

# SELF-AFFIRMATION AND SELF CONSTRUALS

Self and Familial Affirmation as Mediated by Self Construals in Buffering Stress Responses: An  
Experimental Evaluation in a Sample of University Students in Lebanon

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### **Dedications**

I would like to extend my sincerest gratitude to everyone who supported me throughout this long journey and helped me in completing my first big life achievement, my M.A. thesis. It has been tedious, and at times, I questioned my capabilities, yet here I am, wholeheartedly writing my acknowledgments! I could not be prouder!

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As my father always quotes, "Damn the torpedoes, full speed ahead!"

### **Abstract**

Stress is associated with the development and progression of a range of mental disorders which have been shown to be a major contribution to the burden of disease among youth, especially among university students. Research has suggested that self-affirmation, that involves thinking about a value central to the individual, may buffer against adverse effects of stress. Cross cultural differences have been shown regarding the efficacy of the type of affirmation used. Participants in collectivistic cultures benefited from reflecting on values that are related to their familial self, instead of values pertaining to the individual self. Thus, the inclusion of culture when affirming the self, as individual self-affirmation – values pertaining to individual values, and familial self-affirmation – values pertaining to the values of the family. To determine which aspect of the self that may be of particular use to buffer against threat, the Sixfold Self-Construals Scale (Harb and Smith, 2008) was introduced as a mediator to measure whether participants endorse the personal self-construal, which represents the independent self, or the relational-vertical self, which is derived from dyadic familial connections. This study experimentally investigated whether (1) familial self-affirmation or (2) individual self-affirmation will attenuate physiological responses through as measured by (1) heart rate and (2) emotional stress response, as well as psychological stress responses, measured through (3) state anxiety and (4) self-efficacy, among 101 undergraduate students at Haigazian University while shedding light on how (1) self-construals and (2) domain identification may mediate and moderate, respectively the effectiveness of self-affirmation. Results have shown that students with high domain identification did not benefit from the stress buffering effects of individual and familial self-affirmation. The hypotheses of the study were not supported, but there were some marginal effects that may be ruled out with replication of the study. Results have also shown that participants who endorse the personal self-construal had

decreased anxiety and higher self efficacy than participants who endorsed a relational-vertical self-construal, regardless of the affirmation group they were placed in.

*Keywords:* Individual Self-Affirmation, Familial Self-Affirmation, Culture, Self-Construals, Stress, University Students

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### **Introduction**

Stress is recognized as an important risk factor for the development of psychopathological symptoms with daily life stressors being a predictor for the emergence of symptoms of anxiety and depression (D'Angelo and Wierzbicki, 2003; Newnham, Pearson, Stein, and Betancourt, 2015; Parrish, Cohen, and Laurenceau, 2011). In Lebanon, the high prevalence rate of mental disorders and the early age of onset is considered a national burden (Karam et al., 2008). Operationally, stress is defined as the process by which environmental events are evaluated as threatening, which in turn prompts emotional and physiological responses that can negatively affect health and increase vulnerability to disease (Lazarus, 1993; McEwen and Seeman, 1999). University students experience elevated stress levels compared to the general population (Stallman, 2010). Internationally, these high prevalence rates are partially due to the distress caused by the major life transition that students undergo in their university years (Bruffaerts et al., 2018), as well as the pressures they face concerning the responsibilities that come with that transition (Rehner, 2016). Stress among undergraduate and graduate university students is multifactorial, it arises from both academic and non-academic factors (Brand and Schoonheim-Klein, 2009). These include new found autonomy from parents (Sussman and Arnett, 2014), adjustments to new social environments, and dealing with new intellectual, academic and social challenges (Doumit, 2012). This period for emerging adults (18-25 years old) (Arnett, 2007; Hochberg and Konner, 2020) specifically, is a distinct period of development (Arnett, 2007) and is a critical time for the exploration of various life directions (Arnett, 2000) such as the formation a coherent sense of self and identity (Schwartz et al., 2010). Many students might experience ambivalence about taking on adult roles and responsibilities and anxiety as they struggle with identity issues as self-exploration (Arnett, 2004). The importance of identity formation lies in securing a clear and positive sense of

self (Manczak, Zapata-Gietl, and McAdams, 2014) which would ultimately contribute to overall wellbeing. Nevertheless, securing a healthy self may be compromised by several life stressors that characterize this developmental period (Davila et al., 2004; Dubas and Petersen, 1996; Rindfuss, 1991).

Research has shown that psychological distress erodes the self-concept through an increase in self-concept inadequacy, self-criticism, and a hated sense of self, with a decrease in both self-esteem and self-efficacy (Schiller, Hammen, and Shahar, 2016). Self-esteem, as defined by Rogers (1961), is composed of self-perceptions regarding one's own abilities and characteristics. Self-efficacy is defined through the evaluation of one's own competence in successfully executing a specific task to reach a desired outcome (Bandura, 1978, 1993, 1995). When faced with an external demand, an individual may either evaluate it as a threat or as a challenge (Chemers, Hu, and Garcia, 2001; De Groot and Pintrich, 1990). People with low self-efficacy are more likely to evaluate the demand as a threat, which may intensify their emotional reaction in turn resulting in a stress response (Sebastian, 2013). Self-efficacy and stress among university students have shown to have strong negative correlations (Gigliotti and Huff, 1995; Hackett, Betz, Casas, and Rocha-Singh, 1992). Other than the emotional reactions resulting from a psychological threat, the body stress system triggers an increase in heart rate and blood pressure, as well. Prolonged exposure to stress may compromise the functioning of the stress system, namely the sympathetic-adrenomedullary (SAM) axis and hypothalamic-pituitary-adrenocortical (HPA) axis, which may result in chronic physical and mental disorders (McEwen and Seeman, 1999). The onset of psychological distress, and specifically if not addressed, may disrupt the completion of normal educational and developmental tasks that many emerging adults face (Becker and Luthar, 2002). This then renders the identification of psychological resources that allow individuals to adaptively cope with such

stress an important research priority with major implications on physical health conditions, such as coronary heart disease, diabetes, and hypertension (McEwen and Seeman, 1999), as well as implications on mental health conditions, such as depression and anxiety (Alonso et al., 2004; La Via et al., 1996).

### **What is Self-Affirmation?**

One means of adapting to environmental factors that may challenge the sense of self, which is psychologically distressing, is to engage in self-affirmation (Steele, 1988). Self-Affirmation theory proposed by Steele (1988) postulates that people are motivated to maintain their perceived integrity and worth of the self, defined as being a “good” and “appropriate” person. The standards of what is means to be good may include important personal qualities and strengths, healthy relationships, and significant values one may uphold (Sherman and Cohen, 2006). A main goal for individuals is to protect the image of oneself when faced with a psychological threat (Sherman and Cohen, 2006; Steele, 1988). A psychological threat represents an inner alarm that evokes vigilance and the motive to reassert or reaffirm the self (Steele, 1988). One way to bolster the perceived integrity of the self and the overall image of being adequate and effective is through self-affirmation. Self-affirmation theory states that one can affirm important and valued sources in an unrelated domain of self-worth (Sherman, 2013; Sherman and Cohen, 2006). For instance, a college student may reflect on core family values when faced with difficulties adjusting in a new environment. Such reflections would then help place the threat (e.g., difficulty adjusting, rejection) in a larger context, in turn rendering it less psychologically taxing therefore acting as a buffer (Sherman and Cohen, 2006; D. K. Sherman, Bunyan, Creswell, and Jaremka, 2009)

## **The Self**

The self is defined as a cognitive and dynamic self-schema (Fiske and Taylor, 1991) and is composed of different domains, roles, and values (Crocker and Wolfe, 2001; Sherman and Cohen, 2006). For example, being a student or a sibling would be classified as a role, while values could be considered as being religious, succeeding in school, and membership to a certain cultural or racial group (Sherman and Cohen, 2006). Identifying with a certain domain, such as academic domain identification, is seen as self-defining and is an important ingredient in the global self-evaluation process of students (Osborne, 1995).

The self is also shaped and developed through culture. Culture is manifested through different types of selves, which contributes to how individuals define and make meaning of the self (Markus and Kitayama, 1991). For example, people in the U.S.A and Japan may hold strikingly different definitions of the self, others, and the interdependence between the two. People in the U.S.A stress on the attending to the self and how to appreciate the individual self, away from others. The Japanese, on the other hand, put an emphasis on fitting in with the rest of the community, and stress on harmonious interdependence with the group (Markus and Kitayama, 1991).

### ***The Individual Self***

The *individual* self consists of different qualities that distinguishes one person from another and highlights the unique side of the individual (Sedikides, Gaertner, and O'Mara, 2011). This representation of the self is relatively independent of group memberships and relational bonds (Sedikides, Gaertner, and Vevea, 2005). As previously mentioned, the population in the U.S.A exemplifies the independent view of the self, which stresses on appreciating one's difference from others (Markus and Kitayama, 1991).

### ***The Relational Self***

The *relational* self consists of qualities that define the person in unification with significant others within the same group, such as friends, family, or romantic partners (Chen and Boucher, 2008; Chen, Boucher, and Tapias, 2006). The *familial* self is a subcategory of the relational self which explicitly involves family bonds and shared familial identity (Cai, Sedikides, and Jiang, 2012; Cigoli and Scabini, 2006). For example, in East-Asian cultures, where generally affiliation, interdependence, and social harmony are valued, children are taught that morality is expressed through filial piety, which is submission to the parents and earning honor for the family (Wang, Deng, and Yang, 2016). With that being said, members of different cultures construct and adapt differing views of self and may hold extremely different construals of the self, as well (Markus and Kitayama, 1991).

### **Self-Affirmation and the Self**

Most of the literature on self-affirmation focuses on the affirmation of the individual self (Cai et al., 2012). Yet, the buffering effects of self-affirmation have also been supported through affirming the relational self (Chen et al., 2006). Nevertheless, relational and familial self-affirmation can be more useful among populations that value interdependence and shared familial identity (Hoshino-Browne et al., 2005). Kumashiro and Sedikides (2005) have mentioned how close positive relationships may function as shield and a buffer to self-threats among Asian Canadians. Previous studies have also tested relational and individual self-affirmation within an interdependent culture, such as China (Cai et al., 2012), among culturally different groups in the United States (Covarrubias, Herrmann, and Fryberg, 2016) bicultural populations in Canada (Hoshino-Browne et al., 2005), and results show that relational self-affirmation was a successful

buffer against threats to the self among interdependent groups (Cai et al., 2012; Chen and Boucher, 2008; Covarrubias et al., 2016; Gu et al., 2016)

### **Culture and Self-Affirmation**

Although the efficacy of self-affirmation has been established cross-culturally, the relationship between self-affirmation and culture may warrant further investigation. Research has found that culture plays a role in the efficacy of certain types of self-affirmation, as shown in several studies among participants with a relational view of the self (Cai et al., 2012; Hoshino-Browne et al., 2005; Kumashio and Sedikides, 2005). One means of determining which aspect of the self may be of particular use to buffer against threats is to examine self-construals of individuals within different contexts. Self-construal, as defined by Markus and Kitayama (1991) refers to the way one functions effectively in his or her social world and how the structure of the self is constructed within a flexible and dynamic matrix (Harb and Smith, 2008). Self construals can be differentiated through the *personal self-construal*, *relational-vertical*, *relational-horizontal*, *collective-vertical*, *collective-horizontal*, and *humanity-bound self-construal* (Harb and Smith, 2008). With regards to self-representations, the personal self is close to the independent self, a characteristic of Western studies of the self, which may be perceived as a free entity, where the focus is on the individual and not on the social circle the individual belongs to (Harb and Smith, 2008) For example, “I am shy” or “I am intelligent” is considered as an independent or personal statement. The relational self or the interpersonal self is understood through significant dyadic relationships such as family. For example, “I am a mother” or “I am Bob’s girlfriend” are considered statements from a relational self-construal. The collective self is construed as an interchangeable exemplar of larger in-groups such as religious memberships and would incorporate the rules and norms associated with that particular group, such as “I am African

American” or “I am on the soccer team” (Agrawal and Maheswaran, 2005). Finally, humanity-bound self-construal is defined by the belonging to the human species and differentiated from other living organisms – this category rests on a universal representation (Harb and Smith, 2008). The types of group and how they relate to the self are differentiated in terms of whether they emphasize hierarchy or equality, hence, vertical (e.g. Mother-child relationship) or horizontal (e.g. Spouse-spouse or friend-friend relationships) relationships (Harry C. Triandis, Lucca, Asai, Villareal, and Bontempo, 2005).

### ***Lebanon and Self-Construals***

Within the Lebanese context, and specifically among university students, research has shown that the personal and relational-horizontal self-construals are prominent and the population would lie on a continuum somewhere between Arab and Western culture on the other (Harb and Smith, 2008).

Conceptually, this study can account for the Lebanese self-construals where those who consider themselves relational will be able to benefit from familial self-affirmation, while the ones relating more to the personal self-construal will benefit from individual self-affirmation. The focus of the study will be an experiment to report on the ability to reduce stress through the use of self-affirmation on university students, including academic domain identification and self-construals as moderating and mediating variables, respectively, to better understand which type of self-affirmation can benefit which participants.

### **Rationale**

The present study will focus on Lebanese university students with an age range of 18-25, since university students experience elevated high levels of stress in comparison to the general population (Stallman, 2010). Such stress is also recognized as an important risk factor in the

development of psychopathological symptoms (D'Angelo and Wierzbicki, 2003; Newnham et al., 2015; Parrish et al., 2011).

To our knowledge, there are no studies that looked into the use of self-affirmation as a coping tool in Lebanon, especially since the identification of psychological resources that can allow an individual to cope with psychological stress is of high priority and interest (Carver and Vargas, 2011). Hence, the introduction of self-affirmation as a buffer against the psychological stress (Steele, 1988) that university students undergo (Stallman, 2010) is of high importance. Other than domain identification, cultural orientation is significant in the relationship between self-affirmation and self-threats, so self-construals will be studied as a mediating variable to check if the influence of self-construals is stronger than the direct influence of self-affirmation on the outcome variables. To our knowledge, self-affirmation has not been tested using self-construals as a mediating variable. Since self-construals lay on a continuum - instead of being categorical; including it in the study may be able to provide a more flexible view of culture that focuses on the self, at the individual level. This may be able to give insight on the importance of understanding the self-construal of a certain participant prior to providing a certain type of self-affirmation, regardless of the previous culture categorization.

### **Significance**

In Lebanon, the prevalence rates and age of onset of mental disorders are in line with international studies (Karam et al., 2008). Emerging adults, internationally, are struggling with high levels of stress that may result in a range of psychosocial problems and psychopathological symptoms (Landow, 2006).

Self-affirmation addresses a range of problems, such as stress (Sherman and Cohen, 2006). Knowing that self-affirmation can help in ameliorating stress, while shedding light on the cultural factors that implicate the type of self-affirmation deemed beneficial, the present study will provide university students in Lebanon the tools necessary to relieve them of their stressors. From a clinical standpoint, the results of the study may indicate potential benefits of stress-reduction interventions among university students through the introduction of value-affirmation tasks before engaging in stressful events or entering stressful environments.

Other benefits that may arise from this study relate to policy development. Specifically, universities can work on policies to allow students to self-affirm prior to encountering stressful situations, such as exams, in order to increase their academic success (D. K. Sherman et al., 2009, 2013). From a cultural standpoint, with the inclusion of self-construals in the study as a mediating variable, this study can show how cultural orientations may be evaluated on a continuum, based on the self, instead of studying them rigidly, definitively, and categorically. Finally, on a personal level, students will be able to use the tools of self-affirmation, in relation to their self-construals, and incorporate them within their daily routines to help in ameliorating the stressors they undergo.

### **Research Questions**

1. Are both individual self-affirmation and familial self-affirmation effective interventions to reduce stress among university students with high academic domain identification in Lebanon?
2. Can university students who self-affirm by reflecting on values that are core to their personal self have lower anxiety levels and higher self-efficacy when faced with a psychological threat?

3. Can university students who self-affirm by reflecting on values that are core to their personal self have lower stress levels and lower heart rate when faced with a psychological threat?
4. Will university students that identify with personal self -construals benefit more from individual self-affirmation?
5. Will university students that identify with relational-vertical benefit more from familial self-affirmation?

### **Literature Review**

Most mental disorders begin in adolescence and emerging adulthood (Hetrick et al., 2008) and there is strong evidence that points to a high level of continuity between adolescent and adult psychopathology (De Girolamo, Dagani, Purcell, Cocchi, and McGorry, 2012). The onset of mental health disorders can be a combination of both, genetic predispositions and negative environmental factors such as negative life events or high levels of chronic stress (Nimrod, Kleiber, and Berdychevsky, 2018). These disorders are major contributors to the burden of disease among youth (Auerbach et al., 2018). One of the contributing factors to poor mental health outcomes is prolonged stress (Rehner, 2016).

