HAIGAZIAN UNIVERSITY

The Relationship Between Sensory Processing Sensitivity and Depression and Somatization and The Roles of Emotion Regulation and Adverse Childhood Experiences

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A Thesis submitted to the Faculty of Social and Behavioral Sciences in partial fulfillment of the requirements for the Master of Art in Psychology – Emphasis: Clinical Psychology at Haigazian University.

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DEDICATION

This dissertation is dedicated to all highly sensitive individuals who suffer from the negative outcomes of sensory processing sensitivity and to, both, highly sensitive and non-highly sensitive individuals who suffer from depression and somatization as a result of emotion regulation difficulties.

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It is a genuine pleasure to express my sincere gratitude to my advisor Dr. Hanine Hout who made this work possible. Her guidance and advice carried me through all the stages of writing my project.

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"Sensitive people suffer more

But they love more

And they dream more."

Augusto Curey

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Abstract

Sensory-processing sensitivity (SPS) refers to personality trait that distinguishes the extent to which individuals strongly and deeply process stimuli in the environment. While being highly sensitive has been linked to increased psychopathological tendencies, the reasons for this are not well researched. One potential mediator that could explain the relationship between SPS and psychopathologies is emotion regulation—the set of processes influencing which emotions we have, when we have them, and how we experience and express them. This study therefore aimed to investigate whether sensory processing sensitivity is linked, specifically, to depression and somatization via emotion regulation difficulties. In addition, highly sensitive persons who have experienced childhood adversities have been shown to have more depressive and somatic tendencies than non-highly sensitive persons. Therefore, this study also aimed to investigate whether adverse childhood experiences moderated the relationship between sensory processing sensitivity and depression and somatization. This quantitative study followed a correlational design and the survey was administered through a questionnaire to a convenience sample of 94 adults. A total of five online questionnaires were used: The Highly Sensitive Person Scale (HSPS) developed by Aron and Aron (1997) to measure SPS, the Beck-Depression Inventory (BDI-II) developed by Beck et al. (1996) to measure depression, the Cohen–Hoberman Inventory of Physical Symptoms (CHIPS) developed by Cohen and Hoberman (1983) to measure somatization, the Difficulties in Emotion Regulation Scale (DERS-16) initially developed by Gratz and Roemer, L. (2004) to measure difficulties in ER and the adverse childhood experiences, the Adverse Childhood Experience (ACE) Scale developed by Felitti et al. (1998) to measure ACE. The results showed that difficulties in emotion regulation predicted depression and somatization, rather than mediated the relationship between sensory processing sensitivity

and depression and somatization. Adverse childhood experiences did not have any moderating effect on this relationship. Future research should include larger samples to understand more accurately the relationship between all these variables.

Key words: depression, somatization, emotion regulation, sensory-processing sensitivity, adverse childhood experiences

The Relationship between Sensory Processing Sensitivity and Depression and Somatization and the Roles of Emotion Regulation and Adverse Childhood Experiences

Studies on Sensory Processing Sensitivity (SPS) have been on the rise, and point to its association with various psychopathologies, such as depression and somatization. One of the most highlighted characteristics of SPS is that it makes highly sensitive persons (HSPs) more vulnerable to experiencing difficulties in emotion regulation (ER); this, in turn, has been suggested to increase depressive and somatic tendencies among HSPs. The relationship between SPS and depression and somatization may be amplified specifically in those who have adverse childhood experiences. According to some studies, the negative outcomes of SPS have been shown to be present only in highly sensitive individuals who have experienced harsh environmental adversities (Acevedo, 2020).

Approximately one in four people (20%–30% of the population) fit the criteria of being an HSP, and while many tend to consider it a disorder (Acevedo, 2020), it is crucial to clarify that it is not. SPS, unrelated to "Sensory Processing Disorder", has been suggested to be a genetically determined personality trait involving deeper cognitive processing of stimuli, driven by higher emotional reactivity (Greven et al., 2019). SPS was first proposed by Aron and Aron (1997) to explain how people differentially experience external sensory stimuli and internal processes. For instance, sensitive individuals are more affected than non-sensitive individuals by factors such as caffeine, pain, hunger, medication, light, noise, other people's moods, and other stimuli. They are also characterized with increased emotional reactivity and empathy, greater depth of information processing, greater awareness of environmental subtleties, and greater ease of overstimulation. Some of these characteristics are associated with decreased levels of subjective happiness and life satisfaction, increased difficulties in stress management and

emotion regulation, and increased levels of stress; resulting in higher levels of somatization, physical illnesses and complaints (Greven et al. 2019; Acevedo, 2020). It is not the factor of SPS alone that relates to an increase or decrease in psychological and physical well-being, rather it works in conjunction with other factors, namely, difficulties in emotion regulation (Bakker & Moulding, 2012). HSPs are commonly overwhelmed by external and internal stimuli, which impacts their use of effective ER strategies. In turn, maladaptive use of ER has been shown to be highly associated with psychological and physical health symptoms.

