahern, 2004; Elklit, Østergård Kjær, Lasgaard, & Palic, 2012) and PTG (Shand et al., 2015; Vishnevsky,

Cann, Calhoun, Tedeschi, & Demakis, 2010). For instance, studies showed that more PTG was reported in women than men (Morris and Shakespeare-Finch, 2011; Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010). A study was done in Kozovo, two years after the war, to investigate the effect of gender on PTS. Results showed that women had higher PTS scores than men (Ahern, 2004). More recently, Elklit, Østergård Kjær, Lasgaard, and Palic (2012) also found female gender to be a strong predictor of PTSD in a young population of Bosnian refugees. However, in their meta-analysis on cancer patients, Shand et al., (2015) found a weak negative association between gender and PTS symptoms on one hand, and PTG on the other hand. Yet only the association between gender and PTG was statistically significant. Thus, female cancer patients significantly reported more growth than males. Likewise, another study done with cancer patients, in which researchers showed that women reported greater levels of PTG than men (Morris & Shakespeare-Finch, 2011). Since studies examining the relation between gender and posttraumatic stress and growth show mixed results, we will be controlling for gender in our study.

CHAPTER III

AIMS AND HYPOTHESES

A. Aims

The aim of this study is to investigate the separate components implicated in the PF six components model, which include Committed Action, Acceptance, Self-As-Context, mindfulness, values, being in the present and cognitive defusion, in relation to PTG and PTS in a population of Lebanese participants. This is the first study to explore the separate six components of the PF model as proposed by ACT at the same time, in relation to posttraumatic outcomes. This study promotes a broader understanding of the psychological flexibility's six components model and their association with PTS and PTG. This is also the first study to examine committed action and values in relation to post-traumatic growth, and to directly measure SAC in relation to PTS, as other studies measured event centrality instead.

B. Hypotheses

Many studies found that trauma severity influenced the outcome variables (Rosenthal et al., 2005). A study done by Boykin, Anyanwu, Calvin, and Orcutt (2019) showed that as event centrality increased, low psychological flexibility was correlated with higher severity of PTS symptoms. Rosenthal et al. (2005) also showed that women who experienced more severe childhood sexual abuse, relied more on experiential avoidance, which was associated to exacerbated psychological distress. Thus, severity of trauma should be accounted for when studying the posttraumatic outcomes, including stress and growth. Therefore, we will be asking participants responding to the

questionnaires to refer to their most stressful traumatic incident. We will also be controlling for gender and socioeconomic status.

Research showed that committed action (CA) is associated with significant changes in chronic pain treatment, as the PF model suggested (Scott, McCracken, & Norton, 2016). Moreover, CA contributed to significant variance in depression, social functioning as well as in mental health and general health.

Hypothesis 1: Committed action will negatively predict PTS while controlling for gender and SES.

Hypothesis 2: Committed action will positively predict PTG while controlling for gender and SES.

Research also showed that increase in acceptance was associated with decrease in PTS and increase in PTG (Thompson, Arnkoff, & Glass, 2011). In addition, researchers showed that after trauma exposure, PTS and PTG levels depended on the degree of acceptance, or experiential avoidance that participants reported; participants who reported low reliance on experiential avoidance (more acceptance) and greater distress, showed greater growth and meaning in life (Kashdan & Kane, 2011).

Hypothesis 3: Acceptance will negatively predict PTS while controlling for gender and SES.

Hypothesis 4: Acceptance will positively predict PTG while controlling for gender and SES.

Investigators who were interested in studying SAC showed that targeting SAC in ACT sessions contributed to decrease in PTSD symptoms (Boals & Murrell, 2016), and that increased flexibility predicted increase in PTG (Boykin, Anyanwu, Calvin, & Orcutt, 2019).

Hypothesis 5: Self as context will negatively predict post-traumatic stress while controlling for gender and SES.

H6: Self as context will positively predict post-traumatic growth while controlling for gender and SES.

Research also showed that increased levels of mindfulness were associated with more growth (Hanley et al., 2015). Moreover, they were associated with lower symptoms of anxiety, psychological distress, depression (Germer, Siegel, & Fulton, 2013), and less severe PTSD symptoms (Chopko & Schwartz, 2013).

Hypothesis 7: Mindfulness will negatively predict post-traumatic stress while controlling for gender and SES.

Hypothesis 8: Mindfulness will positively predict post-traumatic growth while controlling for gender and SES.

Recently, studies showed that cognitive fusion mediated the relationship between distress tolerance and PTG (Basharpoor, Mehri Mowlaie, & Sarafrazi, 2020). Cognitive defusion was also associated with lower levels of emotional discomfort, and better acceptance of the difficult internal experiences due to trauma (Cox, Motl, Bakker, & Lunt, 2018).

Hypothesis 9: Cognitive defusion will negatively predict post-traumatic stress while controlling for gender and SES.

Hypothesis 10: Cognitive defusion will positively predict post-traumatic growth while controlling for gender and SES.

Studies have supported the role of ACT values processes in decreasing symptoms of depression, pain-related anxiety, and psychosocial disability (McCracken & Keogh, 2009), as well as stress symptoms (Cresswell et al, 2005). Values were also

associated with measures of functioning and mental health (McCracken & Yang, 2006). No studies have examined ACT values process in relation to posttraumatic outcomes in terms of stress and growth specifically. However, based on the importance of values in the context of trauma (Hopper, 2020; Rutkowski, 2007), we expect the following,

Hypothesis 11: Values will negatively predict post-traumatic stress while controlling for gender and SES.

Hypothesis 12: Values will positively predict post-traumatic growth while controlling for gender and SES.

CHAPTER IV

METHODOLOGY

A. Participants

The sample of the study was composed of $N = 177$ participants (20.3% males and 79.7% females). This was above the minimum number of 130 participants, which was determined based on Tabachnick and Fidell's (2001) recommendation ($n \geq 50 + 8m$, with $m =$ number of IVs). Participants were recruited from the American University of Beirut (AUB) from an undergraduate introductory psychology and sociology classes (PSYC 216, 229, 226 and SOAN 201 and 203). Participants were also recruited from the general population through Facebook invitations. Therefore, 53.1% of the participants were from the community and 46.9% were from AUB. All Lebanese participants above 18 were included in the study. This study controlled for gender and SES. The study was approved by the IRB on the 11th of June 2021, and data was collected in July 2021 during the AUB summer semester.

1. Inclusion criteria.

To serve the purpose of this study, which is to examine PF components that are associated with PTS and PTG, participants who report at least one difficult life event that meets criteria for a trauma based on the DSM-5, were included in the study. Traumatic exposure included any event that involves exposure to serious emotional or physical injury, sexual violence, or actual or threatened death, which impends the physical integrity of the self or others (e.g., losing a loved one, experiencing abuse, experiencing natural disaster, having an accident, having cancer/other diseases). Participants should also be Lebanese and 18 years-old or above.

2. *Exclusion criteria.*

Participants who did not report any event that meets DSM-5 criteria for a trauma were excluded from the study, as well as those who recently experienced a trauma (during the last 2 months of the study), as The Institutional Review Board had previously expressed concern regarding participants who had a traumatic incident very recently. Non-Lebanese participants were excluded. There was no clear guideline given to distinguish Lebanese from non-Lebanese, nor specifying whether individuals with Lebanese mothers who are not holding passports themselves, could participate. This would be considered as a limitation to the study.

B. Procedure and Ethical Considerations

The main sample was obtained using convenience sampling. Students had the option to participate in this study to get extra credit in their PSYC 216, 229, 226 and SOAN 201 and 203 classes or else they had the option to complete another assignment for credit. Emails inviting the students to participate in the study were sent along with an informed consent form stating the purpose of the study and emphasizing that participation is voluntary, anonymous, and confidential and that they can withdraw at any time with no consequences. As for the general community, they had access to a link on Facebook inviting them to participate in the study, along with the informed consent. It also included minimal potential discomfort that they might feel, with counselling referrals made available if needed. Those who wished to participate had to access a LimeSurvey link. Surveys were in English only, as the main sample of the study was planned to comprise AUB students. However, due to the insufficient number of participants during data collection in July 2021 (during the summer semester),

participation pool was expanded to include the general community too, therefore surveys were not translated to Arabic due to the lack of time.

C. Variables and Measures

1. Demographics and Trauma Questionnaire

The demographic questionnaire included items about the participants' gender, age, and SES. It included a list of stressful life events that are considered as a traumatic, and whether participants experienced intense fear, hopelessness, numbness, emotional and/or physical injury following the stressful event. It also measured time since the traumatic event.

2. PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013)

Symptoms of posttraumatic stress were measured using the PCL-5. This 20-item self-report measure was designed to present and identify the presence and severity of PTSD symptoms as described in DSM-5 (American Psychological Association, 2013). The PCL-5 has four subscales that represent the categories of symptoms in the DSM-5. They comprise Avoidance, Intrusion, Negative Alterations in Mood and Cognition, and Alterations in Arousal and Reactivity. Participants were asked to indicate the degree to which they have experienced a specific symptom in the last month on a scale ranging from 0 ("not at all") to 4 ("extremely"). Examples are "Feeling very upset when something reminded you of the stressful experience?", "Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?", "Avoiding memories, thoughts, or feelings related to the stressful experience?" Items are summed to provide a total score. PCL-5

showed good internal consistency in the literature; for instance, Richardson and Jost (2019) reported an internal consistency of 0.92. Likewise, the present study reported a high internal consistency (Cronbach's alpha .94).

3. *Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996).*

Symptoms of posttraumatic growth were measured using the PTGI. Researchers who used this 21-item to measure perceived PTG, which is different from actual growth. Examples comprise "I changed my priorities about what is important in life", "I have a greater appreciation for the value of my own life", "I am able to do better things with my life". Participants rate their symptoms in reference to their identified traumatic event, on a scale ranging from 0 ("I did not experience this change as a result of my traumatic experience") to 5 ("I experienced this change to a very great degree as a result of my traumatic experience"). Items are summed to provide a total score, with higher scores representing greater levels of PTG. The PTGI has shown good internal consistency, test-retest reliability, and validity (Tedeschi & Calhoun, 1996). For instance, studies showed high internal consistency (Cronbach's alpha .97) (Boykin, Anyanwu, Calvin, & Orcutt, 2019). A study conducted with a sample of undergraduate students from the psychology introductory course at the American University of Beirut also showed very good internal consistency (Cronbach's alpha .90) (Abboud & Al-Jamil, 2017). The current study reported a very good internal consistency (Cronbach's alpha .92).

4. *The shortened eight-item version of the Committed Action Questionnaire (CAQ-8) (English version; McCracken, Chilcot, & Norton, 2015).*

Committed action was measured using the CAQ-8. This questionnaire comprises 8 items. Participants were asked to rate the extent to which each of the items applies to them on a seven-point scale ranging from 0 (“never true”) to 6 (“always true”). Four items are positively keyed, and the other four are negatively keyed. Examples are “I prefer to change how I approach a goal rather than quit”, “I am able to follow my long terms plans including times when progress is slow”. Previous findings support CAQ-8 the reliability, validity and multidimensionality. For instance, the current study reported a very good internal consistency (Cronbach’s alpha .0.85).

5. *Self-experience questionnaire (SEQ; Yu, McCracken, & Norton, 2016).*

The self-as-context, also called “contextual-self” and “perspective-taking”, was measured using the SEQ. This is a 15-item self-report that comprises items like “Although I can get caught up with my thoughts, emotions and sensations, I can also separate from them”, “I can experience a distinction between my experiences and the ‘I’ who notices these experiences”, “I am able to step back from my emotions and observe them from a separate point of view”, “I am able to separate myself from my thoughts and feelings”. Participants rate their answers on a scale ranging from 0 (“never true”) to 6 (“always true”). The SEQ showed good reliability ($\alpha = .90$), which confirms its unidimensional structure of the SEQ. Moreover, the baseline score of the SEQ significant correlated with the baseline score of a short version of the Chronic Pain Acceptance Questionnaire (CPAQ-8), $r = .41$, $P < .001$, which is consistent with the PF model. The current study reported a very good internal consistency (Cronbach’s alpha .91).

6. *The seven item Acceptance and Action Questionnaire (AAQ-II; Bond et al., 2011).*

This questionnaire was used as a general measure of acceptance for this study. This measure includes 7 items and each item is rated on a seven-point scale from 1 (“never true”) to 7 (“always true”). All items are keyed in the negative direction, and thus to get the total score, they should be reversed first then higher scores would reflect greater acceptance. Examples include “I’m afraid of my feelings”, “Worries get in the way of my success”, “My painful memories prevent me from having a fulfilling life”. The literature showed good support for AA-II internal consistency, temporal stability and construct validity. In the current study, AAQ reported a very good internal consistency (Cronbach’s alpha .92).

7. *The Cognitive Fusion Questionnaire (CFQ; Gillanders et al. 2014)*

Cognitive fusion, also called fusion, was measured using the CFQ which is a 13-item questionnaire using a seven-point Likert response scale, from 1 (corresponding to never true) to 7 (corresponding to always true). Participants were asked to rate items such as ‘I get upset with myself for having certain thoughts’, ‘Even when I am having distressing thoughts, I know that they may become less important eventually’, ‘I over-analyze situations to the point where it's unhelpful to me’, ‘I struggle with my thoughts’. In the current study, CFQ showed a very good internal consistency (Cronbach’s alpha .84).

8. *The Five Factor Mindfulness Questionnaire (FFMQ; Baer et al., 2008)*

Trait mindfulness was measured using a 39-item instrument using the five-point Likert response scale (1 corresponding to never or very rarely and 5 to very often or always true) across the five dimensions: observing, describing, acting with awareness, nonjudging, and nonreacting. Examples include “When I’m walking, I deliberately notice the sensations of my body moving”, “I’m good at finding words to describe my feelings”, “When I do things, my mind wanders off and I’m easily distracted”, “I criticize myself for having irrational or inappropriate emotions”, “I perceive my feelings and emotions without having to react to them”, respectively. In the literature, FFMQ shows good coefficient alphas across the five dimensions ranging from 0.80 to 0.92 (Hanley et al., 2015). Moreover, The FFMQ five factor structure has been supported across time, with the scale demonstrating good psychometric properties (Hanley, Garland & Tedeschi, 2017). In the current study, FFMQ showed a very good internal consistency (Cronbach’s alpha .86).

9. *The Valued Living Questionnaire (VLQ; Wilson et al., 2010).*

The VLQ was used to measure valued living. a modified version will be used to fit the current population of interest. it will ask a series of questions about what one’s values are and how much he or she has been living in accordance with them, evaluating that in a set of life domains comprising 8 items (the original questionnaire has 10 items), using a 10-point Likert response scales (Wislon et al., 2010). Participants will be asked to rate the importance that they put on these different domains of living, by rating each item on a scale of 0 (domain is not important at all) to 10 (domain is very important). Participants rated the extent their actions match these valued domains.

Therefore, the VLQ indicates both the importance of the value and the consistency of one's behavior. Domains are the following: "Family relations (other than marriage or parenting)", "couples/intimate relations", "Friendship", "Education", "Recreation", "Spirituality", "Citizenship", and "Physical selfcare" (Miller et al., 2017). The importance and consistency subscale totals will be calculated first. Then a composite score will be computed from the mean of the product of the importance and consistency ratings, such that higher scores indicate greater values-action consistency. The composite score has been shown to be more reliable and valid as the overall measure of valued living (Wilson et al., 2010). In the current study, VLQ showed a very good internal consistency (Cronbach's alpha .80).

D. Pilot study

A pilot study was conducted to estimate the time needed to complete the surveys, and to make sure that all items are understood and culturally sensitive. Twelve AUB students from the graduate and undergraduate psychology programs were recruited using convenience sampling. They voluntarily participated in this pilot study and were asked to complete the online surveys in English only.

Following the pilot study, few typos were fixed, and the estimated completion time was changed from 20 minutes to 40 minutes based on their recommendations. No other suggestions were given, as participants did not face any difficulty answering the questionnaires.

E. Statistical Analysis

Hierarchical multiple regression was used to examine the link between the six ACT processes and PTS on one hand, and PTG on the other hand. This study also controlled for gender and SES which were entered first.

CHAPTER V

RESULTS

A. Preliminary Analysis

Before conducting main data analysis, preliminary analyses were conducted to check the accuracy of the data. Preliminary analyses included mis-entered data, missing value analysis, reliability analysis, analysis of univariate and multivariate outliers, and analysis of outliers in the solution and influential cases.

1. Mis-entered Data

Mis-entered data was analyzed using the frequencies of the variables to check whether the data falls in the actual ranges of the scales. The results revealed that there was no evidence of mis-entered data in this study.