There is an increasing concern, internationally, regarding the mental health of university students and the impact this may have on the students (Shuchman, 2017). Half of college students in the United States met the DSM-IV criteria for at least one mental disorder (Blanco et al., 2008). The 2006 National Survey of Counseling Center Directors has shown that 91.6% of respondents believe that the number of students struggling with severe psychological problems has increased in recent years – which represents a big concern for the centers (Gallagher, 2005). The Harvard Public Health Department conducted a study in 2014 regarding the burdens of stress in the United States, and it reported that individuals with health-related issues experiences the most stress. In terms of stress, academic factors are viewed to be the predominant cause of stress in most students, followed by physical, social, and emotional factors (Bedewy and Gabriel, 2015). Majority of university students reported elevated stress levels and the numbers are significantly greater than that found in the general population, with females reporting higher levels of distress than their male counterparts (Stallman, 2010). Through an online survey sent to students of two Australian universities, results showed that 83.9% have reported elevated distress levels, which is

significantly greater than what was found within the general population (29%) (Stallman, 2010). Majority of students with elevated stress levels reported high scores on poor self-esteem, and almost half received high scores on the depression scales (Baste and Gadkari, 2014). The literature has also suggested that higher levels of stress are associated with poorer academic performance (Sohail, 2013). The results of such studies suggest that university students are a high-risk population in regards to mental health (Stallman, 2010).

### **Stress and the Transition into Adulthood**

The years spent at university are considered formative for emerging adults, and a major life transition faced by this population (Berzonsky and Kuk, 2000). College students, specifically, are at a high risk for prolonged stress due to the pressures they face concerning the responsibilities that come with their transition into adulthood (Rehner, 2016). These years involve a move from family to private living and shifts between social circles and networks (Vaez and Laflamme, 2002). These years also ask individuals to look closely at their career interests as they face an intense amount of coursework and workload, which in turn can result in a stressful outcome (Vaez and Laflamme, 2002). As students enter adulthood, they gain new responsibilities, such as reaching financial stability and upholding roles in various life domains (Rehner, 2016). With the new obligations of meeting academic standards, taking care of interpersonal issues, and maintaining academic achievement, this can particularly be a time of high stress for many college students.

According to Erikson's (1968) theory of psychosocial development, this population faces the challenges of forming a coherent and clear sense of self-identity. Universities provide an institutionalized moratorium where emerging adults can experiment with various options and roles to be able to construct a stable, coherent, and essentially positive sense of identity (Adams,

Berzonsky, and Keating, 2006; Manczak et al., 2014). Many students may thrive during this transition period (Arnett, 2007), while others may experience anxiety and ambivalence as they cope with identity issues and explore the possibilities in their future (Arnett, 2004). The ability to secure a positive and healthy sense of self can be compromised by various life stressors that often characterize emerging adulthood, such as the aforementioned interpersonal issues (Davila et al., 2004), relocation (Dubas and Petersen, 1996), and other stressors (Davila et al., 2004; Rindfuss, 1991). This may lead to self-doubt among emerging adolescents and may in turn disrupt their ability to navigate healthily through the developmental dimensions that are associated with this time period (Peer and McAuslan, 2015). Self-doubt can be described as a sense of uncertainty about one's competence and ability (Oleson, Poehlmann, Yost, Lynch, and Arkin, 2000). Self-doubt has also been shown to lead emerging adults to question their capabilities to be able to successfully experience the normative features of this critical period of development (Peer and McAuslan, 2015). Given the above, self-doubt has been found to be related to lower self-confidence, which is associated with identity development among college students (Carroll, Arkin, and Shade, 2011). Self-doubt has been suggested to be associated with impaired well-being, negative affectivity, and low self-esteem (Oleson et al., 2000). Given the relationship between self-doubt, negative emotion, and impaired self-esteem, it may play a contributing role in the development of mental disorders (Bandura, 1993; Hermann, Leonardelli, and Arkin, 2002). Self-efficacy, by definition, is the extent to which an individual feels confident about his or her competence in handling a certain situation affects how the task is perceived, either stressful and threatening or a challenge (Chemers et al., 2001; De Groot and Pintrich, 1990). Self-efficacy affects how an individual perceives an external demand and may be considered as a mediator between external stressors and psychological stress. Hackett et al. (1992) also suggested that

anxiety and stress may impair self-efficacy judgements of students and studies have shown that self-efficacy and stress have moderate to strong negative correlations (Gigliotti and Huff, 1995; Hackett et al., 1992). To sum up, the onset of psychological distress may disrupt the completion of normal educational and developmental tasks that many young adults face (Becker and Luthar, 2002).

### **Coping with Stress**

University students may have less well-developed and healthy coping mechanisms, with less experience than older adults in how to cope with disappointments and interpersonal losses, hence making them vulnerable to the effects of related stressors (Blanco et al., 2008). People have a psychological immune system that initiates protective adaptation strategies when an actual psychological threat is perceived (Gilbert, Wilson, Pinel, Blumberg, and Wheatley, 1998). Psychological threats can be considered as innumerable fails and self-threats, which include substandard performance on a class, illnesses, negative feedback, rejection, interpersonal conflict, loss, and so on. (Sherman and Cohen, 2006). In any given day, a number of events could threaten people's adaptive adequacy and their sense of self-integrity, self-worth, and self-efficacy (Sebastian, 2013; Sherman and Cohen, 2006; Zajacova, Lynch, and Espenshade, 2005)

The self is defined as a cognitive and dynamic schema. It is an underlying matrix of information clusters about who we are (Fiske and Taylor, 1991). The self is composed of goals such as succeeding in school, as well as several domains that include roles, such as being a student or sibling; social identities, such as membership to a cultural or racial group; and values, such as being religious. For students, academic domain identification is important because it is perceived as self-schematic and is a crucial aspect of the self-concept of students (Keller, 2007). The self-system is activated once a person experiences a threat to an important self-concept. Such events

may have implications for a person's overall sense of self-worth and self-integrity. Integrity is the sense that one is a "good" and "appropriate" person, while referring to a behavior that is fitting or suitable given the cultural norms and demands on a population within that society (Sherman and Cohen, 2006). For example, receiving negative feedback in school may threaten a person's identity as a student and his/her goal of succeeding in school. For example studies where stress is induced by asking students to perform a difficult mental arithmetic task in front of a hostile audience (Kirschbaum and Hellhammer, 1993) have shown that such tasks threaten the self, induce the appraisals of threat, and elicit the stress hormone known as cortisol (Dickerson and Kemeny, 2004). Such instances activate the self-system and signal the need for engaging in a mechanism aimed at restoring a sense of wellbeing and positive self-regard.

When self-integrity is threatened, people are motivated to repair it – which can result in defensive responses. For example, defensive responses may ameliorate threats to self-integrity but can be maladaptive in a sense that they prevent learning from important experiences and may threaten the integrity of their relationships with other people (Sherman and Cohen, 2006; Cohen et al., 2005). In conclusion, stress can threaten the integrity of the self, since it often emerges from incidents that call into question people's sense of adaptive adequacy and their perceived ability to meet the demands set on them (Sherman and Cohen, 2006).

### **Self-Affirmation: An Alternative Form of Psychological Adaptation**

Self-affirmation has received a great deal of empirical attention as an alternative form of psychological adaptation (Sherman and Cohen, 2006) which can provide any given person with effective coping strategies (Silverman, Logel, and Cohen, 2013), without resorting to defensive biases (Sherman and Cohen, 2006). By definition, self-affirmation is a process of maintaining self-integrity and self-worth when faced with a psychological threat (Steele, 1988). People who self-

affirm can respond to such threats using indirect psychological adaptation through affirming alternative self-resources that are unrelated to the direct threat (Cohen and Sherman, 2014; Sherman and Cohen, 2006; Steele, 1988). So, people can respond to certain threats in one domain by affirming the self in another domain. When self-affirmed, the person may realize that their sense of self-integrity or self-worth does not center on the implications of the situation at hand. So, he or she has less of a need to reconstrue that threat and may be able to respond in a more open and balanced manner, instead of resorting to unhealthy defenses.

Potential domains of self-affirmation include friendships, family, art and music, religion, or charity, to name a few. When faced with a difficult situation, reminders of such core qualities can provide the person with a perspective on who he/she is and can anchor his/her sense of self-integrity when faced with a threat. Self-affirmation makes one of these important qualities of the self, salient. With that being said, self-affirmation allows people to reflect on important domains of personal self-worth (Steele, 1988). Typically, self-affirmation is exercised in research through reporting on an important value or life domain through either writing an essay about it or completing a scale that allows them to assert its importance (McQueen and Klein, 2006).

Analysis of self-affirmation has suggested that stress may be ameliorated through the affirmation of alternative sources of self-integrity (Sherman and Cohen, 2006), which in turn can allow self-efficacy to be enhanced. Evidence of the stress-buffering effect of self-affirmation has been found among university students when faced with a stressful midterm exam (Sherman et al., 2009). Students that were in the treatment condition prior to the exam – those who self-affirmed – did not show a marked increase of epinephrine as their non-affirmed classmates. To test the actual stress-buffering effects of self-affirmation, one study asked participants in the experimental group to complete a self-affirmation task. The self-affirmation task included a value scale based on

previous experiments (McQueen and Klein, 2006; Sherman and Cohen, 2006) that is theorized to bring about important resources that are unrelated to the principal academic stressor (D. K. Sherman et al., 2009). The participants were asked to complete a 10-minute writing exercise in which they had to write about a value that they ranked as most important, such as relationships with family and friends, answer why this value is of importance to them and a time in their life where that value was shown to be the most important. For the no-affirmation condition, the participants in that group were asked to write about the value that they ranked as least important and why this value may be considered an important value to a typical university student (Sherman et al., 2009). To strengthen the affirmation manipulation, the participants in the experimental group were then asked to indicate their level of agreement with statements regarding their most important value, such as “I care about these values.” As for the no-affirmation group, they were asked the same question but indicating their agreement with “The typical university student cares about this value” (G. L. Cohen, Garcia, Apfel, and Master, 2006).

Following the self-affirmation manipulation, participants were then instructed to prepare a speech to two speech evaluators who were trained to act in a sullen manner followed by completing a mental arithmetic task. Salivary cortisol levels were assessed at baseline, before the speech preparation, and 20 minutes after stress onset. Participants were also asked to complete a three-item post-stress measure to rate how threatening, stressful, and difficult the tasks were. At baseline, there were no differences in cortisol levels between participants, yet at post-stress test, participants in the control condition had elevated cortisol levels, whereas the participants in the affirmed group did not. On a psychological level, participants in the self-affirmation group reported less stress levels. This shows that engaging in self-affirmation can buffer the self at a psychological and physiological level. Self-affirmation may therefore encourage people to view the stressful event

without feeling as though their self-integrity is in question. Moreover, if self-affirmations can reduce the physiological responses to stress (Creswell et al., 2005), then it is likely that repeated affirmations may help people cope with daily stressors, since such daily stressors have been shown to impair immune functioning (Kiecolt-Glaser and Glaser, 1988).

### **The Self and Self-Affirmation**

Most of the literature on self-affirmation is predominantly from a Western culture and focuses on the affirmation on the individual self (Cai et al., 2012). White middle-class contexts promote an understanding of the self that is autonomous, independent and separate from others. While, on the other hand, the interdependent model of the self is fostered in more collectivistic contexts, such as Latino, Asian, and Native American culture.

There is extensive literature on cross-cultural differences in the conception and experience of selfhood. For example, the prototypic construal of the self for individuals living the United States is characterized by an independent view of self which is relatively bounded autonomous and consists of qualities that are distinct from others and the environment (Sedikides and Brewer, 2001). This construal of the self represents the behavior of the individual by reference to one's personal repertoire of cognition, feelings, and action and not through the cognition, feelings and actions of other group members (Markus and Kitayama, 1991). The interdependent self is perceived as a connected, flexible, and committed being who is bound to others (Markus and Kitayama, 1991). In recent years, there has been a proposed differentiation of the self along three dimensions, *the personal, relational, and the collective* (Brewer and Gardner, 1996; Kashima and Hardie, 2000; Kashima et al., 1995; Sedikides and Brewer, 2001). Closely related to Markus and Kitayama's (1991) independent self is the "personal self," which is the most characteristic of Western studies of the self. The personal self or independent self strives to differentiate from others

with an independent and unique representation of the self. Second, the relational or interpersonal self is construed through familial relationships or through small groups made up of significant interactions, such as family and close friends (Chen et al., 2006; Sedikides et al., 2011). Third is the collective self, in which the self is construed as a similar exemplar of larger in-groups such as a religious or political membership. This collective self may incorporate the roles and norms that are associated with a particular group. In distinguishing the relational and collective selves, the key variable is the size and intimacy of the group (Harb and Smith, 2008; Sedikides et al., 2011).

Although types of groups and their relation to the self differ in size and intimacy, they can also be differentiated in terms of whether they accentuate equality or hierarchy (Harb and Smith, 2008; Triandis, 1995). Certain groups are more likely to have a hierarchal structure, such as military or political groupings. Others have an egalitarian/horizontal structure such as friends or leisure clubs. This distinction between vertical and horizontal relationships pervades each of the cross-cultural theories currently available (Harb and Smith, 2008). So, it is possible to have several differentiations of self-construals: the personal, which is defined through unique traits and independence – away from family or group values; the relational-vertical, which is defined by a hierarchal dyadic relationships around the focal self (e.g. power among social dynamics, such as family); the relational-horizontal, which is represented by equality within dyadic relationships (e.g. close relationships with friends); the collective-vertical, which is categorized by larger hierarchal social groups (e.g. political affiliations, or military groupings) and the collective-horizontal, explained through a larger in-group that accentuates equality, (Harb and Smith, 2008). So, in regard to self-affirmation, it is important to affirm one's sense of self through the cultural variation of self-concept to be able to positively impact identity safety, (Covarrubias et al., 2016) the belief that an individual is accepted and can succeed in a given situation.

### **Different Types of Self-Affirmation**

Although reflecting on core values central to the personal self has been the norm in the majority of the literature on self-affirmation (Cohen and Sherman, 2014; Sherman, 2013; Steele, 1988), affirming the relational self has also been shown to be effective especially for people for whom dyadic bonds represent core components of their identity (Chen and Boucher, 2008). Relational self-affirmation involves asking participants to reflect upon values that are central to their family, friends or a larger social group as opposed to values that are central to themselves alone (Chen et al., 2006; Hoshino-Browne et al., 2005). People who view their relationships as a core identity component are more likely to refer to their significant others in describing themselves in response to a psychological threat (Chen and Boucher, 2008). Relational self-affirmation is especially potent in counties that value interdependence and social harmony, such as in East-Asian culture (Hoshino-Brown et al., 2005). The relational self can be subdivided into the familial self and the close other self. Familialism specifically reflects an orientation towards familial relationships (Gaines et al., 1997). Familial bonds involve interdependent, emotionally involved, and long-lasting relationships that encompass a special type of groupness, unlike friendship bonds per say. It is a source of shared identity and is of paramount importance to the group members (Cigoli and Scabini, 2006).

In Chinese culture, Familialism is a highly internalized and core value. In contemporary Chinese culture, for example, children learn about morality through familial piety and submission to their parents to earn honors for their family (Wang et al., 2016). Compared with Western cultures on average, Chinese value self-family connectedness more than self-friend connectedness (Li, 2002). This is supported by a study done by Cai, Sedikides, and Jiang (2012) on university students in China, where they compared the potency of familial self-affirmation to individual self-

affirmation, affirmation of friends/romantic partners, and a low affirmation group (values related to the average university students). The threat intervention included a failure feedback result on a integrative orientation test, which was described as a valid measure of integrative ability and creativity. The results among the experiment showed that familial self-affirmation emerged as the most potent buffer against threat in comparison to other types of self-affirmation – with individual self-affirmation being ineffective at all in all experiments. Another study by Gu et al. (2016) focused on familial self-affirmation as a potent psychological resource in social decision-making by increasing the possibility of rejecting an unfair offer within a Chinese population. Since the Chinese culture holds interpersonal harmony at high value and rejecting an offer may pose a real concern regarding interpersonal harmfulness (Markus and Kitayama, 1991), the authors were not sure if the findings of their study hold true beyond China (Gu et al., 2016). According to another study that focused on gender and social-class achievement gaps in China, using an adapted interdependent self-affirmation value scale (Cohen and Sherman, 2014) in the experimental condition, the participants of the Massive Open Online Courses, an online learning environment, had substantially improved grades, completion rates and persistence for the most disadvantaged group of lower-class men who are the most threatened and lowest performing subgroup.

This does not necessarily mean that individual self-affirmation is not useful in all collectivistic contexts. The finding is an example of the need to take into account cultural orientation as a potential mediator when examining how affirmation interventions are applied in non-Western contexts. Although not necessarily evaluated as a mediator, the role of cultural orientation in determining the efficacy of affirmation interventions was evaluated by Hoshino-Brown (2005) where European Canadians and Asian Canadians were randomly assigned to affirm by referring to their independent or interdependent selves. Results showed that bicultural East

Asians who strongly identify with Canadian and Asian cultures and embrace both the independent and interdependent self-concepts had more resources to self-affirm (individual and relational self-affirmation) compared to monocultural populations. The study indicates that to the extent that one identifies with a given culture the resource they tap into to self-affirm differs.