High sensitivity among children and adolescents has also been studied; specifically, highly sensitive children (HSC) who have experienced childhood adversities are more likely to develop depressive and somatic symptoms than HSC who have not experienced childhood adversities (Acevedo, 2020). Childhood adversities are also related to the use of maladaptive ER strategies (Cheong et al., 2017). Thus, adverse childhood experiences are suggested to amplify (moderate) the relationship between SPS and symptoms of depression and somatization.

Purpose of the Study

The purpose of the current study was to examine the relationship between SPS (the independent variable), depression and somatization (the dependent variables), and the roles of difficulties in emotion regulation and childhood adversities in this relationship. This study theorized that difficulties in ER explains (mediates) the relationship between SPS and depression and SPS and somatization, in which the more a HSP has difficulties in ER (non-acceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies and lack of emotional clarity) the stronger the relationship between SPS and depressive symptoms and SPS and somatic symptoms. Also, the current study theorized that HSPs who have experienced

childhood adversities experience higher rates of depressive and somatic symptoms. Thus, childhood adversities are expected to moderate the relationship between SPS and depressive and somatic symptoms.

Research Questions

Based on the above, the following are the investigated research questions:

1) Is the relationship between SPS and depression mediated by difficulties in ER?
2) Is the relationship between SPS and somatization mediated by difficulties in ER?
3) Does SPS predict depression most at the higher levels of adverse childhood experiences?
4) Does SPS predict somatization most at the higher levels of adverse childhood experiences?

Rationale of the Study

Research studies have suggested that further studies be conducted regarding the relation of SPS to mental health and well-being and to physical health (Greven et al., 2019). To date, SPS remains to be a nascent topic, which still lacks information regarding its relation to mental disorders, such as depression and somatization (Harrison et al., 2019). It has also been claimed that extended research related to ER will account for theories of psychopathology and help improve an understanding of the important cognitive and emotional processes (Davoodi et al., 2019). Part of this current study was aimed towards the replication of Davoodi et al. (2019) research results on the role of ER strategies in depression and somatization. Another aim was to extend on previous studies on SPS and its relation to depression and somatization. Strengthening our understanding of SPS itself is essential as it is considered to be the basic feature of individual differences in sensitivity to the environment. According to Aron et al. (2012), our knowledge of

SPS provides important inferences about health, education and work, and is thought to be an important factor effecting well-being, life quality, and functioning.

Thus, the current study mainly aimed to partly replicate previous studies that have examined the relationship of SPS with depression and somatization; and second, to extend these studies by further examining the mediating and moderating effects of ER and childhood adversities, respectively, on the relationship between SPS and depression and somatization. These, in turn, will allow mental health professionals to take into account the factor of SPS and its role in the development of depression and somatization, in their practices, and welcome more accurate diagnoses, treatment plans and processes throughout their careers.

Significance of the Study

The theoretical significance of this study was to shed light on the matter, integrate, and provide more evidence-based research that further explains the factors that potentially link SPS to the development of psychopathologies and health issues. Moreover, it is valuable to study SPS thoroughly with the aim of improving well-being and life satisfaction, and preventing negative effects and impairment among highly sensitive individuals. In fact, understanding the factors underlying the negative outcomes for SPS may assist researchers and program developers in targeting prevention and intervention programs more efficiently (Acevedo, 2020). Understanding the impact that childhood adversities can have on adults' lives and how these adversities linger and continue to influence highly sensitive individuals is also important for the prevention and treatment of psychopathologies. It is valuable to deepen an understanding of how childhood adversities among HSPs contribute to the use of maladaptive ER strategies, and result in amplified depressive and somatic symptoms. Helping highly sensitive individuals, who are prone to using maladaptive ER, adopt healthier cognitive-emotional strategies and coping mechanisms

in the face of life stressors will help clinicians serve a great part of the community, as SPS, depression, somatization and difficulties in ER are all common worldwide.