2. Missing Value Analysis

¹The analysis of the “Prefer not to say” answers were conducted to check whether there were questions that had more than 5% “Prefer not to say” answers. The results revealed that all the variables had less than 5% of “Prefer not to say” answers except for two items on the Values questionnaire; namely how consistent your actions are for the couples/intimate relations domain (5.1%) and for the recreation domain (5.1%). Then, all the “Prefer not to say” answers were regarded as missing values. Missing value analysis revealed that all the variables had less than 5% missing values except for three items on the Valued Living Questionnaire; namely sense of importance

¹ It is important to note that data for participants who completed less than 90% of the questionnaires were deleted from the dataset.

of the recreation domain (5.6%), how consistent your actions are for the couples/intimate relation domain (6.8%), and for the recreation domain (6.8%). To check whether the data is missing completely at random or not, we conducted the Little's MCAR test. The significant result of the Little's MCAR's test revealed that the data might not be missing completely missing at random; $X^2(7121) = 7355.42, p = .026$. To further check whether there were differences on the outcome variables on the three variables that had more than 5% missing values, we recoded the three items (importance of the recreation domain, action consistent for the couples/intimate relation domain, and action consistent in the recreation domain) into two categories (valid responses versus missing responses). Following that, we conducted three t-tests to check whether there were significant differences on the Post-Traumatic Stress scale between participants who answered the three questions (each one separately) versus those who didn't answer these three questions. The t-tests revealed that there were no significant differences on Post-Traumatic Stress between those who had valid responses versus those who had missing responses on (the importance of recreation, action consistent in couples/intimate relation, and action consistent in recreation); $t(175) = -0.97, p = .336, t(175) = 1.34, p = .183, t(175) = -1.18, p = .241$, respectively. Similarly, we conducted three t-tests to check whether there were significant differences on the Post-Traumatic Growth scale between participants who answered the three questions (each one separately) versus those who didn't answer these three questions. The t-tests revealed that there were no significant differences on Post-Traumatic Growth between those who had valid responses versus those who had missing responses on (the importance of recreation, action consistent in couples/intimate relation, and action consistent in recreation); $t(175) = 1.58, p = .117, t(175) = -.33, p = .741, t(175) = 1.23, p = .221$,

respectively. As such, there were no significant differences between who answered and those who didn't answer these three questions. Hence, the data for participants with missing values were retained in this study.

3. *Reliability Analysis*

The reliability analysis revealed that all the scales had very good reliability with Cronbach's alpha $> .70$, as indicated in the table 1 below.

Table 1 Reliability Analysis of the Scales

Scale	Number of Items	Cronbach's Alpha
Post-Traumatic Stress	20	.94
Post- Traumatic Growth	21	.92
Committed Action	7	.85
Acceptance	8	.92
Self as Context	15	.91
Mindfulness	39	.86
Cognitive Defusion	13	.84
Values	16	.80

4. *Univariate and Multivariate Outliers*

Univariate outliers on the scale variables (Post-Traumatic Stress, Post-Traumatic Growth, Committed Action, Acceptance, Self as Context, Mindfulness, Cognitive Defusion, and Values) were checked using z-scores. The criterion was that any case with z-score $> |3.29|$ was considered to be a univariate outlier. The results revealed that the mindfulness scales had one univariate outlier (case # 32). The results, however, revealed that the variables (Post-Traumatic Stress, Post-Traumatic Growth, Acceptance, Committed Action, Self as Context, Cognitive Difusion, and Values) had no univariate outliers.

Multivariate outliers were checked using Mahalanobis Distances with the criterion that any case with Mahalanobis distance > 27.88 (criterion value for eight predictors) was considered to be a multivariate outlier. The results revealed that there were eight multivariate outliers: $X^2(8) = 39.40, p < .001$ (with case # 3, 5, 51, 63, 70, 76, 85 and 88). Since none of the cases was found to be both univariate and multivariate outliers, then all cases of univariate and multivariate outliers were retained in the final dataset (Field, 2013).

5. *Outliers in the Solution and Influential Cases*

Outliers in the solution were inspected using standardized residuals (with the criterion that any case with standardized residual $> |3.29|$ is considered to be an outlier in the solution. For the first regression model (with Post-Traumatic Stress as an outcome variable), the standardized residuals ranged between -2.36 and 2.84; indicating that there were no outliers in the solution. However, for the second regression model (with Post-Traumatic Growth as an outcome variable), the standardized residuals

ranged between -3.44 and 2.28; indicating that there was one outlier in the solution (case # 166).

Influential Cases were inspected using Cook's Distances (with the criterion that any case with Cook's distance > 1 is considered to be an influential case. For the first regression model (with Post-Traumatic Stress as an outcome variable), the Cook's distances ranged between .00 and .07; indicating that there were no influential cases. Similarly, For the second regression model (with Post-Traumatic Growth as an outcome variable), the Cook's distances ranged between .00 and .07; indicating that there were no influential cases. Since the case of the outlier in the solution (case # 166) was not found to be an influential case, then this case was retained in the final dataset (Field, 2013).

B. Sample Descriptives

Table 2 below depicts the characteristics of the sample of the study. The sample of the study was composed of $N = 177$ participants (20.3% males and 79.7% females) with 53.1% from the community and 46.9% were from AUB. Around half of participants (57.1%) belonged to the 19 to 25 age group, 35% of participants belonged to the 26 and above age group, while 7.9% were 18 years old. Regarding the income of participants, more than half of participants (58.8%) earned above 4.5 million LBP, 20.3% earned between 3 million and 4.5 million LBP, and 16.4% earned between 1.5 million and 3 million LBP, while only 4.5% earned less than 1.5 million LBP.

Concerning the experienced traumas, the most experienced trauma by participants was witnessing/feeling the effects of an explosion (60.5%), followed by being exposed to war (46.3%), being bullied during childhood or adolescence (35.6%),

and death of a parent, sibling, or close friend (34.5%). Moreover, around one-third of participants reported that they experienced severe rejection or failure in a relationship (33.9%).

Concerning the most distressing trauma, participants reported that their most distressing trauma was witnessing /feeling the effects of an explosion (26.6%), followed by the death of a parent, sibling or close friend (15.8%), severe rejection or failure in a relationship (8.5%), and sexual harassment or assault during childhood or adulthood (8.5%). When participants were asked when this trauma occurred, 31.6% reported that it occurred 3 to 11 months ago, and 29.9% reported the answer to be “other”.

Table 2 Sample Descriptives

		N	%
Gender	Male	36	20.3
	Female	141	79.7
Age	18	14	7.9
	19 to 25	101	57.1
	26 and above	62	35.0
Income	Less than 1.5Million LBP	8	4.5
	Between 1.5M and 3M LBP	29	16.4
	Between 3M and 4.5M LBP	36	20.3
	above 4.5M LBP	104	58.8
Population	AUB Population	83	46.9
	General Population	94	53.1

Experienced Traumas	Life-threatening accident (Such as a car, boat or motorcycle accident)	47	26.6
	Life-threatening accident experienced by a parent, sibling or close friend	45	25.4
	Life-threatening illness	12	6.8
	Life-threatening illness of a parent, sibling, or close friend	56	31.6
	Death of a parent, sibling, or close friend	61	34.5
	Being threatened with serious harm or seriously injured (ex: threatened with a weapon or by a stranger, getting mugged, bullied))	16	9.0
	Robbery involving a weapon	7	4.0
	Parents separating or divorcing	22	12.4
	Severe rejection or failure in a relationship	60	33.9
	Physically attacked, beaten or abused during childhood or adulthood	25	14.1
	Being bullied during childhood or adolescence	63	35.6
	Witnessed physical attacks or beatings in your home	31	17.5
	Witnessed severe assault outside your home	30	16.9
	Sexual harassment or assault during childhood or adulthood (ex: inappropriate touching, sexual remarks, sexual contact that is against your will or without your consent)	47	26.6

	Witnessed or felt the effects of an explosion	107	60.5
	Was exposed to war	82	46.3
	Uprooted or forced to move from your home	27	15.3
	Traumatic Experiences due to the Pandemic	55	31.1
	Other	8	4.5
Most Distressing Trauma	Life-threatening accident (Such as a car, boat or motorcycle accident)	9	5.1
	Life-threatening accident experienced by a parent, sibling or close friend	5	2.8
	Life-threatening illness	2	1.1
	Life-threatening illness of a parent, sibling or close friend	10	5.6
	Death of a parent, sibling, or close friend	28	15.8
	Being threatened with serious harm or seriously injured (ex: threatened with a weapon or by a stranger, getting mugged, bullied))	2	1.1
	Robbery involving a weapon	0	0
	Parents separating or divorcing	6	3.4
	Severe rejection or failure in a relationship	15	8.5
	Physically attacked, beaten or abused during childhood or adulthood	3	1.7
	Being bullied during childhood or adolescence	6	3.4
	Witnessed physical attacks or beatings in your home	3	1.7

	Witnessed severe assault outside your home	2	1.1
	Sexual harassment or assault during childhood or adulthood (ex: inappropriate touching, sexual remarks, sexual contact that is against your will or without your consent)	15	8.5
	Witnessed or felt the effects of an explosion	47	26.6
	Was exposed to war	12	6.8
	Uprooted or forced to move from your home	0	0
	Traumatic Experiences due to the Pandemic	6	3.4
	Other	6	3.4
How long ago did this event occur?	3 to 11 months	56	31.6
	1 year ago	21	11.9
	2 years ago	16	9.0
	3 years ago	13	7.3
	4 years ago	7	4.0
	5 years ago	11	6.2
	Other	53	29.9