### **Why Lebanon?**

In Lebanon, mental health of young people has not been widely examined and mental health issues are stigmatized (Karam et al., 2008). Yet, from the limited number of studies around the topic, research has shown that the prevalence estimates of mental disorders were similar to those in the West, with anxiety, mood, and substance use disorders being the most prevalent among youth (Karam et al., 2008). Subsequently, several studies show that people living in unstable countries, such as Lebanon, are at a higher risk of developing mental health problems such as depression, anxiety, and other stress disorders which are precursors for suicide ideation and behavior (Karam et al., 2008). The Ministry of Public Health (MoPH) in Lebanon has created a Mental Health and Substance Use prevention, promotion and treatment plan for Lebanon for 2015-2020 to ensure the development of a sustainable public mental health system due to the increasing public health concern on mental health in the country (Ministry of Public Health, 2015). Analysts and policy makers in Lebanon have been assessing a long list of problems in the country with primary challenges to security and stability on an economic and ecological level (Haugbolle, 2019). Lebanon is also one of the highest indebted countries in the world, with \$93.4 billion public debt (Arabian Business, 2020), with a dangerous depletion of resources, human capital and brain drain (World Bank Group, 2020). In 2012, statistical analysis on employments rates in the Arab world showed that Lebanon has a 36.6% unemployment rate among university graduates (El-Khoury, 2016). With the aforementioned political and economic instability in the country, the

concept of uncertainty is a daily stressor that the Lebanese population may undergo (Shamai, 1999).

### *Self-construals in Lebanon*

Arab cultures in general display a strong vertical structure with strong family relationships (Barakat, 1993; H. Hofstede, 2001). In a study on self-construals comparing the United Kingdom, Jordan, Syria, and Lebanon, results showed that in terms of personal self-construal and the relational-horizontal self-construal, the United Kingdom ranked the highest, followed by Lebanon, Jordan and Syria. For the personal self-construal, the personal self is differentiated and individuated from others (Markus and Kitayama, 1991) and the study showed that the United Kingdom and Lebanon ranked higher in such self-concept than Jordan and Syria. As for relational-horizontal self-construal, the relational self is derived from connections and dyadic relationships (e.g. family and friends) while the horizontal differentiation focuses on the egalitarian structure of the relationship (Harb and Smith, 2008). For example, a group of friends may be considered a relational group due to its small size and intimacy and may emphasize equality as a social dynamic which seeps into identity and self-construals (Harb and Smith, 2008). In terms of relational-vertical, the Syrian sample scored the highest, followed by Jordan, then Lebanon, and finally the United Kingdom. This finding means that the dyadic group that one identifies with (e.g. family) follows a hierarchal structure. This may be attributed to the patriarchal system which has been governing the family systems in Arab countries for quite some time (Fargues, 2005). For the collective-vertical, the rank order was Syria, Lebanon, Jordan, then the United Kingdom. The collective self is reflected through the internalizations of the characteristics and norms of important groups (e.g. religious or political groups) and the concept of self is in line with that of group identification (Brewer and Gardner, 1996) and follows a hierarchal structure, meaning that the

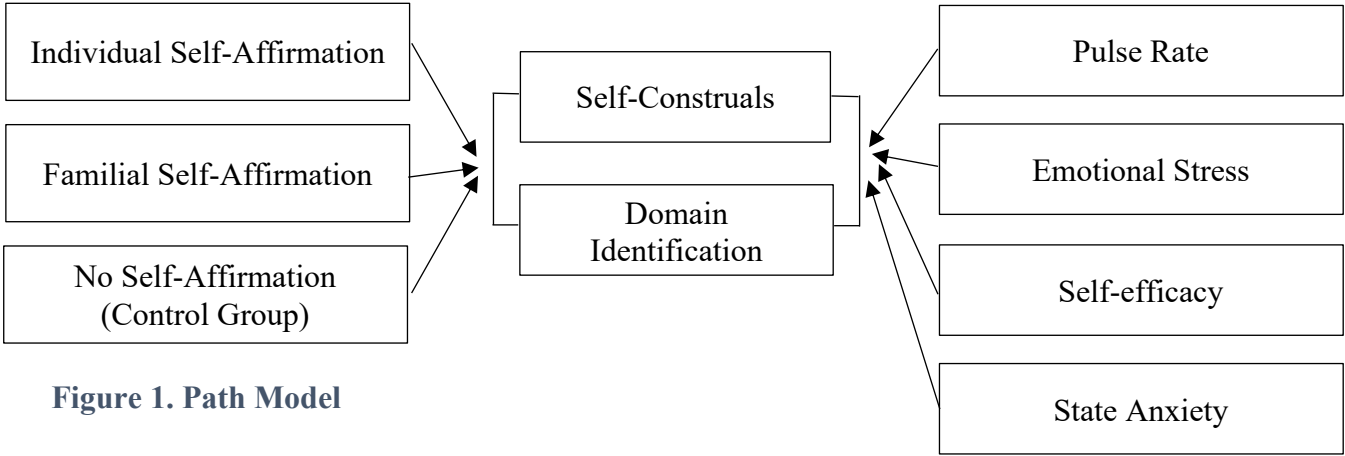
self's goals would be in line with socially oriented values, such as tradition (Harb and Smith, 2008). As for collective-horizontal, Jordan and Syria predicted significantly higher scores than the U.K and Lebanese samples. These results are consistent with existing characterizations of the cultural differences in these countries where Arab participants endorse vertical and collective self-construals more strongly (Barakat, 1993; H. Hofstede, 2001). When talking about collective-horizontal dimension, one may refer to students at a university – the collective represents a larger group, while the horizontal structure focuses on egalitarian views.

The Lebanese sample showed a profile of self-construals that lies on a continuum somewhere between those of the Jordanians and Syrians on one side and the British on the other (Harb and Smith, 2008). This indicates that Lebanese cannot necessarily be characterized as collectivistic as other Arab countries or individualistic as Western nations (specifically North America and Western Europe). A study assessing individualism and collectivism values among managers in seven different Greater Middle East countries by Ralston et al., (2011) has shown that collectivism is higher for Arab Islamic countries, such as Egypt and Algeria, than more religiously diverse countries, such as Lebanon. It has also shown that Lebanon has relatively low collectivism and higher individualism (Ralston et al., 2012). Similarly, in a cross-cultural study assessing the variation of self-reliance (individualism/personal dimension), group-oriented interdependence (collectivism dimension) and competitiveness (individualism or collectivism dimension) among 20 countries, Lebanon was associated with self-reliant competitors – hence portraying individualistic values (Green, Deschamps, and Páez, 2005). On the other hand, according to Ayyash-Abdo (2001) in a study on collectivism and individualism among university students in Lebanon, the participants who chose to complete the survey in their mother tongue, the Arabic language have a more collectivistic orientation than other participants. In regard to religion, it

appeared to be that Muslims specifically also fall on the collectivistic side of the spectrum, in comparison to Christians and Druze in Lebanon. The nuance here supports the need to evaluate self-construals within Lebanon with an expectation that while some may fall on the collectivistic side of the continuum, some others may fall on the other extreme of the continuum, the personal self-construal.

**The Present Study**

The present study extended the literature on self-affirmation in a country as Lebanon that seems to lie on a cultural continuum between a collectivistic and personal self-construals. This research shed light on how self-construals may mediate the effectiveness of self-affirmation. Through the mediating variable of self-construals, an experimental design tested whether Lebanese university students will benefit more from the stress-buffering effects of individual self-affirmation or familial/interdependent self-affirmation (See Figure 1). In the present study, we used personal self-construal and relational-vertical self-construal as mediating variables because they are directly linked to the representation of the self in regard to individual and familial self-affirmation.



**Figure 1. Path Model**

## Hypotheses

Anxiety states are depicted by subjective feelings of apprehension, nervousness, and tension, as well as the activation of the autonomic nervous system (Spielberger, 1972). The autonomic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis are also activated in response to stress (Jacoby, Overfeld, Binder, and Heim, 2015). An emerging body of research has suggested that self-affirmation may be an effective stress management approach (Creswell et al., 2013), which according to Bandura (1997) is a further means by which self-efficacy can be boosted. Experimental interventions have provided evidence on the psychological stress-buffering effects of self-affirmation with positive self-resources being associated with reduced stress appraisals before and after stress tasks. According to McQueen and Klein (2006), domain identification emerged as a factor that varies responses to self-affirmation and academic domain identification, specifically, is a crucial aspect of the self-concept of students (Keller, 2007).

*H<sub>1a</sub>*: Participants with high domain identification, who engage in self-affirmation by reflecting on values that are core to their personal self, compared to those who do not affirm, will score lower on anxiety as measured by the State-Trait Anxiety Inventory (Spielberger, 1983) and higher on self-efficacy as measured by the General Self-Efficacy scale (Schwarzer and Jerusalem, 1995).

In response to a psychological threat, the body's stress systems, such as the sympathetic-adrenomedullary (SAM) axis and the hypothalamic-pituitary-adrenocortical (HPA) axis are affected (McEwen and Seeman, 1999), hence triggering an increase in heart rate, among others, which facilitate short term fight-or-flight responses to threat (McEwen and Seeman, 1999). Research has shown that affirmed participants have significantly lower cortisol responses to stress-tasks in comparison to the control groups (Creswell et al., 2005), hence lower stress levels.

*H<sub>1b</sub>*: Participants with high domain identification, who engage in self-affirmation by reflecting on values that are core to their personal self, compared to those who do not affirm, will have lower heart rate as measured by the Heart Rate and Pulse logger Sensor (NUL-208), as well as lower stress levels as measured by Galvanic Skin Response Logger Sensor (NUL-217).

In addition to individual self-affirmation, many studies have focused on affirming an interdependent self (Cai et al., 2012; Chen and Boucher, 2008; Hoshino-Brown et al., 2005), known as relational self-affirmation. Familial self-affirmation is one type of relational self-affirmation that has been proposed to better fit within an interdependent culture (Cai, Sedikides, and Jiang, 2012). These studies suggest that cultural orientation may moderate the impact of self-affirmation sources. Research points to cross-cultural differences in the conception and the experience of the self, as well (Sedikides and Brewer, 2001). Due to the proposed differentiation of the self among three dimensions, the personal, relational, and the collective (Brewer and Gardner, 1996; Kashima and Hardie, 2000; Kashima et al., 1995; Sedikides and Brewer, 2001) as well as the distinction between vertical and horizontal relationships (Harb and Smith, 2008), self-affirmation may be studied not only through interdependent and independent concepts, but through self-construals, specifically, a more fluid concept of self.

*H<sub>2a</sub>*: We expect that participants who identify with the personal self-concepts, measured by the Sixfold Self-Construal Scale (Harb and Smith, 2008) will benefit from the stress-buffering effects of individual self-affirmation.

*H<sub>2b</sub>*: We expect that participants who identify with relational-vertical self-concepts measured by the Sixfold Self-Construal Scale (Harb and Smith, 2008) will benefit from the stress buffering effects of familial self-affirmation.

## Methodology

### Design

The study employed a blind between-participants post-test only control group experimental design with three groups. Participants were randomly assigned to two experimental groups and one control group to test for the stress-buffering effects of individual self-affirmation and familial self-affirmation relative to a control condition of no affirmation. The independent variable in the study was type of self-affirmation, while the dependent variables were measured through (1) pulse rate, (2) emotional stress, (3) self-efficacy, and (4) state anxiety.

### Participants

A total of 101 male (28.7%) and female (69.3%) undergraduate and graduate students were recruited from Haigazian University through convenience and snowball sampling (See Table 1). Due to the deletion of some cases in the study, because of missing physiological data, 33.7% were in the Individual Affirmation experimental group, 31.7% were in the Familial Affirmation experimental group, and 34.7% were in the No Affirmation (Control) group.

The minimum required sample size for the present study was 159 determined using G\*Power 3.1 assuming medium effect ( $f = .25$ ) with a 5% probability of error and a power of .8 (Faul, Erdfelder, Buchner, and Lang, 2009; Faul, Erdfelder, Lang, and Buchner, 2007). However, the resulting sample size was lower than the required size as a function of external constraints that rendered recruitment of participants difficult. First, in October of 2019, a nationwide revolution in Lebanon broke out and for days at a time, the university was closed. As the second semester started in February of 2020, the COVID-19 pandemic forced the almost complete shutdown of the University and a shift towards online learning. For safety measures, recruitment was stopped at 101 participants. Participants were recruited by the principle investigator in person, two research

assistants, as well as through advertisements posted on campus after receiving clearance from the Social and Behavioral Sciences Ethics Committee at Haigazian University and the student's life office. The advertisement was also shared via email to all students at the university. Students were also approached during class time, after receiving approval from the class instructors, to collect their contact information had they accepted to take part in the study. They were then contacted for scheduling of the experiment.

**Table 1***Sociodemographic Information*

	Student Sample
	N (%)
Sex	
Male	29 (28.7)
Female	70 (69.3)
Age (Mean; Standard Deviation)	20.6; 2.62
Year at University	
Sophomore	40 (39.6)
Junior	35 (34.7)
Senior	25 (24.8)
Graduate (Master's Level)	1 (1)

***Exclusion Criteria***

Exclusion criteria included students with declared preexisting health conditions such as hypertension and mental health problems, such as anxiety disorders, or are taking medication that might influence the HPA axis function, such as psychotropics or beta blockers (Creswell et al., 2005; Tyrca et al., 2007). Other exclusion criteria included not being a Haigazian student, as well as being under the age of 18. No students fit the above criteria, and none were excluded for that purpose. Such criteria was mentioned during recruitment, prior to the experimental procedure.

**Ethical Approval**

Approval was obtained from the Social and Behavioral Sciences Department's Ethics Committee at Haigazian University for the protection of the human participants prior to the initiation of the experiment (Code of Protocol, TY.08.19). Participants were informed that the data was collected for research purposes to complete a thesis dissertation (Check Appendix A for Participant Information). Participants were also informed about the anonymity and confidentiality of their responses as well as their right to refuse participation and withdraw at any time throughout the experimental protocol at no cost (Check Appendix B for Informed Consent). Participants were then asked to provide their phone numbers and received text messages as reminders for the time and day of experiment. The names and phone numbers of participants were stored on a separate sheet on the personal computer of the primary investigator and only the primary investigator had access to them. The names and numbers were not linked to the data of the participant and were not logged into the participants data files. After the completion of the experiment, the sheet was permanently deleted from the personal computer of the primary investigator because such data is not deemed beneficial for the experiment.

The present research involved deception to maintain the integrity of the experimental manipulation and its subsequent effect on the dependent measures. As such, participants were then debriefed after completing the experiment and were given the option to withdraw their participation should they want to, until the thesis is submitted and published.

### **Experimental Protocol and Piloting**

Prior to the launch of the current study, three phases intended at preparing the experimental protocol and piloting it were set in place. Given that the study provided students with the option of responding in English or Arabic, first, all scales to be used were translated using a combination of the backtranslation and committee procedures, a translation process called the application option (Van de Vijver and Hambleton, 1996). Next, the stress inducing task was developed and the experimental protocol was piloted. These phases are elaborated on next.

### ***Translation and Adaptation of Scales***

Since the scales that were used in the study are predominantly in the English language, a translation committee was formed for the translation of the study protocol to the Arabic language. This included the Self-Affirmation intervention, the State Trait Anxiety Scale (Spielberger, 1983), as well as the sociodemographic information and the domain identification statement (Check Appendix D). The application option used in this translation procedure is frequently used and assumes good coverage of the theoretical construct and a suitable instrument format of the translated scale (Van de Vijver and Poortinga, 2004). To ensure cultural adaptation, the first stage was forward translation by two bilingual translators. The second stage included the synthesis of the translations where the items best depicting the English versions were used. The third stage was a back translation, where the new version of the scale was seen by a third translator and translated back to the original language. This was an important process to check on the validity of the

translated material and whether same content as the original material was reflected. Last, the back-translated version of the protocol and the original English protocol was revised by the three translators and the thesis adviser and all discrepancies were resolved. In the final step, the translated scales were reviewed by an expert committee of one PhD clinical psychologist, one PhD social psychologist, one MA clinical psychologist and a linguist where critical decisions were made to achieve equivalence between the original scale items and the translated items (Beaton, Bombardier, Guillemin, and Ferraz, 2000; Wild et al., 2005).

### ***Stress Manipulation Test Items***

For the stress manipulation section of the experiment, participants were asked to complete a 10-item analytic test that they believed was a measure of their analytical skills. The 10 exam items were sampled from the math section of the GRE test (Cadinu, Maass, Frigerio, Impagliazzo, and Latinotti, 2013; Steele and Aronson, 1995). The items chosen were of moderate difficulty level to avoid inducing helplessness among participants. To select the 10 most suitable items, the primary investigator filtered through the items based on the criteria mentioned. Next, the filtered items were reviewed in a focus group, comprised of two graduate and two undergraduate students, and the advisor. Members of the focus group evaluated the items based on clarity and difficulty level, and they found the questions to be of moderate difficulty and were able to solve all 10 exam items.

### ***Testing the Experimental Manipulation***

The experimental protocol was tested in a pilot phase prior to the launch of the study with three volunteer students. The aim of the pilot phase was to evaluate the procedure of the experiment in all its phases. Special attention was directed to the physiological apparatuses being used - the galvanic skin response and the pulse rate monitor - as well as the interpretations of participants on

the aim of the study. After the volunteers completed the experimental procedure, they provided the research instigator with retrospective verbal reports which included their interpretation of the study, duration and boredom. The three students gave positive feedback on the overall experiment. They still believed it was an analytical test, they did not feel any boredom and felt that the duration was acceptable. The students were then debriefed about the experiment and were thanked for their participation in the pilot study.