Chapter 2

Literature Review

Sensory Processing Sensitivity

As sensitivity is a normal part of life, in which feeling overwhelmed by life hassles and being overtaken by joyful moments are common among human beings, the degree to and frequency of which one experiences oversensitivity to the world differs (Acevedo, 2020). Some individuals feel sensitive to things every day, are affected by other people's moods, become annoyed or pleased by small things, and have strong reactions to specific situations; these statements delineate what has been earlier referred to as sensory processing sensitivity (SPS); it is also known as differential susceptibility, vantage sensitivity, high environmental sensitivity, and biological sensitivity to context (Acevedo, 2020; Greven et al., 2019). Individuals who fit the criteria of SPS are characterized with amplified emotional responsiveness and empathy, deeper information processing, greater awareness of environmental subtleties, significant ease of overstimulation, and self-reflection. The HSP scale (Aron & Aron, 1997) measures three components of SPS: (1) Ease of Excitation (EOE, i.e., being easily overwhelmed by internal and external stimuli), (2) Aesthetic sensitivity (AES, i.e., openness for, and pleasure of, aesthetic experiences and positive stimuli), (3) Low Sensory Threshold (LST, sensitivity to external stimuli such as bright lights or loud noises). These dimensions were derived through factor analysis, to determine the extent to which one is affected by caffeine, hunger, pain, other people's moods, music, loud noise, bright lighting, and other stimuli; all of which elicit strong emotional reactions. They also gauge how much one is aware of environmental subtleties, how much one feels the need to withdraw from daily stimulation, how much one is easily startled, and

level of conscientiousness, etc. All of the aforementioned varied statements have been found to be significantly correlated with each other (Aron et al., 2012).

SPS Theories

Theories have, in fact, supported that individual differences in SPS are determined by both biological factors and environmental influences, including the early-childhood developmental environment. The Diathesis-Stress theory explained how the interaction of stressful environments with heritable genetic risk factors contribute to experiencing the environment negatively, as a HSP. The genetic predisposition for SPS intertwined with stressful and harsh surroundings (i.e., childhood adversities) has been shown to engender psychopathologies and poor adult health. Similarly, the Biological Sensitivity to Context theory states that mental and physical health of HSPs may be either improved or deteriorated depending on the individual's supportive versus harsh environment. Thus, the environment of a highly sensitive child plays a role in determining whether the outcomes would be accompanied by increased or decreased physical and mental pathologies. Factors such as abuse, neglect, child maltreatment, and strict parenting were more likely to engender negative outcomes related to psychopathology. Additionally, the Differential Susceptibility theory states that high versus low sensitivity to the environment was maintained by natural selection in preparation for dealing with future environmental threats. Individuals high on sensitivity are more prone to "pause and check" and observe novel surroundings more deeply (i.e., process information more deeply) in aim of protecting themselves from future misfits and threats; which has also been observed in animals that were characterized by SPS. (Compare et al., 2014; Greven et al., 2019).

SPS and its Negative Correlates

The negative outcomes of SPS unfold through one's psychological and physical health. Studies have supported the existence of a strong positive relationship between SPS and various psychopathologies, such as depression and somatization (Brindle et al., 2014; Booth et al., 2015; Aron et al., 2005; Liss et al., 2005; Bakker & Moulding, 2012; Liss et al., 2008; Grimen & Diseth, 2016; Greven et al., 2019; Acevedo, 2020; Ahadi & Basharpoor, 2010; Benham, 2006; Liss et al., 2005); as well as difficulties in emotion regulation (Brindle et al., 2014; Greven et al., 2019; Acevedo, 2020). It was identified that the two factors of SPS, Ease of Excitation and Low Sensory Threshold, seemed to account for the negative aspects of SPS, as both were linked to depression. The third factor, Aesthetic Sensitivity, did not seem to relate to depression.

Depression is assessed through factors such as sadness, pessimism, loss of pleasure, guilt, loss of interest, self-dislike, self-criticalness, punishment feelings, suicidal thoughts or wishes, crying, indecisiveness, worthlessness, agitation, loss of energy, irritability, changes in sleeping patterns and appetite, difficulties in concentration, fatigue, and loss of interest in sex (Beck et al., 1996). Somatization is delineated through items that gauge the extent to which one is bothered by sleep problems, changes in appetite, body aches, gastro-intestinal problems, headaches, nervousness, and other physical symptoms (Cohen & Hoberman, 1983).