C. Scale Descriptives

The scale descriptives are depicted in table 3 below. On average, participants had low levels of Post-Traumatic Stress ($M = 1.73$, $SD = 0.92$, with *Midpoint* = 2)², whereas they had average Post-Traumatic Growth ($M = 2.57$, $SD = 1.05$, with *Midpoint* = 2.5)³. Moreover, on average, participants had high levels of acceptance ($M = 4.46$, $SD = 1.58$, with *Midpoint* = 4)⁴, Committed Action ($M = 3.55$, $SD = 1.12$, with *Midpoint* = 3)⁵, Self as Context ($M = 3.47$, $SD = 1.00$, with *Midpoint* = 3), Mindfulness ($M = 3.06$, $SD = 0.45$, with *Midpoint* = 3)⁶, and Values ($M = 7.20$, $SD = 1.25$ with *Midpoint* = 5.5)⁷. Finally, on average, participants had low levels of Cognitive Defusion ($M = 3.85$, $SD = 0.97$, with *Midpoint* = 4)⁸

Table 3 Scale Descriptives

	N	Min	Max	Mean	SD
Post-Traumatic Stress	177	.00	4.00	1.73	.92
Post- Traumatic Growth	177	.00	5.00	2.57	1.05
Acceptance	177	1.00	7.00	4.46	1.58
Committed Action	177	.00	6.00	3.55	1.12

² Midpoint of the Post-Traumatic Stress is $(0+4)/2 = 2$

³ Midpoint of Post-Traumatic Growth is $(0+5)/2 = 2.5$

⁴ Midpoint of Acceptance is $(1+7)/2 = 4$

⁵ Midpoint of Committed Action and Self as Context is $(0+6)/2 = 3$

⁶ Midpoint of Mindfulness is $(1+5)/2 = 3$

⁷ Midpoint of Values is $(1+10)/2 = 5.5$

⁸ Midpoint of Cognitive Diffusion is $(1+7)/2 = 4$

⁸ Midpoint of the Post-Traumatic Stress is $(0+4)/2 = 2$

⁸ Midpoint of Post-Traumatic Growth is $(0+5)/2 = 2.5$

⁸ Midpoint of Acceptance is $(1+7)/2 = 4$

⁸ Midpoint of Committed Action and Self as Context is $(0+6)/2 = 3$

⁸ Midpoint of Mindfulness is $(1+5)/2 = 3$

⁸ Midpoint of Values is $(1+10)/2 = 5.5$

⁸ Midpoint of Cognitive Diffusion is $(1+7)/2 = 4$

Self as Context	177	.73	6.00	3.47	1.00
Cognitive Defusion	177	1.46	6.08	3.85	.97
Mindfulness	177	1.49	4.26	3.06	.45
Values	174	3.81	10.00	7.20	1.25

D. Correlation

1. Normality of Variables

The normality of the variables (Post-Traumatic Stress, Post-Traumatic Growth, Committed Action, Acceptance, Self as Context, Mindfulness, Cognitive Defusion and Values) was tested using z-skewness and z-kurtosis. The criterion is that z-skewness and z-kurtosis $< |3.29|$ indicated that the distribution of a given variable is normally distributed. The results revealed that all variables had z-skewness and z-kurtosis $< |3.29|$. Hence, the normality of the variables (Post-Traumatic Stress, Post-Traumatic Growth, Acceptance, Committed Action, Self as Context, Cognitive Defusion, Mindfulness, and Values) was met.

2. Main Analysis

Since the normality of variables was met, then Pearson Correlation one-tailed test was used to study the correlations between the predictor variables (Committed Action, Acceptance, Self as Context, Mindfulness, Cognitive Defusion and Values) and the two outcome variables (Post-Traumatic Stress and Post-Traumatic Growth; Table 4).

Pearson's correlation test revealed that there was a significant, negative, and medium correlation between committed action and post-traumatic stress; $r = -.29, p <$

.001 (*one-tailed*). Pearson's correlation test also revealed that there was a significant, negative, and large correlation between acceptance and post-traumatic stress; $r = -.53, p < .001$ (*one-tailed*). Pearson's correlation test, similarly, revealed that there was a significant, negative, and small to medium correlation between self as context and post-traumatic stress; $r = -.15, p = .026$ (*one-tailed*). In addition, Pearson's correlation test revealed that there was a significant, negative, and medium and large correlation between mindfulness and post-traumatic stress; $r = -.41, p < .001$ (*one-tailed*). Furthermore, Pearson's correlation test revealed that there was a significant, negative, and large correlation between cognitive defusion and post-traumatic stress; $r = -.50, p < .001$ (*one-tailed*). Finally, Pearson's correlation test revealed that there was a significant, negative, and small to medium correlation between values and post-traumatic stress; $r = -.23, p = .001$ (*one-tailed*). This indicated that participants who had higher levels of Committed Action, Acceptance, Self as Context, Mindfulness, Cognitive Defusion and Values were more likely to have lower levels of post-traumatic stress.

Pearson correlation test revealed that there was no significant correlation between acceptance and post-traumatic growth; $r = .10, p = .092$ (*one-tailed*). Pearson Correlation test revealed, however, that there was a significant, positive and small to medium correlation between committed action and post-traumatic growth; $r = .28, p < .001$ (*one-tailed*). Correlation test also revealed that there was a significant, positive and small to medium correlation between self as context and post-traumatic growth; $r = .27, p < .001$ (*one-tailed*). Correlation test also revealed that there was a significant, positive and small to medium correlation between mindfulness and post-traumatic growth; $r = .24, p = .001$ (*one-tailed*). Furthermore, the correlation test revealed that there was a

significant, positive and small to medium correlation between cognitive defusion and post-traumatic growth; $r = .13, p = .045$ (*one-tailed*). Finally, the correlation test revealed that there was a significant, positive and medium correlation between values and post-traumatic growth; $r = .31, p < .001$ (*one-tailed*). This indicated that participants who had higher levels of committed action, self as context, mindfulness, cognitive defusion, and values were more likely to have higher levels of post-traumatic growth (Table 4).

Table 4 Pearson's Zero Order Correlation Matrix

	Post-Traumatic Stress	Post-Traumatic Growth
Committed Action	-.29***	.28***
Acceptance	-.53***	.10
Self as Context	-.15*	.27***
Mindfulness	-.41***	.24***
Cognitive Defusion	-.50***	.13*
Values	-.23***	.31***

E. Differences between AUB Population and General Population

Two independent t-tests were carried out to check whether there were differences on Post-traumatic Stress and Post-traumatic Growth between AUB and General population.

Regarding post-traumatic stress, the homogeneity of variance test revealed that the variances of post-traumatic stress were not significantly different between AUB and general populations; $F(1,175) = 0.45, p = .505$, indicating that the homogeneity of

variance assumption was met. The independent t-test revealed that AUB students ($M = 1.90, SD = 0.95$) had significantly higher levels of post-traumatic stress compared to general population ($M = 1.58, SD = 0.88$); $t(175) = 2.29, p = .023$.

Regarding post-traumatic growth, the homogeneity of variance test revealed that the variances of post-traumatic growth were not significantly different between AUB and general populations; $F(1,175) = 0.12, p = .726$, indicating that the homogeneity of variance assumption was met. The independent t-test revealed that there were no significant differences on post-traumatic growth between AUB students ($M = 2.59, SD = 1.04$) and the general population ($M = 2.55, SD = 1.06$); $t(175) = 0.25, p = .804$ (table 9). Although there were significant differences on Post-traumatic stress between AUB and general population, the subsequent regression analysis was done on the sample of the study as a whole (because the sample sizes of AUB community and General Population are too small).