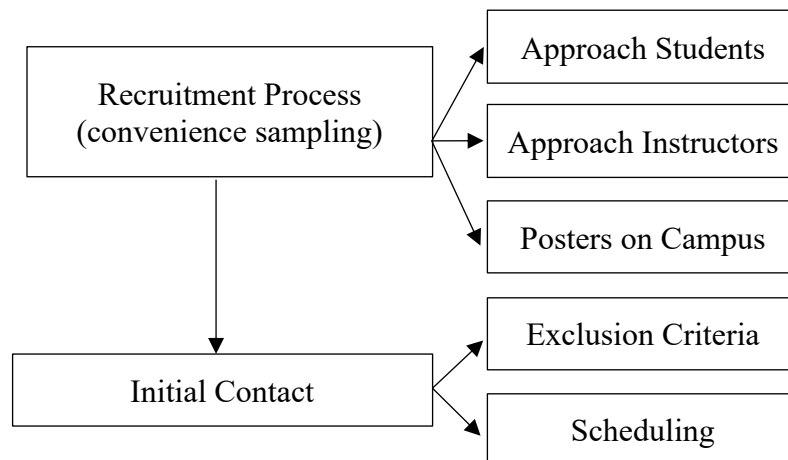
The results of the pilot study provided an approximation of the time required to complete one experimental procedure as well as the effectiveness of the instrumentation used. The experimental procedure took approximately 25-30 minutes per participant. The purpose of the pilot study allowed the primary investigator to test the administrative procedures as right as possible and reveal any possible errors with any of the instruments or the design (Barker, Pistrang, and Elliot, 2016; Christensen, Johnson, Turner, and Christensen, 2011). As for the apparatus and the recording program, the research investigator tested the usability, soundness, recordability, and data extraction procedure.

### **Pre-Commencement**

After piloting the study, the pre commencement phase of the study began, including the recruitment process and initial contact (See Figure 2). Students were approached on campus, through approved advertisements on campus, and in class - after getting the instructors' approval. The title of the experiment was "Analytic Skills of undergraduate students at Haigazian University." When presenting the study, the title was mentioned and the incentive. The incentive provided, after the completion of the experiment, was a cup of coffee and a cookie. The research instigator as well as the research assistants gave minimal information about the experimental process during initial contact, such as the name of the experiment, duration range, withdrawal

right, and the incentive. It was mentioned that all details will be provided upon arrival to the experiment.

Students who agreed to participate were checked if they fit the inclusion criteria (See Exclusion Criteria), and all participants were eligible. The eligible students who agreed to participate were given an appointment to be scheduled between 9:00am and 5:00pm between the months of October 2019 and March 2020. Students were also asked to refrain from activities that affect stress levels such as smoking and having caffeinated drinks on the day of their testing and were contacted a few hours before their experiment as a reminder for attendance.

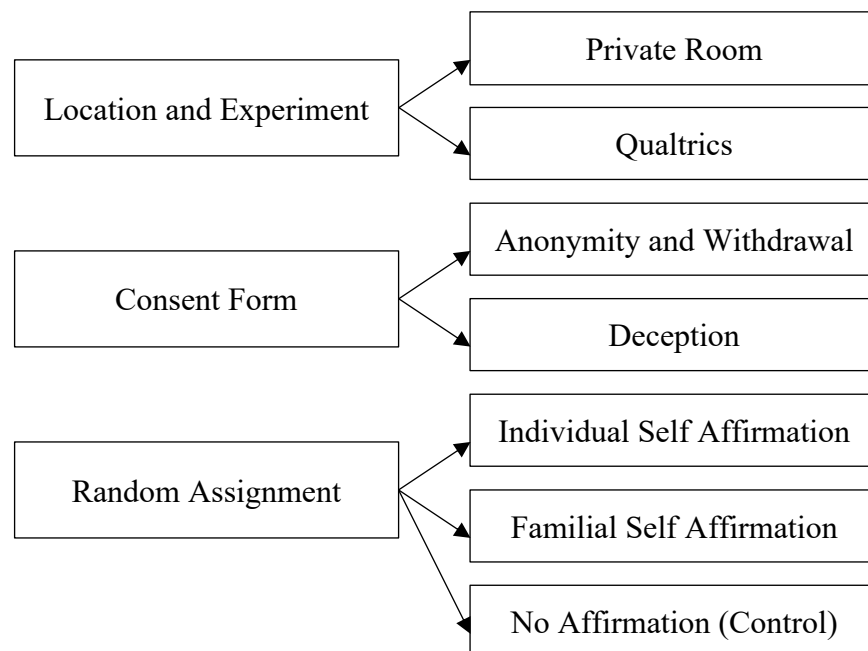


**Figure 2: Pre Commencement**

### **Post-Commencement**

The experimental sessions took place in room 305-MZ1 on the third floor of the Heritage building at Haigazian University . One at a time, participants entered the room and were asked to sit on the designated computer. The primary investigator told participants that the test will be conducted on the computer with all instructions available on the screen. When the students asked questions about the experiment, the primary investigator assured them that all questions will be addressed at the end of the protocol and that he / she should work on doing their best. The

participants were first provided with an electronic consent form (Appendix B) where they were informed that they will be involved in a study investigating “Analytic Skills of undergraduate students at Haigazian University,” an ability which is said to be predictive of students’ professional career, as well as being a valid measure of analytical intelligence. This methodology was used because self-affirmation manipulations have been shown to be less effective when the relationship between the manipulators and subsequent measures have been disclosed (Sherman et al., 2009). Participants were then randomly assigned through a randomizer option on the Qualtrics platform, an online survey platform, to three experimental conditions: (1) Individual self-affirmation, (2) familial self-affirmation, and (3) no self-affirmation (control group). Consenting participants then proceeded with the experiment which was prepared and carried out on Qualtrics (See Figure 3 for Post-Commencement details).



**Figure 3. Post Commencement**

Throughout the process, the lead investigator sat quietly in the room behind another computer screen to maintain privacy of responses and to monitor the physiological measures of stress through a Heart Rate and Pulse logger sensor (NUL-208) that measures heartrate and Galvanic Skin Response logger sensor (NUL\_217) that measures emotional stress. Next is a detailing of the experimental protocol in steps (See Figure 4).

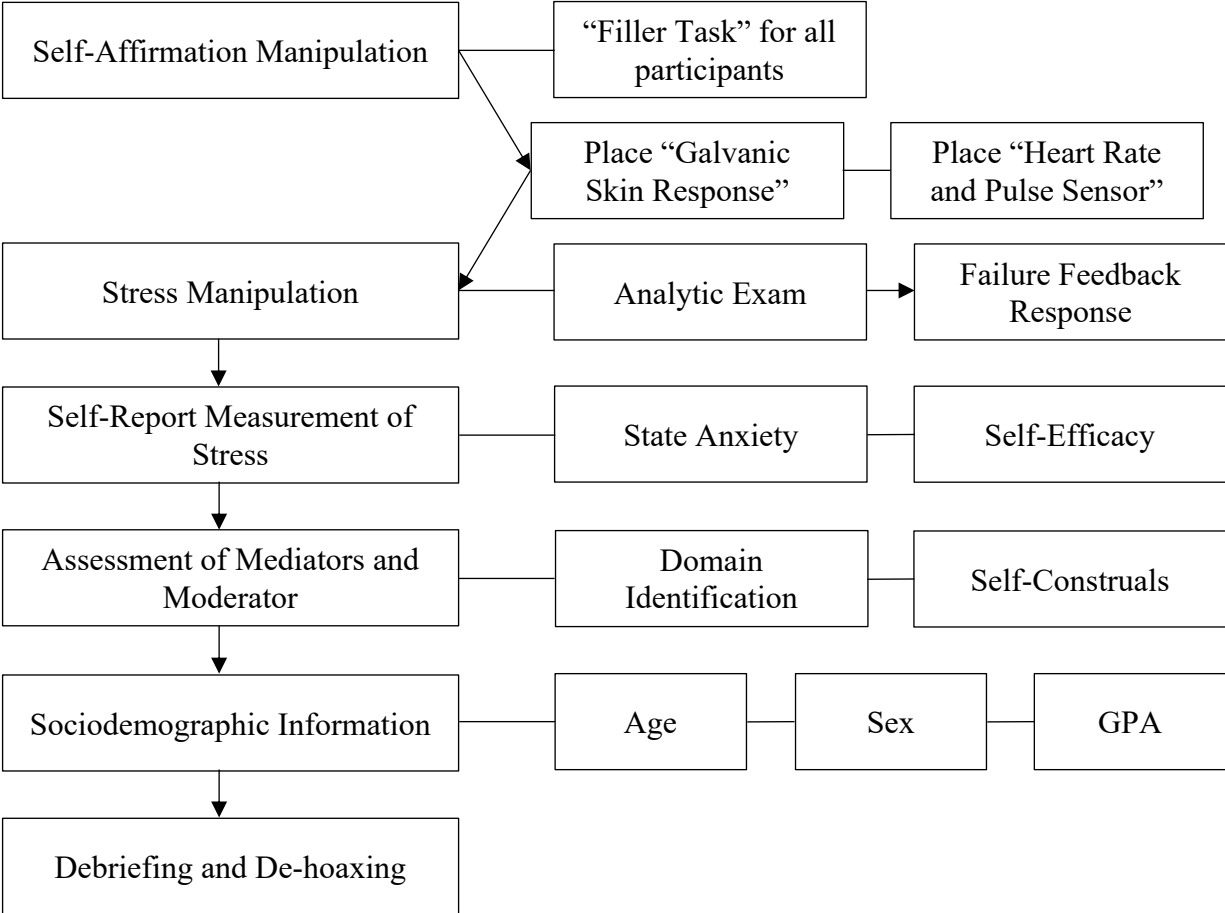


Figure 4. Experimental Protocol

### ***Self-Affirmation Manipulation***

The computer screen mentioned a statement that claimed that the computer was randomizing the questions for the experiment and asked the participant to complete a filler task (self-affirmation manipulation) as participants waited for the questions to be randomized. The individual self-affirmation group was asked to complete a widely-used self-affirmation manipulation (Cohen, Aronson, and Steele, 2000; Sherman, Nelson, and Steele, 2000; Sherman and Cohen, 2006) in which they were shown a list of 11 different values, such as athletics, musical ability, religion, relations with family, and were asked to rank these values from most to least important to them personally. Then, they were asked to write a short essay listing the top reasons the highest-ranked value was important to them as well as indicating the importance of the value to them through four questions rated on a six-point Likert scale. In the familial self-affirmation condition, participants received the same self-affirmation manipulation, but instead of answering how the value is important to them personally, the participants described why the value is important to “them and their family,” collectively. In the control condition, participants were asked to list in detail everything they had eaten or drank in the past 48 hours. They were told not to worry about things they aren’t able to remember (Cohen et al., 2000). This task was chosen to control for any self-affirmation process. The task did not take longer than 10 minutes (Check Appendix D).

### ***Physiological Measurement of Stress.***

After completing the self-affirmation exercise, all participants received a message on the computer asking them to alert the primary investigator to attach the GSR sensor and the heart rate monitor prior to moving forward. Each participant was fitted with a NEULOG GSR logger sensor (NUL-217) on the index and middle fingers of their non-dominant hand, as well as the

Heart Rate and Pulse logger sensor (NUL-208) on the little finger. The participant was asked to relax for the first two minutes to measure their baseline performance (Mundell, Vielma, and Zaman, 2016; Villarejo, Zapirain, and Zorrilla, 2012). After all devices have been connected to the participants and calibrated, the stress manipulation followed, while continuously recording from the device.

### ***Stress Manipulation***

Following the device connection and calibration, all participants were asked on the computer to complete a 10-item analytic exam that was presented as “predictive of students’ professional career and their analytical intelligence.” Each question had a one-minute and ten seconds time frame to trigger cognitive stress (Caviola, Carey, Mammarella, and Szucs, 2017). After completing the test, the screen displayed a message asking the participant to wait as their results are being processed. All participants received a failure feedback message, regardless of their answers (Check Appendix E).

### ***Self-report measurement of stress***

Next, participants were asked to fill in a short 20-item questionnaire measuring state anxiety (Spielberger, 1983) (Check Appendix F) as well as a 10-item questionnaire on general self-efficacy (Schwarzer and Jerusalem, 1995) (Check Appendix G) presented in a counterbalanced order to control for sequencing effects (Christensen et al., 2011).

### ***Assessment of self-construals***

Next, participants were asked to complete the Sixfold Self-Construal Scale (Harb and Smith, 2008) (Check Appendix H).

### ***Assessment of Domain Identification***

Identification strength was assessed through one item asking the importance of academics to their self-concept on a 5-point Likert scale ranging from “Very important” to “Not important” (Check Appendix I). The item states the following: “It is important for me to do well and succeed academically” (McQueen and Klein, 2006). This question is meant to evaluate domain identification as a potential moderator for the effect of self-affirmation on stress levels, given that it has emerged as a factor that varies responses to self-affirmation (McQueen and Klein, 2006). The use of a single item may help in reducing time for participant fatigue and data collection (Reysen, Katzarska-miller, Nesbit, and Pierce, 2013). There are also some academics that argued that when a specific construct is narrow in scope and unambiguous, using a single item may be considered as a good measurement approach (Sackett and Larson Jr., 1990). More recently, Rossiter (2002) mentioned that “when an attribute is judged to be concrete, there is no need to use more than a single item to measure it,” and provided evidence into similar predictive validity of a single item predictor in comparison to a multiple item scale (Bergkvist and Rossiter, 2007).

### ***Assessment of sociodemographic information***

In the final phase of the experiment, participants were asked to fill in socio-demographics, such as age, gender, year at university, and current Grade Point Average (GPA) (Check Appendix I).

### ***Ethical Debriefing***

The primary investigator then debriefed participants on the experiment, provided complete information, explained the rationale for the deception, and answered all questions related to the study (Check Appendix C) (Barker et al., 2016). Participants were then thanked for

taking the time to participate in the experiment and were asked if they are interested in receiving the results of the study via email. Participants were also asked not to share the information on the experiment with their fellow colleagues to avoid contamination.

## **Instruments**

### ***Self-Construals***

The participants' self-construal was measured through The Sixfold Self-Construal Scale constructed by Harb and Smith (2008). The items indicate the participants' various self-construals, for example, whether they are predominantly geared toward horizontal or vertical, collective or personal, etc. It is important to mention that self-construals are not exclusive or bipolar (Harb and Smith, 2008). The participants may sample different subcategories to various degrees – meaning, participants may have a high score on more than one subcategory. Participants rated, on a 7-point Likert scale, the extent to which of the items on the scale applied to each of the 6 categories of construals, with the answers ranging from to *a very small extent* to *a very large extent*. Examples of items are “I think of myself as connected (linked) to myself (I am a unique person separate from others)” and “I feel I have a strong relationship with myself (I act as an independent person)”. The six categories in the scale are representative exemplars of the self-construal items. “My family” was used as an exemplar for the relational-vertical construal, “myself” was used for personal self-construal, “friends” were used as an exemplar for relational-horizontal construal, “students at my university” represent an exemplar of collective-horizontal construal, and finally “social grouping” is an exemplar of collective-vertical.

The scale was developed and phrased in Arabic and English languages with a translation-back translation procedure. It was also put through a bilingual committee to ensure linguistic equivalence (van de Vijver and Leung, 1997). The study by Harb and Smith (2008) confirmed its

convergent criterion validity. The scale appeared to be valid, reliable, and a robust measure of self-construals in the sample of their study, which included Lebanese, Syrians, Jordanians, and British populations. The questionnaire was comprised of 20 newly developed items. Six Group identification items that were originally devised by Brown et al. (1992) were modified and shown Cronbach's alpha reliability coefficients of .87 (Brown, Hinkle, Ely, and Fox-Cardamone, 1992), good internal consistency. Another 6 items were modified from the Inclusion of Other in the Self Scale (IOS) (Aron and Aron, 1996; Aron and McLaughlin-Volpe, 2001) and the Schwartz Value Survey (Schwartz, 1992). The IOS items' format does not allow for classic reliability analysis, but construct validity has already been established (Aron and McLaughlin-Volpe, 2019). Also, the Schwartz Value Survey shows predictive validity. All in all, the modified identity scale's reliability analysis has shown Cronbach alpha coefficients above .80 across samples and subcategories, with the exception of the personal identity category which has shown questionable internal consistency varying between .64 and .70. Reliability was tested in the present study using Cronbach's alpha which yielded scores of  $\alpha = .77$  for the "relational-vertical" subscale and  $\alpha = .90$  for "personal" subscale. For the present study, the two aforementioned subscales were used.