SPS and Emotion Regulation (ER)

The relationship between SPS and depressive and somatic symptoms (such as migraines, non-medical related body aches, sleep problems, digestive issues, etc.), has been suggested to be mediated by difficulties in emotion regulation (Brindle et al., 2014); a recent theory explained that the association of SPS with depressive and somatic symptoms is largely stemmed by maladaptive thoughts and related negative emotions (i.e., difficulties in emotion regulation)

(Acevedo, 2020). Emotion regulation has been defined as a set of cognitive processes that impacts the type of emotional responses, and how one experiences and expresses these emotions. It has also been described as a compound process which involves the initiation, inhibition, or modulation of internal emotional states, emotion-related thoughts, emotion-related bodily reactions, and emotion-related behaviors (Compare et al., 2014). HSPs tend to become increasingly overwhelmed by internal and external stimuli, which interferes with their use of adaptive and effective ER strategies, and manifests through symptoms of depression and somatization (physical symptoms of ill health).The maladaptive emotion regulation strategies that are known to be associated with depressive and somatic symptoms are as follows: non-acceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies and lack of emotional clarity (Gratz and Roemer, L. (2004). Other maladaptive cognitive-emotion regulation strategies include self-blame, blaming others, ruminating and catastrophizing. On the other hand, it has been revealed that adaptive ER strategies such as modification, resilience, and acceptance of negative emotions were strongly and consistently linked to mental health, and the use of positive reappraisal was related to lower depressive symptoms (Davoodi et al., 2019; McRae, 2016; Aldao et al., 2009; Garnefski, 2004). Negative ER strategies were shown to increase psychopathology, while positive ER strategies lowered psychopathology (Kim, 2020). Interestingly, maladaptive ER strategies have been found to be used more commonly in women than in men, which may explain and predict higher rates of depression among women compared to men (Garnefski et al., 2004).

Previous studies have found a high correlation between SPS and difficulties in ER (Brindle et al., 2014; Greven et al., 2019; Acevedo, 2020), and in the study by Brindle et al.

(2014), difficulties in ER was suggested to mediate the relationship between SPS and depression and somatization. Thus, it was appropriate to study ER as mediating variable that intercedes the relationship between SPS and depression and somatization. According to previous findings, ACE has been shown to strengthen this relationship; as the chances of developing depression and somatization are the highest when a HSP has experienced childhood adversities. In other words, SPS predicts depression and somatization the most when HSPs have experienced high levels of childhood adversities (Acevedo, 2020). This relationship is discussed in the following paragraphs.

SPS and Childhood Adversities

SPS has been recognized in children and adolescents; highly sensitive children (HSC) are characterized with high reactivity, easy proneness to stress, shyness and behavioral inhibition. Many HSC and adolescents may remain unrecognized, thus often feel misunderstood, get shamed for their sensitivity, and tend to think that they are inferior. Research has suggested that SPS contributes to the development of depression and somatization in children, but only under conditions of environmental adversity (Kaufman et al., 2004; Mitchell et al., 2011; Pluess & Belsky, 2010; Acevedo, 2020). The environment clearly plays a significant role in shaping the outcomes of SPS. While being a HSP is associated with the development of depression and symptoms of poor physical health, harsh environmental conditions- namely childhood adversities- are suggested to strengthen this relationship. Children who have experienced higher levels of childhood adversities have been shown to present with more difficulties in ER, later in life (Cheong et al., 2017). Other studies have contributed to the understanding of what may lead to a person's vulnerability to experiencing psychological symptoms after experiencing childhood adversities. It has been shown that the relationship between adverse childhood experiences and

psychopathology (namely depression and somatization) was not only supported, but also mediated by sensory processing sensitivity (Dinç et al., 2021) which represents SPS a risk factor for developing psychopathology, rather than ACE itself.

Adverse childhood experiences are determined by factors such as emotional abuse, physical abuse, sexual abuse, neglect, violence inflicted on mother, household substance abuse, household mental illness, parental separation/ divorce, and imprisoned household member (Felitti et al., 1998).