Table 5 Independent Sample t-test: Differences between AUB and General Population

	AUB		General		t-test	df	Sig.
	M	SD	M	SD			
Post-Traumatic Stress	1.90	0.95	1.58	0.88	2.29	175	.023
Post Traumatic Growth	2.59	1.04	2.55	1.06	0.25	175	.804

F. Regression 1: Predictors of Post-Traumatic Stress

1. Assumptions of Regression

As proposed by Tabachnick and Fidell (2012), the number of cases must be larger or equal to $50 + 8m$ for a medium sized relation between the predictors and the outcome variable, and larger than $104 + m$, when testing individual predictors (where m

is the number of predictors). For this study, both equations are satisfied ($N = 177$) which is large than $50 + 8(9) = 122$ and $104 + 9 = 113$. Independence of errors assumption was checked using Durbin Watson score, with the criterion that scores between 1 and 3 are considered to be normal scores. For this analysis, Durbin Watson was equal to 1.70 which indicated that the assumption of independence of errors is met. In addition, the assumption of no multicollinearity was tested using the VIF scores, given that VIF scores < 10 are considered to be normal scores. For this study, the VIF

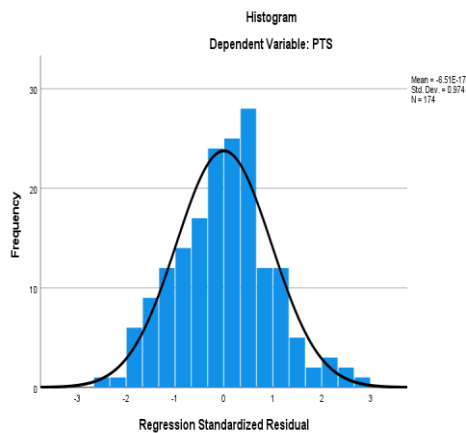


Figure 1 Histogram testing the assumption of Normality of Residuals

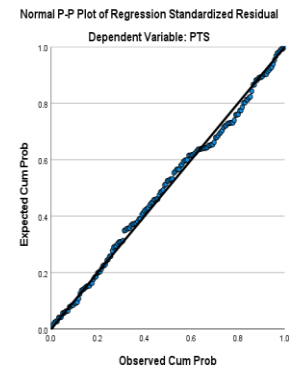


Figure 2 P-P Plot testing the assumption of Normality of Residuals

scores were below 10 which indicated that the assumption of no-multicollinearity is met. Furthermore, the assumption of normality of residuals was tested using the histogram and the P-P plot. For this study, the histogram (figure 1) showed that the residuals form a bell-shaped curve (normally distributed). This was verified with the P-P plot (Figure 2) which showed that the cumulative observed probability of residuals coincided with the cumulative expected probability of normal residuals. Hence, the assumption of normality of residuals was met. Finally, the assumption of homoscedasticity was checked using the ZRESID versus ZPRED scatterplot (Figure 3).

The scatterplot revealed that the residuals were evenly dispersed around zero (without funneling out), which indicated that the assumption of homoscedasticity was met.

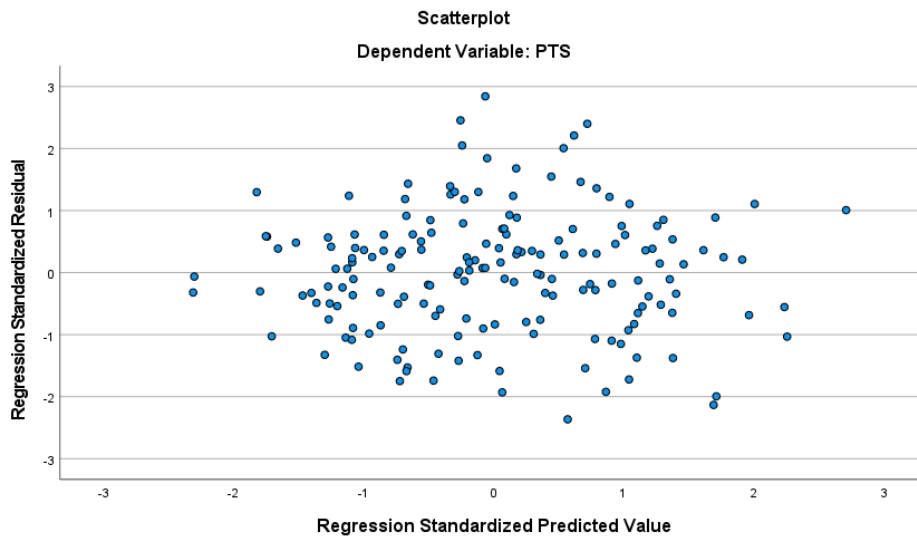


Figure 3 ZRESID versus ZPRED Scatterplot testing the assumption of Homoscedasticity

2. *Regression Main Analysis*

A Hierarchical multiple regression was conducted to study the effects of the predictor variables on the outcome variable (post-traumatic stress) using two steps. In step 1, the control variables gender and income⁹ (medium SES and high SES) were entered using forced entry method. And in the second step the variables (committed action, acceptance, self as context, mindfulness, cognitive defusion, and values) were entered using forced entry method.

For the first regression model, the whole regression model (which included gender, medium SES, and high SES) was a significant model in predicting post-

⁹ For the variable income, the two categories (between 1.5 million and 3 million and between 3 million and 4.5 million) were grouped together to form the medium SES group. The category (less than 1.5 million) was considered to be the low SES group and the category (above 4.5 million) was considered to be the high SES group. Then two dummy variables (medium SES and High SES) were created by taking the low SES as a reference group.

traumatic stress; $F(3, 170) = 6.90, p < .001$. This regression model explained 10.9% ($R^2 = .109$) of the variance of the posttraumatic stress. By looking at the table of coefficients for model 1, only gender and high SES were found to be significant predictors of post-traumatic stress. High SES was found to be a significant, negative, and small to medium predictor of post-traumatic stress; $\beta = -.25, p = .011$. This indicated that participants with high SES ($M = 1.53, SD = 0.94$) were more likely to have lower levels of post-traumatic stress compared to those who had low and medium SES combined ($M = 2.02, SD = 0.82$). Moreover, gender was found to be a significant, positive, and small to medium predictor of post-traumatic stress; $\beta = .18, p = .012$. This indicated that male participants ($M = 1.36, SD = 0.87$) were more likely to have lower levels of post-traumatic stress compared to females ($M = 1.82, SD = 0.92$).

For the second regression model, the whole regression model (which included gender, medium SES, high SES, committed action, acceptance, self as context, mindfulness, cognitive defusion, and values) was a significant model in predicting post-traumatic stress; $F(9, 164) = 10.32, p < .001$. This regression model explained 36.2% ($R^2 = .362$) of the variance of the posttraumatic stress. The ACT variables explained an additional 25.3% of the variance in post-traumatic stress after controlling for gender and income, $\Delta R^2 = .253, F \text{ change}(6, 164) = 10.84, p < .001$ (Table 5). Among the six predictors, only acceptance and mindfulness were found to be significant predictors of post-traumatic stress after controlling for gender and income. Acceptance was found to be the highest significant, negative, and small to medium predictor of post-traumatic stress; $\beta = -.28, p = .010$. Moreover, mindfulness was found to be the lowest, negative, and small to medium predictor of post-traumatic stress; $\beta = -.20, p = .035$. This indicated that hypotheses 3 and 7 were confirmed with participants who had higher

levels of acceptance and mindfulness were more likely to have lower levels of post-traumatic stress. It is important to note that there were no other significant predictors of post-traumatic stress. Moreover, High SES was also found to be a significant predictor of post-traumatic stress in the final model (Table 6).

Table 6 R, R Square, Adjusted R Square

Model	R	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Durbin-Watson	
				R Square Change	F Change	df1	df2		Sig. F Change
1	.33	.109	.88	.109	6.90	3	170	.000	
2	.60	.362	.76	.253	10.84	6	164	.000	1.70

Table 7 Regression Parameters

Model		<i>B</i>	<i>SE B</i>	<i>β</i>
1	(Constant)	1.68	.45	
	Gender	.42	.17	.18*
	Medium SES	-.48	.35	-.25
	High SES	-.89	.34	-.47*
2	(Constant)	4.46	.66	
	Gender	.21	.15	.09
	Medium	-.46	.31	-.24
	High	-.77	.31	-.41*
	Committed Action	.11	.07	.13
	Acceptance	-.16	.06	-.28**
	Self As Context	.11	.07	.11
	Mindfulness	-.40	.19	-.20*
	Cognitive Defusion	-.18	.10	-.18
	Values	-.08	.05	-.11

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

G. Regression 2: Predictors of Post-Traumatic Growth

1. Assumptions of Regression

As proposed by Tabachnick and Fidell (2012), the number of cases must be larger or equal to $50 + 8m$ for a medium sized relation between the predictors and the outcome variable, and larger than $104 + m$, when testing individual predictors (where m is the number of predictors). For this study, both equations are satisfied ($N = 177$) which is large than $50 + 8(9) = 122$ and $104 + 9 = 113$. Independence of errors assumption was checked using Durbin Watson score, with the criterion that scores between 1 and 3 are considered to be normal scores. For this analysis, Durbin Watson was equal to 2.28 which indicated that the assumption of independence of errors is met. In addition, the assumption of no multicollinearity was tested using the VIF scores, given that VIF scores < 10 are considered to be normal scores. For this study, the VIF scores were below 10 which indicated that the assumption of no-multicollinearity is met. Furthermore, the assumption of normality of residuals was tested using the histogram and the P-P plot. For this study, the histogram (figure 4) showed that the residuals form a bell-shaped curve (normally distributed). This was verified with the P-P plot (Figure 5) which showed that the cumulative observed probability of residuals coincided with the cumulative expected probability of normal residuals. Hence, the assumption of normality of residuals was met. Finally, the assumption of homoscedasticity was checked using the ZRESID versus ZPRED scatterplot (Figure 6). The scatterplot revealed that the residuals were evenly dispersed around zero (without funneling out), which indicated that the assumption of homoscedasticity was met.