### ***State Anxiety***

The State-Trait Anxiety Inventory (STAI), developed by Spielberger (1983), is a brief and useful tool for the assessment of symptoms of anxiety and has been used extensively in clinical practice and research. The STAI Form Y-1 consists of 20 items that evaluate how participants are feeling at this given time (right now, at this moment), such as "I feel calm," "I feel comfortable," and "I feel jittery." The scale measures feelings of tension, apprehension, worry, and nervousness. Each item is given a score between 1 and 4 signifying the level of anxiety. Internal consistency of the STAI Form Y-1 was high when given under conditions of psychological stress, with a

coefficient ranging between .89 and .94 (Spielberger, 1983). The STAI also showed good psychometric properties through several studies found among different university populations (Hishinuma, Miyamoto, Nishimura, and Nahulu, 2000; Maynard et al., 2010; Seok, Hamid, Mutang, and Ismail, 2018) with inter-factor correlations reflecting positively on the concurrent validity of STAI. Reliability was tested in the present study through Cronbach alpha and results yielded good internal consistency,  $\alpha=.91$ .

### ***Self-Efficacy***

The General Self-Efficacy scale developed by Schwarzer and Jerusalem (1995) is used to assess a general sense of perceived self-efficacy. It can also be suitable as an indicator of quality of life at any point in time. With 10 items in the scale, responses are made on a 4-point Likert scale. Examples of the items are “It is easy for me to stick to my aims and accomplish my goals,” or “I can solve most problems if I invest the necessary effort.” In terms of reliability, the scale has shown high internal consistency among 23 nations, with Cronbach alphas ranging from .76 to .90, with the majority in the high .80s (Rimm and Jerusalem, 1999; Scholz, Doña, Sud, and Schwarzer, 2002; Schwarzer, Bäßler, Kwiatek, Schröder, and Zhang, 1997; Schwarzer and Jerusalem, 1995). Criterion-related validity has also been documented in several correlation studies where positive coefficients were found with dispositional optimism, work satisfaction, and favorable emotions. Also, negative coefficients were found with anxiety, stress, burnout, and depression. In the present study, reliability was tested using Cronbach alpha and yielded good internal consistency,  $\alpha=.84$

### **Apparatus**

#### ***Galvanic Skin Response (GSR) Logger Sensor (NUL-217)***

One proposed way to measure stress is through the Galvanic Skin Response logger sensor, an electrical conductance of the skin which depends on the presecretory activity in the sweat glands

(Lader and Montagu, 1962) measured in micro siemens ( $\mu\text{S}$ ), which is a unit of conductance. Emotional and sensory stimulation allow for the production of sweat and the Galvanic Skin Response sensors are used to measure sweat coming from the sweat glands located in the hands. It includes a wearable biosensor which makes data collection easier. Many studies have supported the relationship between galvanic skin response and stress (Healey and Picard, 2005; Jung, 1907; Boucsein, 2011). The apparatus, Galvanic Skin Response logger sensor (NUL-217), was purchased by Haigazian university from the NeuLog website, which offer experimental sensors for learning labs of schools around the world.

### ***Heart Rate and Pulse (HRP) Logger Sensor (NUL-208)***

To be able to measure the heart rate/pulse rate of the participant, a heart rate and pulse logger sensor was used to monitor and compare pulse rates under various conditions. The sensor measures the beats per minute of the heart rate (BPM). The apparatus, Heart Rate and Pulse logger sensor (NUL-208) was also purchased by Haigazian university from the NeuLog website.

### **Data Analysis**

All data was entered into the IBM Statistical Package for the Social Sciences 24 (IBM SPSS). Descriptive analysis was applied to describe the sample of students who undertook the experiment. To test for the main effect of the independent variable affirmation (self, familial, and no affirmation) on the four dependent measures of pulse rate, emotional stress, self-efficacy, and state anxiety, mediated by familial and personal self construals and moderated by domain identification, a path analytic model was tested on SPSS AMOS. To test for the moderating effect of domain identification, interaction terms were calculated and saved as variables (Hayes, 2018) between the independent variables (individual and familial affirmation) and the moderating variable (domain identification). Mean scores were calculated for the State-Trait Anxiety Form Y-

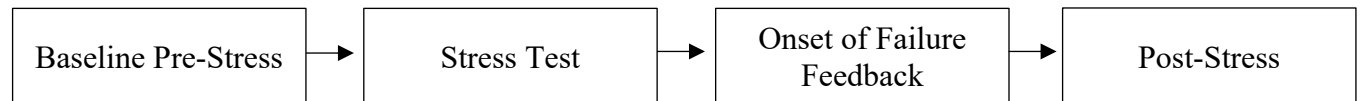
1 (Spielberger, 1983), General Self-Efficacy Scale (Schwarzer and Jerusalem, 1995), as well as “family” and “personal” items in the Sixfold Self-Construals Scale (Harb and Smith, 2008). As for the physiological data (Emotional Stress and Heart Rate measurement), the mean difference between baseline pre-stress and the onset of failure feedback was calculated to portray the physiological effect of stress induction in the sample. The decision of using this certain measurement for emotional stress and heart rate as an outcome variable is further explained below.

## Results

### Data Management and Cleaning

#### *Physiological Apparatus.*

The raw data from the GSR and the HR sensors was exported through the apparatus application (Neulog3). The raw data included an image of the GSR and HR graph data with markers that determine the different states/phases for each participant, as well as an excel file documenting the GSR and HR measurements at every second during the experimentation process for each participant, through micro siemens ( $\mu\text{S}$ ) and beats per minute (BPM), respectively. The markers were set on certain phases to be able to extract and analyze the data depending on the different phase of the experiment. With the graphs, the increase and decrease of the signals was observed depending on the phase of the experimental process. Each participant data for GSR and HR was separated into four phases that were justified by the placement of the markers during experimentation. These parameters include (1) Baseline measurement of stress and heartrate (2) Stress test, (3) Onset of Failure Feedback, and (4) Post-stress (See Figure 5).



**Figure 5. Phases of Stress Management**

For the present study, the mean difference was calculated between Baseline Pre-Stress and Onset of Failure Feedback to account for the change in (1) galvanic skin response (stress levels) and (2) heart rate. To our knowledge, GSR and HR data has not been measured as means and used comparatively prior to this present study. Other studies have studied GSR stress response as a main variable and analyzed the results per participant (Karthikeyan, Murugappan, and Yaacob, 2013;

Mundell et al., 2016). The priority of the physiological data in the study was to check whether there was any significant change in the signals between baseline pre-stress (resting period) and stress-onset (failure feedback) for all participants with the inclusion of self-affirmation. With that being said, to measure the signal changes of emotional stress and heart rate, the mean differences were calculated between baseline pre-stress and stress-onset, for comparative purposes.

### ***Missing Data and Testing for Normality***

The data was cleaned by conducting a review for missing data. Seven participants did not have physiological data available, so they were excluded from the study sample. The data collected met the appropriate assumptions to allow for parametric testing. To address violation in normality, a robust method was used by applying bootstrapping in the main analysis (Field, 2013). Since the independent variable, Self-Affirmation, is split into three experiment conditions, normality was tested per group on all dependent variables. All variables were shown to be normally distributed, except for heart rate in the familial affirmation experimental group and the control group. A Shapiro-Wilk test showed a significant departure from normality  $W(32)=0.92, p<0.05$  and  $W(35)=0.94, p<0.05$ , respectively.

### ***Outliers***

Outliers were checked using standardized  $z$ -scores. Values that exceeded the absolute value of  $\pm 1.96$  were considered outliers significant to the 95<sup>th</sup> confidence interval. Outliers were measured across the three experimental groups. A total of 12 outliers were found across the four outcome variables in the individual self-affirmation group. One was found on the STAI subscale, two on the GSE scale, three were found in the GSR data, three in the HR data, two on the Self-Construals Personal subscale, and one in the Self-Construals relational-horizontal subscale. According to Field (2013), It is expected that 5% of cases would have an absolute value greater

that 1.96. According to the data of the individual self-affirmation experimental group ( $N = 34$ ), the number of outliers per scale should not exceed 1.7, rounded to 2. The GSR and HR data both exceeded the cutoff. As for the familial affirmation group, one outlier was found in the STAI subscale, one in the GSE subscale, two in the GSR data, one in the HR data, one in the self-construals personal subscale, and one in the self-construals relational horizontal subscale. According to the data of the group ( $N = 32$ ), the number of outliers should not exceed 1.6 rounded up to 2. None of these scales held a number of outliers that exceeded the cutoff. Finally, for the No Affirmation (Control) Group, one outlier was found in the GSE subscale, one in the GSR data, one in the HR data, one in the self-construals personal subscale, and two in the self-construals relational-horizontal subscale. The number of outliers in this group ( $N = 35$ ) should not exceed 1.75, rounded up to 2, and none of the scales held a number that exceeded the cutoff. No outliers were deleted from the study.

### **Self-Affirmation Values**

Descriptive information on the participants' most important values (individual or familial) is provided below (Table 3). The table provides information on the percentage of participants who ranked the item as their most important value.

**Table 2***Self-Affirmation Highest Ranked Values Descriptive Results*

	Individual Self-Affirmation		Familial Self Affirmation	
	<i>N</i>	%	<i>N</i>	%
Artistic Skills	34	2.9	32	3.1
Athletics	34	5.9	32	.0
Business/Money	34	.0	32	3.1
Creativity	34	11.8	32	.0
Independence	34	26.5	32	21.9
Musical Ability	34	.0	32	3.1
Politics	34	.0	32	.0
Relationships	34	14.7	32	37.5
Religious Values	34	17.6	32	21.9
Sense of Humor	34	2.9	32	3.1
Spontaneity	34	17.6	32	6.3

Results show that participants who were grouped in the individual self-affirmation group ( $N = 34$ ) considered “Independence” as the most important value (26.5%), followed by “Religious Values” (17.6%). Business/Earning Money, Musical Ability and Appreciation, as well as Politics were not placed as the number 1 ranked value for all the participants in the Individual self-affirmation group. As for the participants grouped in the familial self-affirmation group ( $N = 32$ ), “Relationships with Friends or Family” (37.5%) was considered the most important value,

followed by “Independence” and “Religious Values” (21.9%). “Athletics,” “Politics,” and “Creativity” were not chosen as the number 1 ranked value for any of the participants in the familial self-affirmation group.

### Self-Construals Data

As for self-construals measured through The Six-Fold Self Construals Scale (Harb and Smith, 2008), measures of central tendency and dispersion of the two subscales of Personal and Vertical-Relational construals representing family bonds are presented in Table 4 .

**Table 3**

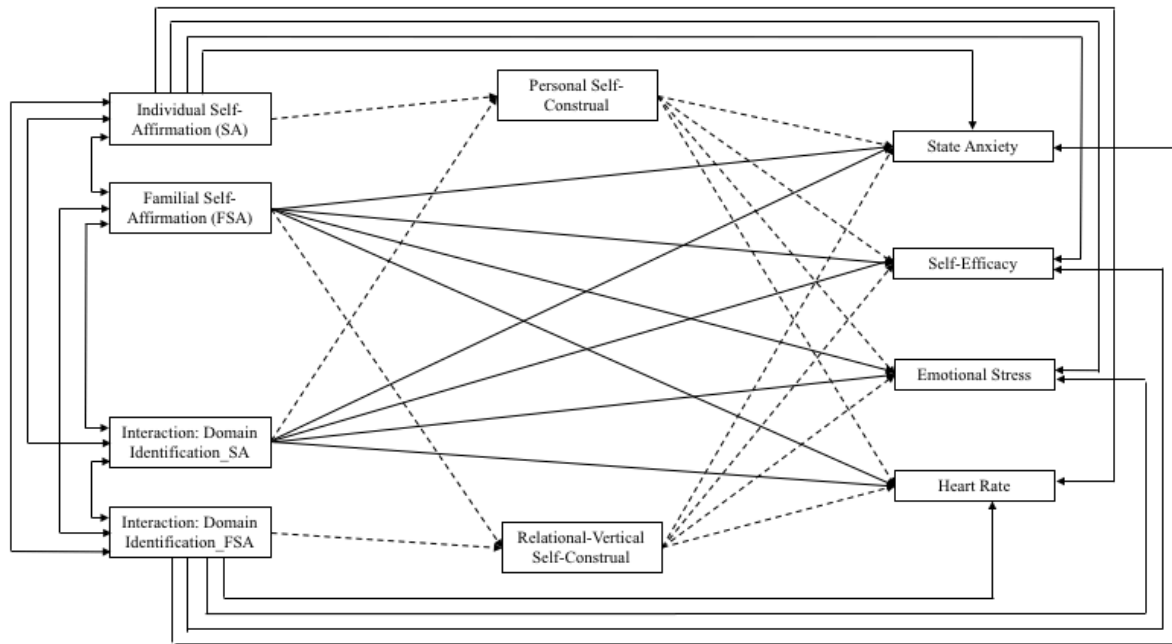
*Self-Construals Mean Data*

	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
Personal Construal	101	1	5	4.16	0.77
Vertical-Relational	101	2	5	3.96	0.72

A paired samples t-test was performed to compare the respective means on Personal and Vertical relational construals. Results showed that regardless of the experimental condition assigned ( $t(100) = -2.23, p = 0.028, d=-0.22$ ), participants scored significantly higher on the Personal subscale indicating to a higher endorsement of an individuated self-construal ( $M = 4.16, SD = 0.77$ ) over a vertical relational (collective) self-construal ( $M = 3.96, SD = 0.72$ ). As for the effect size, Cohen’s  $d$  portrayed a small effect size.

## Main Analysis

The hypotheses were tested through the path model represented in Figure 6.



**Figure 6. Experimental Model**

### *Model Fit*

Fit indexes were applied to measure the goodness of fit for the proposed model. First, the associated model chi-square values was assessed and results showed good model fit;  $\chi^2(11) = 12.53, p = 0.327$ . The CFI=.99 > .95, indicated good model fit. This was also supported based on an assessment of the TLI= .99 > .90 and RMSEA= .04 <.08. The testing of the GFI and AGFI of the model showed that the AGFI index was less than the cutoff (GFI =.98 > 0.95; AGFI= .88 > .90). Yet, the model showed an adequate fit.

### *Direct Effects*

*Hypotheses 1a* and *1b* were tested by calculating the direct effects of self-affirmation (familial and individual) on the self-efficacy, state anxiety, emotional stress, and heart rate on participants. Since domain identification was added as a moderator, the direct effects of the

interaction variables with the aforementioned outcome variables were also assessed. Upon examining standardized regression weights, no significant direct effects between self-affirmation (individual and familial) and the outcome variables were found.

For individual self-affirmation, there were no significant associations found with state anxiety ( $\beta = .458, p = .111$ ) ( $\beta = -.533, p = .103$  without domain identification), general self-efficacy ( $\beta = .092, p = .936$ ) ( $\beta = -.533, p = .799$  without domain identification), no significant associations with emotional stress ( $\beta = .270, p = .490$ ) ( $\beta = -.142, p = .793$  without domain identification), and no significant associations with heart rate variation ( $\beta = -.446, p = .144$ ) ( $\beta = .548, p = .171$  without domain identification)

As for familial self-affirmation, there were no associations found with self-efficacy ( $\beta = .241, p = .448$ ), ( $\beta = -.165, p = .516$  without domain identification), state anxiety ( $\beta = .217, p = .654$ ), ( $\beta = -.351, p = .344$  without domain identification), emotional stress ( $\beta = .001, p = .996$ ), ( $\beta = .044, p = .978$  without domain identification), and heart rate ( $\beta = -.485, p = .274$ ) ( $\beta = .560, p = .177$  without domain identification).

So, *Hypotheses 1a* and *1b* were not supported, since the proposed associations did not provide significant results.

### ***Other Direct Effects***

Upon examining other standardized regression weights, several associations were found to be significant. There was a significant negative association between personal self-construal (myself) and state anxiety ( $\beta = -.217, p = .029$ ), indicating that participants who endorsed a personal self-construal had decreased anxiety. A significant positive association between personal self-construal (myself) and general self-efficacy ( $\beta = .434, p = .010$ ), was found indicating that an endorsement of a personal self-construal was associated with increased self-efficacy.

***Indirect Effects***

*Hypotheses 2<sub>a</sub>* and *2<sub>b</sub>* were tested by calculating the indirect effects of self-affirmation (individual or familial) on self-efficacy, state anxiety, emotional stress, and heart rate through self-construals, moderated by domain identification. We also measured the indirect effects without including domain identification as a moderator to check for possible comparative judgement. *Hypothesis 2<sub>a</sub>* stated that participants with high domain identification who identify with personal self-construal (myself) (Harb and Smith, 2008) will benefit from the stress buffering effects of individual self-affirmation; while *hypothesis 2<sub>b</sub>* stated that participants with high domain identification who identify with relational-vertical (my family) (Harb and Smith, 2008) will benefit from the stress buffering effects of familial self-affirmation. No indirect effects emerged from the sample as none of the associations were found to be significant, with domain identification as a moderator and without it. For familial self-affirmation, there was one marginal effect worth considering. There may be a significant indirect effect between familial self-affirmation and state anxiety, moderated by domain identification and mediated by relational-vertical self-construal ( $\beta = -.120, p = .086$ ), possibly reflecting a mediation within the model. This possible association may reflect that that participants in the familial self-affirmation group who hold a relational self-construal may have decreased state anxiety compared to the rest of the sample. When removing domain identification as a moderator, the association between familial self-affirmation and state anxiety is not significant ( $\beta = .120, p = .108$ ). As for the other familial self-affirmation relationships, there were no associations found with self-efficacy ( $\beta = .081, p = .147$ ), ( $\beta = -.081, p = .206$  without domain identification), emotional stress ( $\beta = -.097, p = .134$ ), ( $\beta = .097, p = .159$  without domain identification), and heart rate ( $\beta = .035, p = .440$ ) ( $\beta = -.035, p = .466$  without domain identification).