Positive outcomes of SPS

Whereas studies have focused on the negative outcomes of SPS, some studies have highlighted the positive outcomes of SPS, such that it has been associated with enhanced creativity, empathy, awareness, and openness. High sensitivity has also been shown to be associated with better listening skills. Recent studies have also started to investigate SPS in relation to positive variables in adult samples; For example, SPS has been shown to correlate with positive emotions after a positive mood manipulation laboratory task (Lionetti et al., 2018), creativity (Bridges & Schendan, 2019), and feelings of awe. HSPs who reported positive childhood environments also reported greater life satisfaction (Acevedo, 2020). Thus, the environment significantly affects whether highly sensitive individuals will experience negative or positive outcomes of SPS. Experiencing stressful life events are inevitable, however, when stressful events are buffered by social support (a protective factor), SPS may be related to more positive experiences and less psychopathologies. Other protective factors that may attribute to experiencing more desirable outcomes of SPS include family education, stable household environments, healthy relationships among family members, etc., all of which may buffer the negative features of SPS. Research has also suggested that SPS is associated with positive aspects such as the ability to exact positive

mood, increased social competencies in interaction, developing positive parenting styles, increased activation in the major reward centers of the brain in response to positive stimuli and the development of talents. In supportive non-harsh environments, highly sensitive children are also suggested to academically perform better than their peers; achieve better grades in school, have more positive virtuous attitudes, higher levels of social competence and self-regulation, and a greater sense of security. High sensitivity may also be seen as the one's individual strength and potential, studies have described it as being an advantage only under supporting environments and conditions (Baryła-Matejczuk, 2020).

Current Study

The current study suggested a mediating role of difficulties in ER in the link between SPS and depressive and somatic symptoms, in which using maladaptive ER strategies predicts depressive and somatic symptoms. Adverse childhood experiences, which are linked to having difficulties in ER, are suggested to amplify the relationship between SPS and depressive and somatic symptoms. Thus, the current study hypothesized the following:

(1) Difficulties in ER mediates the relationship between SPS and depression.

(2) Difficulties in ER mediates the relationship between SPS and somatization.

(3) SPS predicts depression most at the higher levels of ACE.

(4) SPS predicts somatization most at the higher levels of ACE.

Chapter 3

Method

Research Design

This was a quantitative and correlational study that followed a cross-sectional survey design. Its purpose was to examine the relationship between SPS and depression, and SPS and somatization, given the roles of emotion regulation and adverse childhood experiences. The survey was done through an online and mail administered questionnaire. The scales on the questionnaire were counterbalanced with incomplete counterbalancing to control for order and carryover effects. Generalization of results was limited due to non-random-sampling.

Participants

The ideal sample size for obtaining a small effect size in this study should have consisted of *N*= 539 where 3 predictor variables were included, one for each- sensory processing sensitivity, emotion regulation and adverse childhood experiences (Fields, 2005). However, this number was difficult to attain, knowing that the survey was administered online. Thus, it was more practical to aim for a compromised sample size that is in the following range [77- 539], in which 77 is the expected sample size for a medium effect size with three predictor variables. A convenience and snowball sampling method were utilized and the obtained sample size was 94 participants. The inclusion criteria of the participants included being fluent in English language, having access to the internet, being above the age of 18. As can be seen below in Table 1, 58 were females and 35 were males, and the mean age of the participants was 30.76. Regarding the marital status, 49 were single, 19 were married, 4 divorced, 19 in a relationship and one was widowed. In total, there were 77 Lebanese and 13 from other nationalities, of which 58 resided in Lebanon and 34 outside. Finally, the sample consisted of 3 participants with a middle school

education, 11 with a high school degree, 43 with a bachelor's degree, 33 with a master's degree and two with a doctorate (see table 1).

Table 1

Frequency and percentage of Demographics (N=94)

		N	%
Gender	Female	58	61.7
	Male	35	37.2
Age	18-21 years	11	16.7
	22-25 years	18	19.1
	26-29 years	32	34.1
	30-40 years	15	15.9
	41-55 years	14	14.9
	56-77 years	3	2.2
Nationality	Lebanese	77	81.9
	Other	13	13.8
Country of Residence	Lebanon	58	61.7
	Other	34	36.2
Level of Education	Middle school	3	3.2
	High school	11	11.7
	Bachelor's degree	43	45.7
	Master's degree	33	35.1
	Ph.D. or higher	2	2.1
Marital Status	Single	49	52.1
	Married	19	20.2
	Divorced	4	4.3
	Widowed	1	1.1
	In a relationship	19	20.2

Ethical Considerations

Participants registered for the study identified as ''The Relationship between Sensory Processing Sensitivity and Depression and Somatization and the roles of Emotion Regulation and Adverse Childhood Experiences'', and were then linked to a consent form and surveys (hosted at www.surveymonkey.com). All rights of participants were ensured through informed consent (see