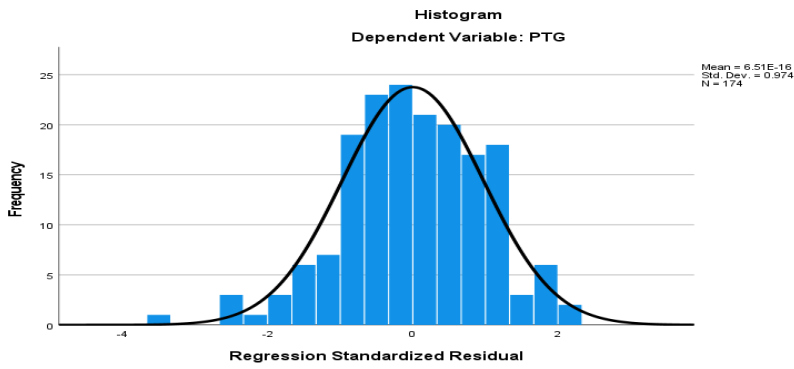


Figure 4 Histogram testing the assumption of Normality of Residuals

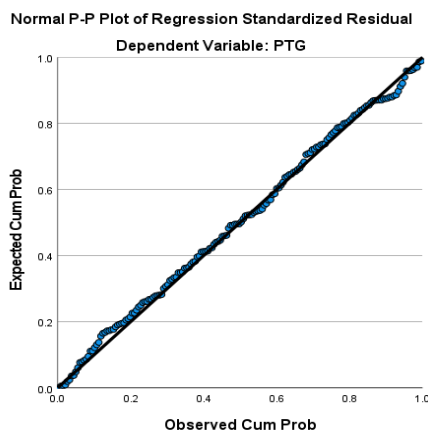


Figure 5 P-P Plot testing the assumption of Normality of Residuals

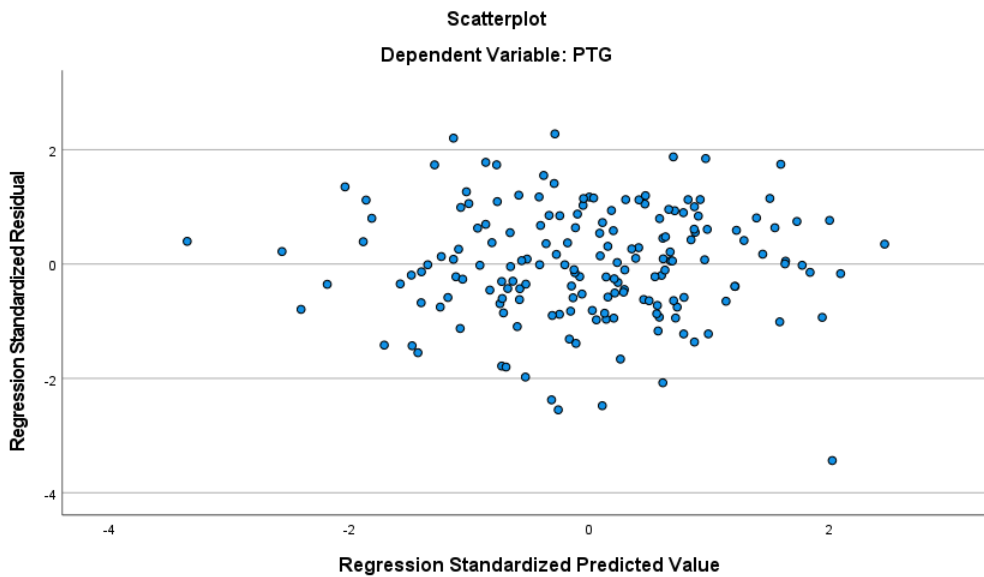


Figure 6 ZRESID versus ZPRED Scatterplot testing the assumption of Homoscedasticity

2. Regression Main Analysis

A Hierarchical multiple regression was conducted to study the effects of the predictor variables on the outcome variable (post-traumatic growth) using two steps.

For the first regression model, the whole regression model (which included gender, medium SES, and high SES) was not significant model in predicting post-traumatic growth; $F(3, 170) = 1.83, p = .144, R^2 = .031$. For the second regression model, the whole regression model (which included gender, medium SES, high SES, committed action, acceptance, self as context, mindfulness, cognitive defusion, and values) was a significant model in predicting post-traumatic growth; $F(9, 164) = 4.33, p < .001$. This regression model explained 19.2% ($R^2 = .192$) of the variance of the posttraumatic growth. The ACT variables explained an additional 16.1% of the variance in post-traumatic growth after controlling for gender and income, $\Delta R^2 = .161, F \text{ change}(6, 164) = 5.44, p < .001$ (Table 7). Among the six predictors, only committed action, self as context, and values were found to be significant predictors of post-traumatic growth after controlling for gender and income. Committed action was found to be the highest significant, positive, and small to medium predictor of post-traumatic growth; $\beta = .19, p = .044$. Moreover, Values was found to be the second highest, positive, and small to medium predictor of post-traumatic growth; $\beta = .188, p = .019$. Furthermore, self as context was found to be the lowest, positive, and small to medium predictor of post-traumatic growth. This indicated that hypotheses 2, 6, and 12 were confirmed with participants who had higher levels of committed action, self as context, and values were more likely to have higher levels of post-traumatic growth. It is important to note that there were no other significant predictors of post-traumatic growth. Moreover, gender was found to be a significant, positive, and small to medium predictor of post-traumatic

growth; $\beta = .15$, $p = .044$. This indicated that male participants ($M = 2.29$, $SD = 1.00$) were more likely to have lower levels of post-traumatic growth compared to females ($M = 2.64$, $SD = 1.05$, table 8).

Table 8 R, R Square, Adjusted R Square

Model	R	Adjusted R Square	Std. Error of the Estimate	Change in R Square	Statistics F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.18	.031	1.04	.031	1.83	3	170	.144	
2	.44	.192	.97	.161	5.44	6	164	.000	2.28

Table 9 Regression Parameters

Model		<i>B</i>	<i>SE B</i>	β
1	(Constant)	2.20	.53	
	Gender	.38	.20	.15
	Medium SES	-.43	.41	-.20
	High SES	-.24	.41	-.11
2	(Constant)	-.60	.84	
	Gender	.39	.19	.15*
	Medium	-.28	.39	-.13
	High	-.21	.39	-.10
	Committed Action	.18	.09	.19*
	Acceptance	-.12	.08	-.17
	Self As Context	.18	.08	.17*
	Mindfulness	.24	.24	.10
	Cognitive Defusion	.02	.13	.02
	Values	.16	.07	.19*

* $p < .05$

CHAPTER VI

DISCUSSION

The aims of this study were to measure the prevalence of posttraumatic growth and stress and to investigate their various predictors – specifically in terms of the six ACT processes. Examining these components aimed to help understand the impact of each of the six ACT processes separately on PTS and PTG (Boykin, Anyanwu, Calvin, & Orcutt, 2019).

Among the six predictors, only committed action, self as context, and values were found to be significant predictors of post-traumatic growth after controlling for gender and income. These findings support our hypotheses (H2, H6 and H12), and it is the first time that ACT values, CA and SAC were directly studied in relation to growth and shown to be significant and positive predictors of posttraumatic growth. For instance, CA and values were studied in relation to pain, not PTG (McCracken, 2013; Rutkowski, 2007). Moreover, researchers investigated event centrality as an alternative to SAC, in the trauma context. SAC was only measured directly in relation to chronic pain, not PTS (Boykin, Anyanwu, Calvin, and Orcutt, 2019; Boals and Murrell, 2016).

In fact, the strongest highest predictor of post-traumatic growth was committed action. Committed Action, one component of ACT, refers to the person's ability to bind to a valued change in his or her life and to take actions towards it. Even though CA was not previously studied in relation to growth after trauma, it was studied in relation to chronic pain, and showed that CA contributed significantly to improving depression, social functioning, mental health, vitality, and general health (McCracken, 2013). This

is the first study that showed the positive and significant association between CA and PTG.

The second positive significant direct predictor on posttraumatic growth was values. This is the first study that investigated the relation between values and PTG, as there are no other studies that investigated ACT values in relation to PTG before. In ACT terms, values refer to verbally constructed, freely chosen life domains, such as family, friendship, work, leisure, and education that clients find personally meaningful. Identifying a client's values is an important part of the ACT therapeutic process. On the other hand, Posttraumatic growth can be experienced in the form of new possibilities and priorities. After experiencing a trauma, survivors who rely on a set of values are able to recognize more satisfying future plans (Sheikh, 2008). They could engage in humanitarian work, shift in their career focus, have new relationships, engage in spiritual practices. Therefore, ACT helps in clarifying values which supports the individual move towards important committed actions in their life, which aligns with exploring new meaningful pathways- an important aspect of PTG. Readjusting priorities and pursuing values-based actions, which is also a PTG dimension, help in exploring new possibilities in different aspects in life that were taken previously for granted, which underlies the growth that individuals experience after the trauma (Sheikh, 2008). In the literature, identifying values and verbalizing them were also associated with an increased awareness of their sensory and perceptual consequences, which reinforces the values-based actions. In other words, speaking about values, motivates the person to engage in specific behaviors to pursue them. For instance, therapeutic exercises that focused on identifying values showed increased positive outcomes (Engle & Follette, 2018).