Considering the individual self-affirmation group, there were no associations found with anxiety ( $\beta = .040, p = .435$ ), ( $\beta = -.028, p = .392$  without domain identification), self-efficacy ( $\beta = -.079, p = .584$ ), ( $\beta = .056, p = .619$  without domain identification), emotional stress ( $\beta = -.009, p = .481$ ), ( $\beta = .007, p = .512$  without domain identification), and heart rate ( $\beta = .005, p = .464$ ) ( $\beta = -.004, p = .585$  without domain identification).

So, *hypotheses 2<sub>a</sub> and 2<sub>b</sub>* were also not supported.

### Discussion

The overall aim of the study was to experimentally test if value self-affirmation is a stress-buffering tool for university students in Lebanon, while taking into consideration the impact of self-construals on the efficacy of the different types of self-affirmation, individual and familial. It was also important to add domain identification as a moderating variable since McQueen and Klein (2006) have mentioned that domain identification specifically emerges as a factor that varies responses to self-affirmation, while considering that academic domain identification specifically is a crucial self-concept for students (Keller, 2007). To test our hypotheses, a blind between-participants post-test only experimental design was applied. The current study aimed at addressing five research questions, (1) are both individual self-affirmation and familial self-affirmation effective interventions to reduce stress among university students with high academic domain identification in Lebanon? (2) Can university students who self-affirm by reflecting on values that are core to their personal self have lower anxiety levels and higher self-efficacy, (3) as well as lower stress levels and lower heart rate? (4) Will university students that identify with personal self -construals benefit more from individual self-affirmation? (5) Will university students that identify with relational-vertical self-construals benefit more from familial self-affirmation? The study had four outcome variables (1) State Anxiety, measured by the State-Trait Anxiety Inventory Form Y-1 (Spielberger, 1983) (2) Self-Efficacy, measured by the General Self-Efficacy scale (Schwarzer and Jerusalem, 1995), (3) Emotional Stress, measured by the galvanic skin response logger sensor (NUL-217), and (4) Heart rate, measured by heart rate and pulse logger sensor (NUL-208). The study used several outcomes in order to be able to possibly make generalizations through the results, so the inclusion of both psychological and physiological aspects in the study was crucial. The experiment included 10 GRE Math questions with a time limit to induce stress among the participants, as well as a failure feedback result, regardless of their answers. The

participants had to undergo deception prior to the experiment to maintain the integrity of the experimental manipulation and its effect on the outcome measures.

In order to address the aforementioned questions, a proposed theoretical model was formed following 4 hypotheses (See Figure. 1).

### **Self-Affirmation among University Students in Lebanon**

Regarding the first two *hypotheses 1a* and *1b*, it was expected that participants with high domain identification who engage in self affirmation, in comparison to those who do not self-affirm, will score lower on state anxiety (Spielberger, 1983) and higher on self-efficacy (Schwarzer and Jerusalem, 1995) when faced with a threat. Also, in regard to physiological triggers, we also expected that affirmed participants will also have a lower heart rate and lower emotional stress levels as measured by the Heart Rate and Pulse logger Sensor (NUL-208) and the Galvanic Skin Response Logger Sensor (NUL-217), respectively. This is in line with some previous research on the effects of self-affirmation on participants. Self-Affirmation may be most pertinent in times of self-threat (Cohen and Wills, 1985). According to Sherman et al. (2009), stress buffering effects of self-affirmation have been found among university students on a physiological level when measuring cortisol levels at baseline and post-stress test. Creswell et al. (2013), showed that. The study also suggested that self-affirmation may also be effective in boosting performance in some academic tasks that require creativity and associative processing. In another study by Creswell et al. (2013), value affirmation alone was sufficient to buffer the neuroendocrine responses to stress by participants.

In our present study, we first measured the direct effects between self-affirmation and our outcome variables. The results were not aligned with previous research and we rejected the hypotheses that self-affirmation manipulation will result in lower state anxiety, lower heart rate,

lower emotional stress, and higher self-efficacy than the non-affirmed participants. There was no evident significant difference between the self-affirmation groups and the control group that received no affirmation. With that being said, self-affirmation, whether it was familial or individual, was not a stress-buffering tool for the participants who underwent a stressful task, or a threat. Negative feedback (failure feedback) affected all participants, regardless of what affirmation group they were placed in.

### **Effects of Self-Affirmation**

Self-affirmation manipulations have shown a more consistent positive effect on acceptance of counter opinions, reduction in prejudice, attitude change after dissonance arousal, and downward comparisons. Yet, there is mixed evidence regarding the effects of self-affirmation manipulations on mood, task performance, cognition, self-esteem, and physiological stress (McQueen and Klein, 2006).

### ***Mood***

Mood has been examined as a potential mediator for the effect of self-affirmation with mixed results from several studies (Koole, Smeets, Knippenberg, and Dijksterhuis, 1999). It may be one of the explanations for the lack of self-affirmation effect in the present study. Perhaps, the assessment of mood in the study would have yielded different results or a better understanding of the extraneous variables that may affect the relationship between self-affirmation and the outcome variables. The participants in the study were residing in Lebanon and the specific timing of the experimental process (October 2019 till March 2020) was during a time of turmoil in the country and internationally, such as road and university closures, economic crisis, and the beginning of the COVID-19 outbreak. According to a systematic review conducted by Mucci et al. (2016) on the correlation between stress and economic crisis, results show that a recent economic crisis within a

country was considered an important stressor that had negative effects on the general population. University closures and the October revolution in Lebanon, specifically, may have sparked uncertainty among the population, which is considered an important risk factor for psychological wellbeing (Satici, Saricali, Satici, and Griffiths, 2020). The current COVID-19 pandemic is also causing global anxiety and heightened levels of stress (Salari et al., 2020), which may have affected some of the participants in the study that took part during the beginning of the outbreak. Such events may have played a pivotal role in the overall mood and anxiety levels of the participants and overshadowed the threat intervention, which could have also rendered self-affirmation as ineffective among this population at this certain time. Another possible explanation regarding the role of mood is the larger contextual stressor that was ongoing that might have required more than value self-affirmation protocol to curb the results.

### ***Task Performance***

The sample in the present study was predominantly female (69.3%). We checked for gender differences across the sample on self-efficacy and state anxiety. Since the sample of females and males was not equal, we made a random selection and performed an independent samples *t*-test to compare the means on General Self-Efficacy (Schwarzer & Jerusalem, 1979) and State Trait Anxiety (Spielberger, 1983) among the chosen sample. There was no significant difference in the means for males and females<sup>1</sup>. Yet, it is noteworthy to discuss possible gender stereotype threats that may have occurred through the experimental process. A common gender stereotype is the association of subjects such as math and physics with males, and humanities and language subjects with females (Koul, Lerdpornkulrat, and Poondej, 2016). According to a meta-analysis on stereotype threat conducted by Flore and Wicherts (2015), they found that girls underperform on math, science, and special skills tests. Members of negatively stereotyped groups

may experience higher levels of stress than their counterparts when performing on tasks that risk confirming a certain stereotype about their group (Cadinu et al., 2013). This type of stress may undermine the performance of the participants. The stress-inducing task used in the present study was a list of math-specific questions. Having the test be math inclusive may have primed gender stereotypes and induced a stressful reaction with the female participants. Although, evidence has shown that self-affirmation appears to reduce stereotype threats among students (Martens, Johns, Greenberg, and Schimel, 2006) and facilitate performance under such conditions (Spencer, Steele, and Quinn, 1999), this was not evident in the present study. However, results from the meta-analysis conducted by Flore and Wicherts (2015), indicated the presence of publication bias in the field of stereotype threat and math performance, which was already considered to be susceptible to publication bias (Ioannidis, 2005). With that being said, it is important to approach gender stereotypes with caution.

### ***Self-Esteem***

Little evidence exists on the effect of self-affirmation on self-esteem, specifically, and whether self-esteem moderates the effect of self-affirmation. Findings from studies by Steele et al. (1993), Stone and Cooper (2003), and Creswell et al. (2005) have shown that self-affirmation produced higher perceived stress and higher attitude change among participants with low self-esteem in comparison with the participants with high self-esteem. Self-esteem was also shown to moderate the impact of self-affirmation in terms of increasing openness to relevant health-risk information (Düring and Jessop, 2015). The aforementioned study's findings showed that self-affirmation manipulations may be of benefit for participants with low self-esteem in regard to promoting openness towards health-risk information. It has also been suggested that individuals with low self-esteem may benefit from the stress-buffering effects of self-affirmation since they

do not have access to the positive self-feelings in comparison to people with high self-esteem (Pietersma and Dijkstra, 2012; Sherman and Cohen, 2006). A study by Spencer et al. (2001), produced different results and suggested that there was no discrepancy in the self-affirmation manipulation for individuals with both high and low self-esteem. Such discrepancies between different studies shows the importance of assessing self-esteem as a moderator within a self-affirmation context to have a clearer image of the effect of self-esteem on self-affirmation. According to McQueen and Klein (2006), these discrepancies in the aforementioned studies may be due to the different types of self-affirmation manipulations.

### ***Type of Affirmation***

The classic value self-affirmation technique that was used in this study was first used in Steele and Lui's (1983) study and was employed by most affirmation studies. The technique has been shown to be effective and successful (McQueen and Klein, 2006). Yet, there seems to be no consensus among affirmation researchers on the most effective self-affirmation manipulation. As for the values scale, specifically, it has been developed for global values (e.g. politics, sense of humor, artistic abilities, etc.) and may not be culture specific. In a study by Tavitian-Elmadjian et al. (2020), autobiographical recall of mastery experiences was found to be self-affirmative. Autobiographical recall involves reflecting on the successful resolution of a challenging personal situation (Thorne, McLean, and Lawrence, 2004). This has been shown to be beneficial in several domains, such as self-enhancement (Wilson, Gunn, and Ross, 2009), solving problems (Cohen, 1998), and memory (Baddeley, 1988; Bluck, 2009). In general, people are motivated to maintain a positive view of the self (Sherman and Cohen, 2006). When people experience a threat to an important self-concept, the self-system is activated and signals the need to restore a sense of positive self-regard. Such threats may trigger reactions that may be considered defensive

(Sherman, 2013). Self-affirmation postulates that people can enhance the resources of the self through less defensive means to maintain self-worth, and buffer against the threat (Sherman and Cohen, 2006; Sherman et al., 2014). Recall of autobiographical memories serves as a motive to maintain a favorable view of the self (Wilson et al., 2009; Wilson and Ross, 2003) and has been associated with increased self-efficacy (Bandura, 1978). According to Cohen and Sherman (2014), recalling a memory when a person has faced and overcome adversity may be considered an important source of self-affirmation. Hence, recalling mastery memories can be used as a means of self-affirmation when faced with a threat to the self-concept (Tavitian-Elmadjian, Bender, Van de Vijver, Chasiotis, and Harb, 2020). In light of the above, it is noteworthy to mention that perhaps the lack of a main effect for affirmation in the current study does not necessarily reflect that self-affirmation is irrelevant in the Lebanese context but that the type of self-affirmation (value affirmation) that was used may not have been the right fit for this specific sample. Specifically, that one of the outcomes assessed was self-efficacy, driven by mastery beliefs.

### **Culture and Self-Affirmation**

The cultural system encompasses values, ideals, and norms that shape the psychological system (Sedikides, Gaertner, and Toguchi, 2003). Regarding self-enhancement, Sedikides et al. (2003) have shown that culturally independent people self-enhance on individualistic attributes, while people with interdependent (or familial) culture self-enhance on collectivistic attributes, which shows that culture is always relevant, and it influences psychological functioning. Specifically, people self-enhance through domains or dimensions that they consider personally important. Cultural influences may be fundamental in shaping the individual's coping pattern when faced with a threat (Lam and Zane, 2004). When faced with a threat, individuals with an independent sense of self may be more oriented towards a type of coping strategy that is aligned

with one's own values, desires, and goals (Heckhausen and Schulz, 1995; Morling and Fiske, 1999), while individuals from cultures who endorse interdependent self-construal focused on group cohesion (Morling and Fiske, 1999). When studying ethnic differences in coping with interpersonal stressors, Lam and Zane (2004) found that differences in self-construals were an important factor in explaining the ethnic differences in how people cope with interpersonal threats. A mediation effect in the study suggested that White Americans who endorse an independent self-construal may be more oriented towards directly controlling the environment to fit their own personal needs, desires, and values (Markus and Kitayama, 1991), thus portraying a significant role of self-construals in terms of coping.

Gearing back into self-affirmation, several studies have shown that cultural factors may influence the effect of self-affirmation, as well. Meaning that individuals from collectivistic cultures, for example, may require self-affirmation manipulations that affirm important domains of the self that is considered relevant to a collective identity (Heine and Lehman, 1997; Hoshino-Browne et al., 2005). Many studies have discussed the important role of culture when studying the self and human behavior (Heine et al., 1997; Hoshino-Browne et al., 2005; Lam and Zane, 2004; Markus and Kitayama, 1991; Morling and Fiske, 1999). Following previous literature on self-construals and their significant effect on the self, this study measured self-construals (Harb and Smith, 2008) as a mediating variable to shed light on influence of culture when studying the relationship between self-affirmation and the psychological and physiological stress responses to threat.

As mentioned in a study by Harb and Smith (2008), the Lebanese sample showed a profile of self-construals that lies on a cultural continuum between Arab culture and Western culture which allowed us to have a more flexible view on culture, instead of it being categorical. The

results of the study have shown that participants scored significantly higher on the personal self-construal subscale than the vertical-relational self-construal subscale, indicating that participants had a higher endorsement of a personal (individual) self-construal. This finding does not mean that students do not endorse a relational-vertical self-construal. Triandis (1989) mentioned that individuals may adopt both interdependent and interdependent self-construals, but the degree to which they are presented differs in accordance to the influence of culture.

We also hypothesized that participants with high domain identification, who identify with the personal self-construal with benefit from the stress buffering effects of individual self-affirmation. The path model that was put into place to study the associations between the variables showed no significant associations between individual self-affirmation and the psychological (state anxiety and self-efficacy) and physiological outcomes (emotional stress and heart rate) measured. The same insignificant results appeared for the participants who identified with the vertical-relational self-construal. These participants also did not benefit from the stress buffering effects of familial self-affirmation. So, hypotheses *2a* and *2b* were also rejected for this study.

Although the hypotheses were not supported using the cutoff, there was one marginal effect to consider. Our results have shown a marginal indirect effect between familial self-affirmation and state anxiety, moderated by domain identification and mediated by relational-vertical self-construal. This result showed that participants with high domain identification that were sampled into the familial self-affirmation group, who endorsed a vertical-relational (familial) self-construal, may have less state anxiety than the rest of the participants in other groups. This result supports the literature on the effectiveness of familial self-affirmation (Cai et al., 2012; Hoshino-Browne et al., 2005) among individuals who endorse a familial self or in the context of this study, a relational-horizontal self-construal. This is not to say that individual self-affirmation was ineffective in the

experiments, but the possibility that people who endorse a familial self-concept or a familial self-construal may benefit more from the stress-buffering effects of familial self-affirmation in relation to state anxiety, specifically.

### **Domain identification**

With domain identification being considered as an important moderating variable for self-affirmation (Keller, 2007), we tested the model with moderator variable and tested again without it, to check for any comparative results. No indirect effects were found to be significant in both models. The marginal effect that appeared between familial self-affirmation and state anxiety that was sheds light on the importance of possibly considering academic domain identification as a variable when studying self-affirmation among university students (Keller, 2007; McQueen and Klein, 2006).

### **Important effects**

The results of the path model showed us insignificant results and rejected all the hypotheses that were proposed, but there appeared several direct effects that were noteworthy.

- 1) There was a significant negative association between personal self-construal and state anxiety which indicates that the participants who endorsed personal self-construal had less state anxiety than the rest of the participants.
- 2) There was a significant positive association between personal self-construal and general self-efficacy, indicating that the participants who endorsed the personal self-construal had higher self-efficacy than the rest of the participants.

The results have shown that the participants who construe themselves in terms of their personal self, have decreased state anxiety and higher self-efficacy than participants who endorsed a

familial self. There may be several possible explanations for the significant results that may relate to self-esteem and self-serving bias.