Appendices A and B), which informed participants that participation in the study is completely voluntary, anonymous and confidential. The names of the participants or any other identifying information were not asked. The provided data from all participants were stored in combination in a password protected folder. Only the principle investigators of the study have access to the compiled data which will be stored for a period of 10 years post data. During this time, participants have the right to review the data. The informed consent also included informing participants of their rights to withdraw from the study or discontinue participation at any time and for any reason. Their decisions to withdraw or refuse to participate did not include any loss of benefits or penalty. In case of adverse impact, referrals were made. The risk in this study was limited to some participants getting triggered if they had experienced childhood adversities, or have been previously diagnosed with depression and/or somatization. Nevertheless, the results of this study aided in shedding light on the factor of SPS and its link to mental health, normalizing it as an existent and common personality trait, and contributing in the prevention and treatment of mental health issues in HSPs. Moreover, the current research study was reviewed and received clearance from the SBS Ethics Committee at Haigazian University. Participants had the right to contact the University for any Further Concerns about their rights at SBS.Ethics@haigazian.edu.lb.

Instruments

The Highly Sensitive Person Scale (HSPS). This scale which was developed by Aron and Aron, (1997) is a 27-item self-report measure of SPS. Items are scored on a 7-point Likert scale. This scale shows good levels of reliability and validity (content, construct, convergent, and discriminant) with Cronbach's alpha $\alpha = .85$, and test-retest reliability r=.661 (Aron Ershova et al, 2018; Montoya-Pérez et al., 2019). It comprises of three dimensions: Low Sensory Threshold

(α= .82), Aesthetic Sensitivity (α= .61) and Ease of Excitation (α = .81). This scale was used across several behavioral and brain activity studies, which provided empirical evidence that the score resulting from the sum of items of the HSP scale correlates with an increased depth of processing and increased emotional reactivity to both positive and negative environmental contexts. Another thing to be considered when evaluating the three sensitivity factors is that none of these components specifically measure depth of processing, which is a key feature of SPS. To some extent, some of the items currently included in the Aesthetic Sensitivity factor do measure an increased depth of processing (e.g., "do you seem to be aware of subtitles in the environment?), but these items are indirect and few (Acevedo, 2020). Furthermore, this is the only validated scale that aims to measure SPS. The items in this scale are consistent with the conceptual definition of SPS. The use of the HSPS was appropriate in this study. Higher scores indicated greater sensitivity (see Appendix C).

The Beck-Depression Inventory (BDI-II). This scale which was developed by Beck et al. (1996) is a 21-item self-report measure that assesses both cognitive-affective and somatic aspects of depression. It is reliable and well-validated with Cronbach's alpha that ranges between α= .73 to α=.95. Studies in the literature review have commonly used this scale to measure depressive symptoms in SPS. It is a popular and well-established scale that has been commonly used in well-conducted studies. Thus, it was appropriate to utilize in the current study. Higher scores indicated greater depression (see Appendix D).

The Difficulties in Emotion Regulation Scale (DERS-16). This scale which was initially developed by Gratz and Roemer, L. (2004) is a brief, 36-item self-report questionnaire designed to assess multiple aspects of emotional dysregulation through a range of six sub-scales: (1) Non-acceptance of emotional responses, (2) Difficulty engaging in Goal-directed behavior,

(3) Impulse control difficulties, (4) Lack of emotional awareness, (5) Limited access to emotion regulation strategies, and (6) Lack of emotional clarity. The DERS has demonstrated good internal consistency (α = .93), and strong results have been reported for test-retest reliability and construct and predictive validity (Gratz & Roemer, 2004). However, at 36- items, the DERS may be challenging to administer in some situations or settings. Recently, a brief 16-item version of this scale—the DERS-16—was developed. It has been found by several studies that the DERS-16 has excellent internal consistency (α = .92), good test–retest reliability (r = .85), and good concurrent validity. It has been found that it is a valid and reliable self-report measure for difficulties in ER (Lawlor et al., 2021). Knowing that five different questionnaires will be administered in the current study, and to keep the administration of the survey short (approximately 20 minutes), the DERS-16 seemed suitable to be utilized in this study. Higher scores suggested greater problems with emotion regulation. Items are scored on a 5-point Likert scale. The scoring of DERS-16 is equal to the original DERS (see Appendix E).

The Cohen–Hoberman Inventory of Physical Symptoms (CHIPS). This scale, which was developed by Cohen and Hoberman (1983), is a 33-item self-report measure that assesses the extent to which physical symptoms have bothered subjects during the past two weeks. It is a 5-point Likert scale with a Cronbach's alpha α=.88 indicating high internal consistency among measured items. It has been previously used in studies that aimed to find correlations between SPS and physical complaints (Benham, 2006), thus it was appropriate to utilize in the current study (see Appendix F).