The third positive significant direct predictor on posttraumatic growth was self as context, which was conceptualized as one's ability to observe internal experiences without overidentifying with them (Hayes et al., 2012). This perspective that one can take on his or her thoughts and feelings, facilitates the ability to distinguish between the self and the psychological experiences. Only two studies investigated SAC indirectly in relation to PTG by measuring event centrality as an alternative (Boykin, Anyanwu, Calvin, & Orcutt, 2019; Kashdan & Kane, 2011). SAC was not studied directly in relation to PTG in the context of trauma before. Previous studies measured event centrality instead since there was no measure of SAC. SAC was also ignored as a potential mediator in study designs, that comprised the other five processes (Stockton et al., 2019). Therefore, our study is the first study that measures the relation between SAC and PTG.

As ACT stems from the belief that being aware of one's ongoing feelings and thoughts facilitates engagement and promotes flexible goals-based actions and behaviors (Yu, Norton, & McCracken, 2017), individuals who scored high on SAC are able to step back from their thoughts and view them as experiences rather than facts. This would help them maintain a stable self-perception after experiencing a trauma (Boykin, Anyanwu, Calvin, & Orcutt, 2019). Having the ability to perceive internal feelings and thoughts as flowing experiences could help the individuals recognize them as a result of the trauma and reflect on them. Knowing that they have survived the trauma and have been able to cope with it, survivors might develop a sense of personal strength and self-efficacy, which is also a domain of posttraumatic growth (Sheikh, 2008).

Inconsistent with our hypotheses, defusion and mindfulness did not come out as significant predictors of PTG in our model despite being significantly correlated with PTG independently. Moreover, the acceptance component did not significantly or predict post-traumatic growth.

As per the ACT definition, acceptance means one's willingness to contact his or her internal processes such as memories, emotions, thoughts, flashbacks without resorting to avoidance strategies or maladaptive behaviors (Hayes & Wilson, 2012). This definition portrays the PTSD category of avoidance, rather than any of the PTG domains. This could explain why acceptance was a significant predictor for stress, and not growth.

Even though the literature pointed to an association between mindfulness and growth after trauma (Hanley et al., 2015), this was not supported in our study. In studies that established a positive correlation between mindfulness and PTG, deliberate rumination was a significant mediator in this association (Hanley et al., 2015). Likewise, contacting the present moment in an ongoing and non-judgmental way and flexibly bringing one's awareness and attention to the here-and-now experience (Harris & Hayes, 2019), are not enough to foster growth after adversities, as cognitive processing is also required for PTG to occur (Hanley et al., 2015) as well as an examination of one's core beliefs (Triplett, Tedeschi, Cann, Calhoun, & Reeve, 2012).

Defusion processes promote one's ability to notice the thoughts, urges, memories and feelings and detach from them (Harris & Hayes, 2019). Even though these interactions also facilitate one's ability to develop a SAC perspective (Luciano et al., 2011), cognitive defusion was not a significant predictor of PTG in this current study. Past studies have found that cognitive defusion did not show significant

mediation effects on outcomes variables including quality of life, functioning and mental health outcomes (Stockton et al., 2019). Along with this study's findings, this suggests that the component is not quite distinctive for ACT.

Furthermore, female participants also had higher levels of PTG. This is consistent with previous studies that found that more PTG was reported in women than men (Morris and Shakespeare-Finch, 2011; Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010). Studies show that women significantly engaged in ruminating on constructive matters such as personal strengths awareness and life appreciation, which are also domains of PTG (Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010).

Consistent with our hypotheses, which are grounded in the literature, acceptance and mindfulness were found to be significant predictors of post-traumatic stress after controlling for gender and income. It appears that in the aftermath of trauma, people who report greater acceptance and mindfulness also report lower PTS (Chopko & Schwartz, 2013; Thompson, Arnkoff, & Glass, 2011).

In this study, acceptance was found to be the strongest predictor of posttraumatic stress. In PTSD, trauma survivors experience a set of symptoms for 30 days or more, which consist of negative changes to cognitions, and mood and arousal symptoms, and avoidance. Therefore, active efforts to avoid them are part of the diagnostic criteria for PTSD (DSM-5; American Psychiatric Association [APA], 2013). Patients experiencing avoidance symptoms try hard not to think, feel or remember things about the trauma. For example, they might willingly stop going somewhere that reminds them of the trauma or even talking about it. Experiential avoidance also depicts one's engagement in strategies designed to adjust the occurrence of certain internal experiences and physiological sensations (Batten, 2011). Considering that avoidance

and escape behaviors play an important role in maintaining and developing posttraumatic stress, the reduction of these maladaptive strategies is a target of acceptance-based therapies such as ACT intervention (Orsillo & Batten, 2005). The latter aims to increase acceptance and willingness to sit with these uncomfortable internal processes, rather than avoiding them. This would decrease the struggle traumatized individuals have against their own experiences, to the point that avoidance becomes a serious obstacle to their ability to pursue their values goals (Harris & Hayes, 2019). As opposed to the traditional cognitive-behavioral therapy (CBT), the goal of ACT acceptance is not to verbally challenge clients or not to persuade them to see their situation differently, but to accept their internal experiences and to willingly experience them rather than to engage in avoidance and escape behaviors (Orsillo & Batten, 2005).

The second significant predictor of PTS was mindfulness. To begin with, mindfulness has been described as one's ability to observe external and internal experiences in the present moment, without engaging in actions to change or judge them. Instead of worrying about the future or ruminating about the past, the mindful individual will be fully aware and conscious of his or her present experience (Orsillo & Batten, 2005). The association between mindfulness as depicted by ACT and posttraumatic stress has been highly evidenced in the literature (Dick et al., 2014; Chopko & Schwartz, 2013). Studies showed that mindfulness approaches were significantly associated with less severe intrusion, avoidance, and hyperarousal PTSD symptoms. In fact, the greater one's ability to describe their internal and external experiences was shown to be associated with less hyperarousal symptoms, therefore fewer PTS symptoms (Chopko & Schwartz, 2013). As psychological flexibility aims to promote a better relationship between the individual and their internal processes,

mindfulness teaches people to focus on the here-and-now; the moments when behaviors happen, which promotes value-based behaviors and committed actions (Harris & Hayes, 2019).

This study also explored the role of other ACT components in relation to PTS such as committed action, self as context, values and cognitive defusion, all of which were not significant predictors of PTS, which is inconsistent with our hypotheses.

Similar to the studies completed by Ahern in 2004 and Elklit, Østergård Kjær, Lasgaard, and Palic in 2012, our study showed that in total, males reported lower PTS compared to females. Moreover, in our study, participants with high SES reported lower PTS compared to low and medium combined. Low SES is a risk factor to developing PTSD not only because economic disadvantage was associated with higher risk for trauma exposure, frequency and onset (Myers et al., 2015), but also due to the inability to afford therapy when needed. For instance, individuals with low SES receive low level of hospital care, also most cases of deaths were reported following traumatic events among patients with low SES (Abedzadeh-Kalahroudi, Razi & Sehat, 2018).

Committed action, self as context, values and cognitive defusion were not significant predictors of PTS. These ACT components do not directly relate to the PTSD categories. CA, SAC and values relate to PTG domains. Moreover, Cognitive defusion was not considered as distinctive ACT process (Stockton et al., 2019). For instance, cognitive defusion was studied as a process to achieve SAC.

CHAPTER VII

FUTURE DIRECTIONS AND IMPLICATIONS

A. Limitations and Future Directions

There are several limitations that are worth mentioning. First, this study is limited by its cross-sectional design; therefore, no causal interpretations can be made. Second, although this study investigated a wide range of traumas, it did not measure or control for the influence of multiple traumas on posttraumatic stress or growth; at least 91% of participants in this study reported more than one potentially traumatic experience. Because of the curvilinear relationship between the impact of trauma and post-traumatic growth shown in previous research (McCaslin et al., 2009) and the positive and significant association between the number of traumas and PTSD symptoms (Richardson & Jost, 2019), the impact of multiple traumas may change the findings on post-traumatic stress and growth. This study did not account for the trauma magnitude either. Researchers should consider the impact of ongoing chronic stress and investigate how this variable could affect the relationship between ACT components and posttraumatic stress and growth.