### *Self-esteem*

According to Vohs and Heatherton (2001), after undergoing an ego threat, people with high self-esteem perceive themselves as more independent, while people with low self-esteem perceive themselves as more interdependent. Another study by Schutz and Tice (1997) found that high and low self-esteem people differed in the types of self-values they chose to feature, with high self-esteem individuals endorsing their personal independent qualities and accomplishments, while low self-esteem people endorsed their interpersonal qualities, such as group memberships or relationships with others. This may be a possible explanation for the aforementioned significant results. After the participants in the study were faced with the failure feedback, or the self-threat, they were asked to complete the Sixfold Self Construals Scale (Harb and Smith, 2008). Could the self-threat have affected their self-conceptions, depending on their self-esteem, as seen in previous literature? This sheds light on the importance of measuring self-esteem as a variable when studying self-threat related topics, as well as measuring self-construals (as a mediator) before and after the self-threat to provide more clarity on the results of the self-construals of the participants without having self-esteem as an extraneous variable. Self-esteem may have been a possible moderator when measuring self-threat and psychological outcomes. Yet, self-esteem alone may not provide a full explanation to the result. The question is, how does self-esteem relate to having an increase or decrease in anxiety and self-efficacy when faced with a threat? The concept of self-serving bias may also shed light on the topic.

### *Self-Serving Bias*

According to Sedikides et al. (1998), individuals self-enhance and are motivated to maintain, protect, or enhance the positivity of their self-concept, (Sedikides, 1993; Sedikides et al., 2003; Steele, 1988) whether they endorse an independent or an interdependent cultural attribute. One mechanism in how individuals maintain positive beliefs about themselves when faced with a self-threat is through self-serving bias. It refers to individuals taking responsibility for their successes but blaming external factors for their failed outcomes (Sedikides, Campbell, Reeder, and Elliot, 1998). These cognitive tendencies protect the ego from threat and injury (Forsyth, 2008). In the present study, there were several aspects that highlight the possible presence of self-serving bias among the participants. Participants thought their analytical skills were being assessed to measure their future success, a considerably stressful task for university students. A failure feedback result for such an assessment may allow for a higher level of self-threat among the participants (Miller and Ross, 1975). Participants with high self-esteem will become more defensive when faced with negative or threatening feedback (Baumeister, Heatherton, and Tice, 1993; Baumeister, Smart, and Boden, 1996) and their defensiveness will be manifested through accentuated self-serving bias. Reverting back to self-esteem once again, people with high self-esteem blame external factors when their outcome is negative and credit themselves when the outcome is positive. On the contrary, individuals with low self-esteem tend to be fair in their acknowledgments and have shown a reversal of the self-serving bias, in some studies (Blaine and Crocker, 1993). An interesting finding by Sedikides et al. (1998) stated that people in psychologically close dyads do not engage in self-serving bias, in comparison to people in distant dyads. This finding suggests that self-serving bias may be attenuated among individuals who construe an interdependent self-construal. With that being said, it is possible that participants in

the study who construe an independent or personal self-construal used self-serving bias to attenuate the self-threat they received from the failure feedback, which in return may not allow for high stress and low self-efficacy measures since the failure feedback could have been blamed on an external factor. Other than the importance of including self-esteem as a variable to study, it may also be important to study self-serving bias to better understand the behavior of individuals when faced with a self-threat.

### **Limitation and Future Direction**

There were several limitations to be considered over the course of the experiment. The students that were sampled for this study were from Haigazian University and were recruited through snowballing and convenience sampling technique. Contamination may also be considered as a possible limitation due to the sampling technique where students may have possibly discussed the experiment with their fellow colleagues. Assuming generalizability for this present study is baseless because students from Haigazian University are not representative of the entire university student body in Lebanon. The aim of the study was not to assume generalizable findings or draw conclusions about all university students in Lebanon, but to check if value self-affirmation may or may not provide results on this population, as a preliminary study. The minimum required sample for the study was 159 participants to assume a medium effect size. Due to several limitations, we were only able to collect clean data from 101 participants. Socioeconomic status was not included as a variable in the sociodemographic information. This may be considered as a limitation to be addressed in further studies. Most of the participants in the study were sophomore students (39.6%), which may be considered a possible limitation because stressors may be different for new students in comparison to older students.

The scheduled timing of the experimental procedure was during the October Revolution in Lebanon that included road and university closures throughout the months of October, November, and December 2019. The outbreak of COVID-19 resulted in a global lockdown in the month of March 2020 which also did not allow for students to take part of the experiment for safety reasons (WHO, 2020). The lack of stability that occurred during the experiment dates may have also influenced the mood, perceived stress, and the overall wellbeing of the students. Another important limitation to the study was the predominant number of females that took part in the experiment, which may influence gender stereotypes (Flore and Wicherts, 2015) and affect the overall results of the experiment.

Sherman et al. (2000) have mentioned that the order in which the self-affirmation manipulation is presented, whether it is before or after the threat, is not important and the effect is robust. As for the mediators and moderators that were presented in this experiment, it is important to note that there was no counterbalancing of the mediator scale. The Six-Fold Self Construal Scale (Harb and Smith, 2008), as mediating variable, followed the threat onset and the self-report measurement of stress. The failure feedback results, and the completion of the psychological scales, may have affected the mood of the participant, thus resulting in possible bias. According to MacKinnon (2011), it is important to measure the mediating variables before and after the intervention to determine possible changes in the measures.

The results of the study have directed us towards the importance of replicating the study with some methodological changes and larger samples to evaluate whether the marginal effects emerging in our study are products of error or lack of power. There are important extraneous variables to be taken into consideration, such as the possibility of gender stereotype threat when faced with a pure mathematical test (Flore and Wicherts, 2015; Spencer et al., 1999), or the

influence of economic and national instability on the overall stress and wellbeing of the students. Another important variable to consider is self-esteem in general (McQueen and Klein, 2006), and whether it moderates the effects of self-affirmation. For further studies, it is also important to test other variations of self-affirmations, such as 'mastery recall,' before concluding that self-affirmation is not a stress buffering tool for students in Lebanon. It is important to look at self-affirmation research diligently, especially within a cross-cultural context. Attempting to understand self-affirmation within a different cultural context than what was studied in other cultures is deemed more difficult, with a lot of variables that do not pan out the same way as in other research studies. When considering Lebanon, specifically, there are several attributes to stress that differ from other cultures, and there is little information on culture and self-construals among the population. The findings of the study did shed some light on the possible effectivity of familial self-affirmation on students who construe an interdependent or relational-horizontal self-construal, but it is important to consider other variables and expect differences between our studies and what we find cross-culturally.

<sup>1</sup> For General Self Efficacy,  $t(38) = .24, p = .811$   
For State Trait Anxiety,  $t(38) = -.1.75, p = .088$

## SELF-AFFIRMATION AND SELF CONSTRUALS

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## Appendix A

### Participant Information Letter

Dear Ms./Mr.

I am Serene Yordi, a student at Haigazian University from the Department of Social and Behavioral Sciences. I am currently carrying out a research study titled “Investigating Analytic Skills and Heart Rate During Testing as Predictors of Student’s Professional Careers” advised by Dr. Lucy Tavitian.

You are being asked to take part in this study since you are an enrolled student at Haigazian University between the age of 18 and 25.

Kindly read the below information to decide whether you would like to participate in this research study.

### Purpose of the Research Project

This research study aims at investigating the analytical skills of students as predictors of success in their professional careers, alongside the measurement of heart rate during testing, while using self-construals (a measurement of culture) as a moderating variable between the aforementioned relationships. This study will contribute towards the partial fulfillment of my academic study requirements at Haigazian University.

### What will I be asked to do?

If you choose to participate in this research study, you will be asked to fill in two questionnaires after sitting for a test, while having your heart rate monitored through the examination section of the study. The heart rate monitor (Neulog 208, an instrument used by students internationally for experiments) will be placed on your fingers to measure the heart rate before and during testing. Your participation will involve completing a survey that entails statements that you will have to rate based on agreement, a test of approximately (10) minutes, and 2 questionnaires for approximately (10) minutes and a demographic form for approximately (5) minutes. The testing will include measurement of heart rate through a heart-rate monitor. If you are not unwilling to complete the questionnaires or have your heartrate measured, you are free not to participate. Participation in this project is voluntary and you will receive a beverage and a snack after the completion of the study incentive through (1) grade point as per your instructor’s consent. You are free to withdraw anytime without having to give any reason for your withdrawal.

### What are my rights?

- Participation in this study is completely voluntary, anonymous and confidential. Your name or any other identifying information will not be asked Name and contact will be gathered initially to schedule an appointment and will be disposed of after the study is complete.
- Data you provide along with data from all participants in the present research will be stored in aggregate in a password protected folder on the computer of the primary investigator, Serene Yordi. The data will be analysed and reported in aggregate. Only the principle investigators of this study will have access to the compiled data which will be

stored for a period of 10 years post data collection. During this time, you have the right to inspect the data.

- You have the right to withdraw your consent or discontinue participation at any time for any reason. Your decision to refuse participation or withdraw will not involve any penalty or loss of benefits to which you are otherwise entitled. Discontinuing participation in no way affects your relationship with Haigazian University.
- This research study has been reviewed and has received clearance from the Social and Behavioural sciences Ethics Committee at Haigazian University. If you have any further concerns about your rights as a research participant, please, do not hesitate to contact my advisor Dr. Lucy Tavitian at [lucy.tavitian@haigazian.edu.lb](mailto:lucy.tavitian@haigazian.edu.lb) or the ethics committee at [sbs.ethics@haigazian.edu.lb](mailto:sbs.ethics@haigazian.edu.lb).

### **What are the risks and benefits of participation?**

- Participation in this study does not involve any physical risk or emotional risk to you beyond the risks of daily life. The participant may be at risk for fatigue or boredom due to the length of the experimentation process.
- You will receive no direct benefits from participating in this research; however, your participation does help researchers better understand the predictors of students' future success in their professional careers.

### **Contact information**

If you have any questions or concerns about the research, you may contact:

#### Primary Investigator:

Serene Yordi, MA Candidate in the Department of Psychology  
Haigazian University  
961 3 065 149  
[syordi@students.haigazian.edu.lb](mailto:syordi@students.haigazian.edu.lb)

#### Advisor:

Ms. Lucy Tavitian, Drs.  
Instructor in the Department of Psychology  
Haigazian University  
[Lucy.tavitian@haigazian.edu.lb](mailto:Lucy.tavitian@haigazian.edu.lb)

## Appendix B

### Participant Consent Form

**Please read the following statements and answer the question below.**

- I agree to participate in this research project conducted for purposes of study. My decision is voluntary, and I will receive a beverage and a snack after the completion of the study.
- I know that I can choose to withdraw from participation any time without any penalties or consequences whatsoever. I also hold the right to decline to respond to any question(s) that I may feel uncomfortable with.
- My participation involves answering 2 questionnaires and taking a test for approximately (40) minutes.
- The test will involve physiological measures of heart rate. I understand that if I choose to abstain from responding to the questionnaires or have my heart rate monitored, I am effectively withdrawing from participation.
- I have been assured that the researcher will maintain my identity confidential.
- I have been assured that my contact information will only be used to schedule an appointment to complete the research. My contact information will not be annexed to the data I provide and will be disposed of immediately after my participation.
- I have been assured that the information from this study will be used for the purpose of academic study, possible publication, and educational use.
- I have received the assurance that this research study has been duly reviewed and approved by the Social and Behavioral Sciences ethics committee at Haigazian University.
- I agree that the data gathered be kept in a secure location under the care of the study investigators for a period of 10 years.
- I have been assured that I can access my data at any time.

**I have read this informed consent document. I understand each part of the document and I freely and voluntarily choose to participate in this study**

## Appendix C

### Debriefing Questions

You will now be presented with a few general questions about the current study. Use the space allocated for each question to fill in your answer.

1. What do you think the purpose of this experiment was?
2. What do you think this experiment was trying to study?
3. Did you think that any of the tasks you did were related in any way? If “yes” in what way are they related?
4. Did anything you did on one task affect what you did on any other task? If “yes” how exactly did it affect you?
5. When you were reading the short description did you notice anything unusual about it?
6. Did you use any particular strategy in answering the questions?

**Appendix D**

**INDIVIDUAL SELF-AFFIRMATION CONDITION**

What are your personal values?

Below is a list of characteristics and values, some of which may be important to you, some of which may be unimportant. Please read carefully over this list and think about each of these values. Then, rank these values and qualities in order of their importance to you, from 1 to 11 (“1” being the most important item, “11” being the least important). **Use each number only once.**

- \_\_\_\_\_ Artistic skills
- \_\_\_\_\_ Athletics
- \_\_\_\_\_ Business / earning money
- \_\_\_\_\_ Creativity
- \_\_\_\_\_ Independence
- \_\_\_\_\_ Musical ability / appreciation
- \_\_\_\_\_ Politics
- \_\_\_\_\_ Relations with friends or family
- \_\_\_\_\_ Religious Values
- \_\_\_\_\_ Sense of Humor
- \_\_\_\_\_ Spontaneity / Living life in the moment

On the previous page, you ranked a list of values in terms of their importance to you personally. Now we’d like you to think about a value or personal characteristic that you ranked as being particularly important to you personally. Please now write the value that you ranked as **#1** in the space provided:

**My #1 Ranked Value Was:**

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Now, please describe why this personal characteristic or life domain is important and meaningful to you. Think about a time in your life that this value was particularly important. Write as much or as little as you wish, and don’t worry about how well it’s written. Just focus on expressing your memory of the event and the feelings that you had at the time. Please do your best to write about this event and your feelings about your #1 ranked value for the next 10 minutes.

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Again, think about the value that you ranked as #1 on your list and wrote about on the previous page. Please list the top two reasons why this value is important to you:

- 1.
- 2.

Please indicate how much you agree with each of the following statements about this value by marking one of the boxes:

1. This value or personal characteristic has influenced my life.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
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2. In general, I try to live up to this value.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
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3. This value is an important part of who I am.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
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4. I care about this value.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
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**INDIVIDUAL SELF-AFFIRMATION CONDITION – Arabic Translation**

فيما يلي قائمة بالخصائص والقيم، قد يكون بعضها مهم بالنسبة لك وبعضها قد تكون غير مهمة. يرجى قراءة هذه القائمة بعناية والتفكير في كل من هذه القيم. ثم رتب هذه القيم والصفات حسب أهميتها لك من 1 إلى 11 ("1" هو العنصر الأكثر أهمية و "11" هي الأقل أهمية).

- مهارات فنية
- الألعاب الرياضية
- الأعمال / كسب المال
- الإبداع
- استقلال
- القدرة الموسيقية / التقدير
- سياسة
- العلاقات مع الأصدقاء أو العائلة
- القيم الدينية
- حس فكاهي
- عفوية / عيش الحياة في الوقت الراهن

في الصفحة السابقة قمت بترتيب قائمة القيم من حيث أهميتها بالنسبة لك شخصياً. الآن نود منك أن تفكر في قيمة أو خاصية شخصية تعتبرها ذات أهمية خاصة لك شخصياً. يرجى الآن كتابة القيمة التي صنفتها في المرتبة الأولى في المساحة المتوفرة:

القيمة المصنفة رقم 1 كانت: \_\_\_\_\_

الآن يرجى وصف سبب أهمية هذه الخاصية الشخصية أو مجال الحياة بالنسبة لك. فكر في وقت في حياتك بأن هذه القيمة كانت ذات أهمية خاصة. اكتب الكثير أو أقل ما تريد ولا تقلق بشأن جودة كتابته. ركز فقط على التعبير عن ذاكرتك للحدث والمشاعر التي شعرت بها في ذلك الوقت. يرجى بذل قصارى جهدك للكتابة عن هذا الحدث ومشاعرك حول القيمة المرتبة الأولى لل 10 دقائق التالية.

مرة أخرى فكر في القيمة التي صنفتها في المرتبة الأولى في قائمتك وكتب عنها في الصفحة السابقة. يرجى ذكر أهم سببين وراء أهمية هذه القيمة لك:

1

2

يرجى توضيح مدى موافقتك على كل عبارة من العبارات التالية حول هذه القيمة عن طريق وضع علامة على أحد المربعات:

هذه القيمة أو الخاصية الشخصية أثرت في حياتي.  
 بشكل عام أحاول أن ترقى إلى هذه الق.  
 هذه القيمة هي جزء مهم من أنا.  
 أنا أهتم بهذه القيمة

**FAMILIAL SELF-AFFIRMATION CONDITION**

What are your family’s values?

Below is a list of characteristics and values, some of which may be important to you and your family, some of which may be unimportant. Please read carefully over this list and think about each of these values. Then, rank these values and qualities in order of their importance to you and your family, from 1 to 11 (“1” being the most important item, “11” being the least important). **Use each number only once.**

- \_\_\_\_\_ Artistic skills
- \_\_\_\_\_ Athletics
- \_\_\_\_\_ Business / earning money
- \_\_\_\_\_ Creativity
- \_\_\_\_\_ Independence
- \_\_\_\_\_ Musical ability / appreciation
- \_\_\_\_\_ Politics
- \_\_\_\_\_ Relations with friends or family
- \_\_\_\_\_ Religious Values
- \_\_\_\_\_ Sense of Humor
- \_\_\_\_\_ Spontaneity / Living life in the moment

On the previous page, you ranked a list of values in terms of their importance to you and your family. Now we’d like you to think about a value or personal characteristic that you ranked as being particularly important to you and your family. Please now write the value that you ranked as **#1** in the space provided:

**My #1 Ranked Value Was:**

---

Now, please describe why this personal characteristic or life domain is important and meaningful to you and your family. Think about a time in your life that this value was particularly important for all of you. Write as much or as little as you wish, and don’t worry about how well it’s written. Just focus on expressing your memory of the event and the feelings that you and your family had at the time. Please do your best to write about this event and your feelings about your #1 ranked value for the next 10 minutes.