The Adverse Childhood Experience (ACE) Questionnaire. This scale was developed by Felitti et al. 1998; it is a10-item measure intended to assess 10 types of childhood adversities in three different areas of abuse, including emotional and physical abuse, physical neglect, and

abuse associated with living in a dysfunctional household. It was designed to measure the occurrence of adverse experiences individuals have experienced before the age of 18 years. It is a yes/no type of response questionnaire, in which each "yes" answer equals 1 point. It includes a scale that measures resilience which has no use of being utilized in the current study, thus it will be removed. Each section is scored alone- scoring will not be affected by removing the resilience section. It is a reliable and valid measure of childhood adversity that has been used extensively in large-scale ACE studies (Meinck et al., 2017), specifically used to predict physical and mental health and well-being in adults who have experienced childhood adversities. It has adequate internal consistency (Cronbach's alpha = .88) (see Appendix G).

In addition to the above mentioned instruments, the survey included a demographic section (see Appendix H) that focused on the following variables: age, gender, nationality, country of residence, marital status and level of education, as well as a consent and a purpose of the research forms.

Procedure

Pilot study. The pilot study was carried out on a range of 19 participants. The purpose was to verify the practicability of the study by assessing the inclusion criteria of the participants, the recruitment process of participants, the testing of the survey- including the scales' reliabilities and the demographic variables. A consent of participation was obtained after the purpose of the pilot study was elucidated clearly to the participants. They were asked for feedback regarding their understanding of the items utilized, in the hope of singling out any items that might not have reflect the construct appropriately in the Arab culture- as it was originated in English. Moreover, the Cronbach alphas of the scales were calculated and approved of before the actual study began.

Actual study. The sample was recruited conveniently. Participants who fit the inclusion criteria mentioned above were allowed to participate. Participants were also reached through snowball sampling and social media advertising. A social media post explaining the objectives of the study by the researcher was advertised for. The researcher had no research assistants aiding in data collection, thus, there was no need to train any assistants on the procedures that needed to be followed in order to maintain the participants' anonymity.

Participants were kept anonymous- as adverse childhood experiences may have been a sensitive topic for some, and gauging mental health issues (such as depression) could have elicited the need to manage one's public image, and thus respond with bias. The researcher was sensitive to the fact that some participants might be triggered if they had experienced childhood adversities, or had been previously diagnosed with depression or somatization. Therefore, surveys initially included an informed consent, a contact email or number for the researcher in case the participant had any questions or comments regarding the study, and had a referral section that included contacts of a mental health center in case of adverse impact. The survey took around 20 minutes to fill and were read by the participants themselves.

The procedures described above were carried out after the researcher received the approval of the Social and Behavioral Sciences' (SBS) ethics committee of Haigazian University.

Chapter 4

Results

The purpose of this study was to investigate the relationship between sensory processing sensitivity (SPS) and depression, and SPS and somatization; as well as to investigate the mediating effect of difficulties in emotion regulation and the moderating effect of adverse childhood experiences, on this relationship. This chapter includes the reliability findings of the scales and the findings contributing to the hypotheses testing using the Statistical Package for the Social Sciences (version 26).

Reliability Testing

The reliability coefficients were calculated for each of the 5 scales used in this research. To verify the internal reliability of each of the scales, Cronbach's alpha was generated on SPSS. The reliability coefficient for the 27- item Highly Sensitive Person Scale (HSPS) gave a Cronbach's alpha of 0.912. The reliability coefficient of the 21-item Beck Depression Inventory (BDI-II) gave a Cronbach's alpha of 0.927. The reliability coefficient of the 33-item Cohen–Hoberman Inventory of Physical Symptoms (CHIPS) gave a Cronbach's alpha of 0.95. The reliability coefficient for the 16-item Difficulties in Emotion Regulation Scale (DERS-16) gave a Cronbach's alpha of 0.957. The reliability coefficient for the Adverse Childhood Experiences Scale (ACE) gave a Cronbach's of 0.687. In comparison to studies found in the literature, the ACE scale showed a lower Cronbach's alpha- which did not change when any of the items were deleted. Although the Cronbach's alpha of this scale was in the low range, but it was still acceptable to be utilized in the study (see Table 2).