Moreover, data was collected in July 2021 during which a lower number of students enrol in AUB courses, compared to other semesters, therefore the general community had to be considered to reach the required number of participants. Even though participants from the general community were included, questionnaires were not translated to Arabic, due to the lack of time because the initial sample was supposed to comprise AUB students only. Furthermore, the AUB sample got a credit for

participating in the study, while no incentive was given to the community sample for participating.

In addition to the above mentioned limitations, all scales relied on retrospective self-report, which can be influenced by recall biases and social desirability bias. Participants reported higher scores on most ACT scales, which could suggest social desirability. Another limitation was an increased PTS in the general sample, however due to the low sample size, the AUB and the general sample were kept as one larger sample. Finally, the sample of the current study included Lebanese participants only without clearly specifying the standards for being considered as a Lebanese or not; for instance, it was not indicated if individuals with Lebanese mothers who do not hold a Lebanese passport could participate. Future research should be more specific in identifying the inclusion criteria and providing a clear rationale behind including certain nationalities and not others.

Finally, the measure of income was biased since the data was collected in July, 2021, while the currency in Lebanon had severely devalued, and therefore the SES categories in the survey do not actually reflect the real economic status.

B. Clinical Implications

ACT adopts an approach which assumes that people can find meaning and purpose, in their suffering. This optimistic perspective aims to change one's relationship with their symptoms and to improve their psychological flexibility (Harris & Hayes, 2019). The current literature on ACT recommended identifying the specific components through which ACT enables change (Stockton et al., 2019). This becomes relevant at any stage within the therapy process, as targeting significant ACT components in

specific could not only decrease PTS but could also promote growth and a better quality of life (Orsillo & Batten, 2005).

The current study adds to the theoretical model of ACT and could help inform ACT as a therapy in clinical settings. For instance, therapists may have to consider the population they are working with when working on PTS, as the AUB sample in this current study had higher PTS levels, compared to the general community.

The implications of the present study are therefore to support the evidence-base for the six separate ACT components and their relation to both PTS and PTG. Future studies may also focus on differentiating between factors relevant to PTS and those relevant to PTG. If the goal is to promote benefit finding and growth, working on ACT values and committed action in therapy could become relevant. It could facilitate broadening perspectives in terms of identifying values as they change and facilitating their pursuit, knowing that trauma disrupts the individuals' core beliefs and challenges their values (Kashdan & Kane, 2011). Therapists could also implement SAC focused therapy; in fact, targeting SAC could help patients see that they are more than their traumatic life events, memories, and thoughts. While patients are still aware of these experiences, understanding the SAC concept will lead to a decentralization of the traumatic event from their own identity. This could also decrease the defining power of these events as patients would not describe themselves through the lens of the trauma (Boals & Murrell, 2016).

Finally, since this study is the first study to examine the ACT components specifically in a sample of Lebanese participants, it would be helpful to conduct future studies in order to better understand the relevance of the ACT model to the Lebanese community. For example, the findings revealed that more than 5% of the participants

did not answer the item tackling couples' intimate relations in the values' questionnaire. This could indicate that participants struggled to reflect on the consistency of their actions in their relationships. Therefore, ACT therapists working with Lebanese patients could spend more time discussing this value with the patients, to understand if they are either unclear about, neglecting or acting inconsistently in accordance with their relationships.

APPENDIX



Consent to participate in an Online 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

Consent Form for Psychology PSYC 216, 229, 226 and SOAN 201 and 203

Students

Participating in a Research Project

Project Title: The Relation Between ACT processes and Posttraumatic Stress and
Growth in Lebanon

Investigator: Dr. Fatimah El Jamil

Co-Investigator: Dana Berry

Address: American University of Beirut, Jesup 101

Phone: 01- 350 000, ext 4372

Email: fa25@aub.edu.lb

If you are not Lebanese, or you have not experienced an incredibly stressful and difficult life event or situation OR you are aged less than 18 years, OR if you have experienced a traumatic incident in the last two months, you are not eligible for this survey.

Dear Students,

We would like to invite you to participate in a research study conducted at the American University of Beirut. The study seeks to examine the relationship between components of psychological flexibility (PF), and sociocultural variables and posttraumatic reactions such as stress and growth.

In order to take part in this study, you must be Lebanese, 18 years old or above and have experienced a stressful and difficult event or situation that you believe impacted you greatly. Participants who are under 18 years and who do not report experiencing an incredibly stressful and difficult life event or situation will be excluded from the study, as well as those who recently experienced a trauma (during the last 2 months of the study).

Only the data you provide in the questionnaire will be collected and analyzed. The research team will not have access to your name or contact details. The research is conducted online and is hosted on an AUB server.

The results of the survey will be published in a thesis in printed form and electronically from AUB Libraries.

As a research participant, you will be asked to read this consent form, and respond to a battery of questionnaires. Completing the questionnaires will take around 40 minutes. This is a one-off survey.

The main sample will be obtained using convenience sampling. All of the data collected from minimum 138 participants 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 a 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 nor your course instructor.

The results of the study will provide data in the literature on psychological flexibility, posttraumatic stress and growth and will provide data on posttraumatic outcomes and psychological flexibility in a college student sample in Lebanon which is until this point missing.

There is no monetary reward for participating in this study. However, you will receive 1% point in your PSYC 216, 229, 226 and SOAN 201 or 203 grade. Should you decide not to participate in this study but still wish to receive extra course credit, you will be given the option to complete another task assigned by your professor. If you wish to complete the other task instead of participating, please contact your instructor to receive the task.

You will be provided with a copy of the consent form, which you will also find on the Limesurvey.

In case you decide to participate you will be asked to create and enter a code which you will give to your instructor. This code will not link your responses to you, and will only ensure that you receive credit for your participation.

This study might exacerbate disturbing memories and cause emotional distress. Some examples of stressful events in the survey might make you feel upset. Examples of sensitive questions that you will get “Feeling very upset when something reminded you of the stressful experience?”, “Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?”, “Avoiding memories, thoughts, or feelings related to the stressful experience?”. If you think that you need talk to someone about your feelings, please visit or contact Counselling Centre at AUB which provides free counselling services to students. Their number is 01-350 000 ext. 3196. You may also contact the

Psychiatry Unit at AUBMC (ext. 5650) for appointments that qualify for student HIP-coverage, or Embrace (number: +961 1 346 226, hotline: 1564).

If at any time and for any reason you prefer not to answer any questions, please feel free to skip them. If you are in therapy due to a traumatic event, please discuss your possible involvement in this study with your therapist before deciding whether you want to be involved.

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 x4372 or Dana Berry dob01@mail.aub.edu

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

Note: If you are currently experiencing any distress, please contact the Counselling Centre at AUB, for current AUB students (West Hall, room 210, ext. 3196), Family Medicine Clinic (ext. 3000), the Psychiatry Department at AUBMC (ext. 5650) for appointments that qualify for student HIP-coverage, or Embrace (number: +961 1 346 226, hotline: 1564

For inquiries regarding any kind of discriminatory harassment, you may be directed to the Equity/Title IX Coordinator, Mitra Tauk: AUB, Office of the President in College Hall, Room 425. Their number is 01-350000 (ext: 2514), titleix@aub.edu.lb. You also

have the right to raise concerns to the US Department of Education's Office for Civil Rights that oversees compliance with Title IX on this email OCR.NewYork@ed.gov

THANK YOU FOR YOUR COOPERATION

If you are currently experiencing any distress, please contact the Counselling Centre at AUB, for current AUB students



Consent to participate in an Online Research Study

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American University of Beirut, Jesup 101, 01- 350 000 ext. 4372,

fa25@aub.edu.lb

It is not an Official Message from AUB

Consent Form for the general community

Participating in a Research Project

Project Title: The Relation Between ACT processes and Posttraumatic Stress and Growth in Lebanon

Investigator: Dr. Fatimah El Jamil

Co-Investigator: Dana Berry

Address: American University of Beirut, Jesup 101

Phone: 01- 350 000, ext 4372

Email: fa25@aub.edu.lb

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We would like to invite you to participate in a research study conducted at the American University of Beirut. The study seeks to examine the relationship between components of psychological flexibility (PF), and sociocultural variables and posttraumatic reactions such as stress and growth.

In order to take part in this study, you must be Lebanese, 18 years old or above and have experienced a stressful and difficult event or situation that you believe impacted you greatly. Participants who are under 18 years and who do not report experiencing an incredibly stressful and difficult life event or situation will be excluded from the study, as well as those who recently experienced a trauma (during the last 2 months of the study).

Only the data you provide in the questionnaire will be collected and analyzed. The research team will not have access to your name or contact details. The research is conducted online and is hosted on an AUB server.

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If at any time and for any reason you prefer not to answer any questions, please feel free to skip them. If you are in therapy due to a traumatic event, please discuss your possible involvement in this study with your therapist before deciding whether you want to be involved.

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 x4372 or Dana Berry dob01@mail.aub.edu

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