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Again, think about the value that you ranked as #1 on your list and wrote about on the previous page. Please list the top two reasons why this value is important to you and your family:

- 1.
- 2.

Please indicate how much you agree with each of the following statements about this value by marking one of the boxes:

1. This value or personal characteristic has influenced the lives of my family and I.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
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2. In general, my family and I try to live up to this value.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
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3. This value is an important part of who we are as a family.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
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4. My family and I care about this value.

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
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**FAMILIAL SELF-AFFIRMATION CONDITION- Arabic Translation**

فيما يلي قائمة بالخصائص والقيم لدى عائلتك، قد يكون بعضها مهم بالنسبة لعائلتك وبعضها قد تكون غير مهمة. يرجى قراءة هذه القائمة بعناية والتفكير في كل من هذه القيم. ثم رتب هذه القيم والصفات حسب أهميتها لعائلتك من 1 إلى 11 ("1" هو العنصر الأكثر أهمية و "11" هي الأقل أهمية).

- مهارات فنية
- الألعاب الرياضية
- الأعمال / كسب المال
- الإبداع
- استقلال
- القدرة الموسيقية / التقدير
- سياسة
- العلاقات مع الأصدقاء أو العائلة
- القيم الدينية
- حس فكاهي
- عفوية / عيش الحياة في الوقت الراهن

في الصفحة السابقة قمت بترتيب قائمة القيم من حيث أهميتها بالنسبة لعائلتك. الآن نود منك أن تفكر في قيمة أو خاصية تعتبرها ذات أهمية خاصة لعائلتك. يرجى الآن كتابة القيمة التي صنفتها في المرتبة الأولى في المساحة المتوفرة:

القيمة المصنفة رقم 1 كانت: \_\_\_\_\_

الآن يرجى وصف سبب أهمية هذه الخاصية لعائلتك أو مجال الحياة بالنسبة لعائلتك. فكر في وقت في حياتك بأن هذه القيمة كانت ذات أهمية لعائلتك. اكتب الكثير أو أقل ما تريد ولا تقلق بشأن جودة كتابته. ركز فقط على التعبير عن ذاكرتك للحدث والمشاعر التي شعرت بها في ذلك الوقت. يرجى بذل قصارى جهدك للكتابة عن هذا الحدث ومشاعر عائلتك حول القيمة المرتبة الأولى لل 10 دقائق التالية.

مرة أخرى فكر في القيمة التي صنفتها في المرتبة الأولى في قائمتك وكتب عنها في الصفحة السابقة. يرجى ذكر أهم سببين وراء أهمية هذه القيمة لعائلتك:

1

2

يرجى توضيح مدى موافقتك على كل عبارة من العبارات التالية حول هذه القيمة عن طريق وضع علامة على أحد المربعات:

هذه القيمة أو الخاصية الشخصية أثرت في حياة عائلتي.  
 بشكل عام أحاول أنا وعائلتي أن نترقى إلى هذه الق.  
 هذه القيمة هي جزء مهم من عائلتي.  
 أنا وعائلتي تهتم بهذه القيمة

**NO SELF AFFIRMATION CONDITION**

Kindly list in detail what you drank and ate in the last 48 hours.  
You have 10 minutes to complete this task

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**NO SELF AFFIRMATION CONDITION – Arabic Translation**

يرجى ذكر ما شربته وأكلته بالتفصيل في آخر ٤٨ ساعة  
لديك ١٠ دقائق لإكمال هذه المهمة

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## Appendix E

## Stress Task – GRE Questions

1. Compare Quantity A and Quantity B, using additional information centered above the two quantities if such information is given, and select one of the four answer choices:

*A symbol that appears more than once in a question has the same meaning throughout the question.*

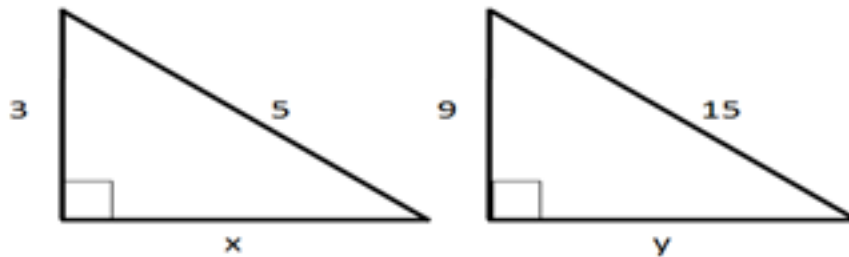


Figure is not drawn to scale

Quantity A  
 $y/x$

Quantity B  
3

- (A) The two quantities are equal  
 (B) Quantity B is greater  
 (C) Quantity A is greater  
 (D) The relationship cannot be determined from the information given
2. The price of a pair of sneakers was \$80 for the last six months of last year. On January first, the price increased 20%. After the price increase, an employee bought these sneakers with a 10% employee discount. What price did the employee pay?
- (A) \$70.40  
 (B) \$82.00  
 (C) \$83.33  
 (D) \$86.40  
 (E) \$88.00
3.  $a > 0$ , and  $a$  is odd.  
 $b > 1$

**Quantity A:**  $(1-b)^a$

**Quantity B:**  $(-b)^a$

- (A) The two quantities are equal  
 (B) Quantity B is greater  
 (C) Quantity A is greater  
 (D) The relationship cannot be determined from the information given

4. If  $8s - 6k = 4s - 2k$ , then, in terms of  $s$ ,  $k = ?$

- (A)  $3s$
- (B)  $5s$
- (C)  $s$
- (D)  $2s$
- (E) Cannot be determined

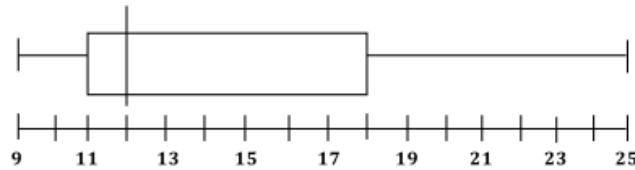
5.  $xy > 0$

**Quantity A:**  $x^2y^4$

**Quantity B:**  $x^3y^6$

- (A) The two quantities are equal
- (B) Quantity B is greater
- (C) Quantity A is greater
- (D) The relationship cannot be determined from the information given

6. The box-and-whisker plot below shows weights for 60 kids in a playgroup. How many kids weight between 18 kilograms and 23 kilograms, inclusive, if the 23 kilograms represents the 90<sup>th</sup> percentile value on the plot above?

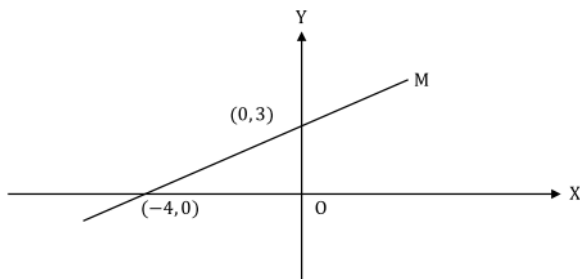


- (A) 3
- (B) 6
- (C) 9
- (D) 15
- (E) 16

7. The graph of which of the following equations is a straight line that is parallel to line M in the figure above and intersects the negative direction of Y-axis?

Indicate all such equations.

[Note: Select one or more answer choices]



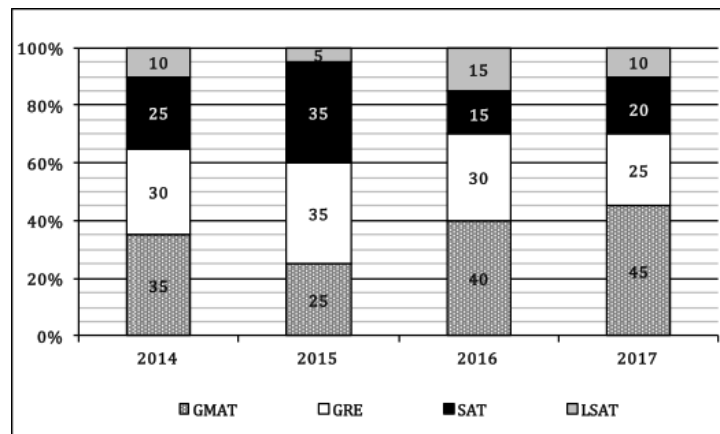
- (A)  $4y + 3x = 0$
- (B)  $4y - 3x = -2$
- (C)  $4y - 3x = 4$
- (D)  $4y + 3x = -4$
- (E)  $4y - 3x = -1$
- (F)  $4y - 3x = 0$

8. Which of the following statements individually provide enough information to determine the number of students in a group?

Indicate all such statements.

[ **Note:** Select one or more answer choices]

- (A) The number of ways 3 students can be selected from the group to form a team is 35.
  - (B) The number of ways 3 students from the group can be seated in a row is 210.
  - (C) The number of ways all the students from the group can be selected to form a team is 1.
  - (D) The number of ways 3 students can be selected from the group to form a team equals the number of ways 4 students can be selected from the group to form a team.
9. The following chart shows the percent distribution of the number of candidates enrolled in a certain test-prep company from 2014 to 2017 for four courses: GMAT, GRE, SAT and LSAT.



If the number of candidates in 2014 was 500, and there was a 20% increase in the number of candidates per year for the next two years, what is the number of candidates for the LSAT course in 2016?

Numeric Answer:

10.  $0 > p > q > r$

**Quantity A:**  $p/q$   
**Quantity B:**  $q/r$

- (E) The two quantities are equal
- (F) Quantity B is greater

- (G) Quantity A is greater
- (H) The relationship cannot be determined from the information given

**Appendix F****State-Trait Anxiety Inventory (C. Spielberger, 1983a)**

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then write the number in the blank at the end of the statement that indicates how you feel right now, that is, at this moment. There is no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best

		Not at all	Some What	Moderately so	Very much so
1.	I feel calm	1	2	3	4
2.	I feel secure	1	2	3	4
3.	I am tense	1	2	3	4
4.	I feel strained	1	2	3	4
5.	I feel at ease	1	2	3	4
6.	I feel upset	1	2	3	4
7.	I am presently worrying over possible misfortunes	1	2	3	4
8.	I feel satisfied	1	2	3	4
9.	I feel frightened	1	2	3	4
10.	I feel comfortable	1	2	3	4
11.	I feel self confident	1	2	3	4
12.	I feel nervous	1	2	3	4
13.	I am jittery	1	2	3	4
14.	I feel indecisive	1	2	3	4
15.	I am relaxed	1	2	3	4
16.	I feel content	1	2	3	4
17.	I am worried	1	2	3	4
18.	I feel confused	1	2	3	4
19.	I feel steady	1	2	3	4
20.	I feel pleasant	1	2	3	4

## State-Trait Anxiety Inventory – Arabic Translation

الإرشادات: هناك عدد من التعابير التي تستخدمها الناس من أجل ان تصف نفسها. إقرأ كل تعبير ثم اختر الرقم الذي يشير المما تشعر به حالياً، اي بهذه اللحظة. ليس هنالك اي جواب صح او خطأ. لا تفكر كثيراً بكل تعبير. أجب بما تشعر بأنه يصف مشاعرك حالياً.

أبداً لا	القليل	باعتدال	الكثير
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1	أشعر بالهدوء
2	أشعر بالأمان
3	أنا متوتر
4	أشعر بالتعب
5	أشعر بالرواق
6	أشعر بالضيق
7	أشعر بالقلق اتجاه مصائب محتملة
8	أشعر بالرضى
9	أشعر بالخوف
10	أشعر بالراحة
11	أشعر بالثقة بالنفس
12	أشعر بالقلق
13	أنا منرفز
14	أشعر بالحسم
15	أنا مرتاح
16	أشعر بالأطمئنان
17	أنا مهموم
18	أنا محتار
19	أشعر بالاستقرار
20	أشعر بالسعادة

**Appendix G****General Self-Efficacy Scale** (Schwarzer and Jerusalem, 1995)

Answer the questions below:

	Not at all true	Hardly true	Moderately true	Exactly true
1. I can always manage to solve difficult problems if I try hard enough	1	2	3	4
2. If someone opposes me, I can find the means and ways to get what I want.	1	2	3	4
3. It is easy for me to stick to my aims and accomplish my goals.	1	2	3	4
4. I am confident that I could deal efficiently with unexpected events.	1	2	3	4
5. Thanks to my resourcefulness, I know how to handle unforeseen situations.	1	2	3	4
6. I can solve most problems if I invest the necessary effort.	1	2	3	4
7. I can remain calm when facing difficulties because I can rely on my coping abilities.	1	2	3	4
8. When I am confronted with a problem, I can usually find several solutions.	1	2	3	4
9. If I am in trouble, I can usually think of a solution	1	2	3	4
10. I can usually handle whatever comes my way.	1	2	3	4

## General Self-Efficacy Scale – Arabic translation (Crandall, Rahim, Youmt, 2015)

9. أرفض الإجابة	8. لا أعرف	4. صحيحة تماماً	3. صحيحة إلى حد ما	2. بالكاد تكون صحيحة	1. غير صحيحة على الإطلاق	
9	8	4	3	2	1	a. في إمكاني النجاح في حل المشاكل الصعبة إذا حاولت بما فيه الكفاية
9	8	4	3	2	1	b. إذا عارضني شخص ما، في إمكاني أن أجِد الوسائل والمسبل للحصول على ما أريد.
9	8	4	3	2	1	c. من المسبل بالنسبة لي التمسك بأهدافي وتحقيقها.
9	8	4	3	2	1	d. أنا واثقة من قدرتي على التعامل بكفاءة مع الأحداث غير المتوقعة.
9	8	4	3	2	1	e. بفضل ما لدي من حيلة، أعرف كيفية التعامل في المواقف غير المتوقعة.
9	8	4	3	2	1	f. يمكنني حل معظم المشاكل إذا استثمرت فيها الجهد اللازم.
9	8	4	3	2	1	g. يمكنني التزام الهدوء عند مواجهة صعوبات لأنه يمكنني الاعتماد على قدراتي في التأقلم.
9	8	4	3	2	1	h. عندما أواجه مشكلة، يمكنني عادة إيجاد العديد من الحلول.
9	8	4	3	2	1	i. إذا واجهت مشكلة، عادة يمكنني التفكير في حل.
9	8	4	3	2	1	j. عادة يمكنني التعامل مع كل ما يأتي في طريقي.

## Appendix H

### Sixfold Self-Construal Scale (Harb and Smith, 2008)

**Instructions:** Below, you will find a series of questions that revolve around your perception of yourself. Each question is followed by a set of 6 possible categories: family, friends, social groupings, school/department peers, humanity in general, and personal self.

**Social groupings could be any of the following:** political group/party, Governmental institution, or religious affiliation.

**Scale use:** You are asked to mark, from a low of 1 to a high of 5 the frequency/magnitude that most reflects your response to each question.

**Please respond to each question AND to each item within that question. Make sure to read each question carefully. Thank you.**

*1) I think of myself as connected (linked) to:*

	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent
My family	1	2	3	4	5
My friends	1	2	3	4	5
Students in my department/faculty	1	2	3	4	5
My social grouping	1	2	3	4	5
Humanity in general	1	2	3	4	5
Myself (I am a unique person separate from others)	1	2	3	4	5

*2) I control my behavior to accommodate the wishes (interests) of:*

	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent
My family	1	2	3	4	5
My friends	1	2	3	4	5
Students in my department/faculty	1	2	3	4	5

My social grouping	1	2	3	4	5
Humanity in general	1	2	3	4	5
Myself (I am a unique person separate from others)	1	2	3	4	5

3) I am affected by events that concern (relate) to:

	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent
My family	1	2	3	4	5
My friends	1	2	3	4	5
Students in my department/faculty	1	2	3	4	5
My social grouping	1	2	3	4	5
Humanity in general	1	2	3	4	5
Myself (I am a unique person separate from others)	1	2	3	4	5

4) I am aware of the needs, desires, and goals of:

	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent
My family	1	2	3	4	5
My friends	1	2	3	4	5
Students in my department/faculty	1	2	3	4	5
My social grouping	1	2	3	4	5
Humanity in general	1	2	3	4	5
Myself (I am a unique person separate from others)	1	2	3	4	5

5) I feel I have a strong relationship with:

	To a very small extent	To a small extent	To a moderate extent	To a large extent	To a very large extent
My family	1	2	3	4	5
My friends	1	2	3	4	5
Students in my department/faculty	1	2	3	4	5
My social grouping	1	2	3	4	5
Humanity in general	1	2	3	4	5
Myself (I am a unique person separate from others)	1	2	3	4	5

**Appendix I**

**Domain Identification and Sociodemographic Questions**

1) What is your current GPA out of 100? \_\_\_\_\_

2) Kindly answer below:

	Very Important	Important	Moderately Important	Slightly Important	Not Important
It is important for me to do well and succeed academically					

3) What is your year at university?

- Freshman
- Sophomore
- Junior
- Senior
- Graduate (MA Year 1)
- Graduate (MA Year 2)

4) How old are you? \_\_\_\_\_

5) What is your sex?

- Male
- Female
- I would prefer not to answer