Table 2

Comparison between the Literature and Current Cronbach's Alphas of the Scales

Scale	Previous Cronbach's Alpha	Current Cronbach's Alpha
HSPS	.85	.912
BDI	.73 - .95	.927
CHIPS	.88	.95
DERS-16	.92	.957
ACE	.88	.687

Correlation Matrix

The Pearson correlations of the main study variables shown in table 3 below helped demonstrate how all study variables are correlated with each other.

Table 3

Pearson Correlations for the main study variables

		Age	Level of Education	SPS Total	DEP Mean	SOM Total	ACE Total	ER Total
Age	Pearson Correlation	1	.013	-.005	-.106	-.062	-.158	-.147
	Sig. (2- tailed)		.903	.964	.317	.558	.134	.162
	N		92	92	92	92	92	92
Level of Education	Pearson Correlation		1	.011	-.185	-.188	.002	-.194
	Sig. (2- tailed)			.919	.078	.073	.983	.065
	N			92	92	92	92	92
SPS Total	Pearson Correlation			1	.543**	.539**	.304**	.537**
	Sig. (2- tailed)				.000	.000	.003	.000
	N				94	94	94	94
DEP Mean	Pearson Correlation				1	.802**	.253*	.760*
	Sig. (2- tailed)					.000	.014	.000
	N					94	94	94
SOM Total	Pearson Correlation					1	.226*	.734**
	Sig. (2- tailed)						.029	.000
	N						94	94
ACE Total	Pearson Correlation	-.158	.002	.304**	.253*	.226*	1	.312**
	Sig. (2- tailed)	.134	.983	.003	.014	.029		.002
	N		92	92	94	94	94	94
ER Total	Pearson Correlation	-.147	-.194	.537**	.760**	.734**	.312**	1
	Sig. (2- tailed)	.162	.065	.000	.000	.000	.002	
	N	92	92	94	94	94	94	94

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Hypotheses Testing

Hypothesis 1: Emotion regulation (measured by DERS-16) mediates the relationship between sensory processing sensitivity (measured by HSPS) and depression (measured by BDI-II).

To test this hypothesis, multiple hierarchical regression analysis was used to show the effect of difficulties in emotion regulation on the relationship between sensory processing sensitivity and depression (see Tables 4 a, b, c).

Table 4a

Model Summary of the Regression Analysis of depression as the dependent variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.796[a]	.634	.604	.37693	.634	20.571	7	83	.000

a. Predictors: (Constant), ACE Total, LevelofEducation, Age, Gender, SPSTotal, AreaofResidence, ER Total

Table 4b

Anova Table of depression as dependent variable

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	20.459	7	2.923	20.571	.000[b]
	Residual	11.793	83	.142		
	Total	32.251	90			

a. Dependent Variable: DEP Mean

b. Predictors: (Constant), ACE Total, LevelofEducation, Age, Gender, SPSTotal, AreaofResidence, ER Total

Table 4c

Regression Coefficients of Depression as the Dependent Variable

Model		Unstandardized Coefficients B		Standardized Coefficients Beta	T	Sig.
1	(Constant)	.279	.344		.809	.421
	Gender	-.016	.089	-.013	-.185	.854
	Age	-.002	.004	-.032	-.442	.659
	Area of Residence	.120	.089	.098	1.353	.180
	Level of Education	-.046	.051	-.062	-.894	.374
	SPS Total	.005	.002	.187	2.231	.028
	ER Total	.025	.003	.662	7.813	.000
	ACE Total	.003	.021	.010	.131	.896

a. Dependent Variable: DEP Mean

Based on Table 4c, and looking at all the Beta values as well as the values of significance, we notice that both variables, the emotional regulation (DER Total), which is the mediating variable in this study, and sensory processing sensitivity (SPS Total), which is the independent variable of our hypothesis, predict the first dependent variable, depression. Specifically, sensory processing sensitivity contributed to depression by 18.7% with a significance value of p=0.028 and emotional regulation contributed to depression by 66.2% with a significance value of p=0.000. In the multiple hierarchical regression, when we controlled for the mediator (difficulties in ER), SPS (the independent variable) still significantly predicted depression (the dependent variable). Therefore, we could not conclude that there is a mediation. So, the results indicated that difficulties in emotion regulation did not mediate the relationship between sensory processing sensitivity and depression and, hence, hypothesis 1 was rejected.

Hypothesis 2: Emotion regulation (measured by DERS-16) mediates the relationship between sensory processing sensitivity (measured by HSPS) and somatization (measured by CHIPS).

To test this hypothesis, multiple regression analysis was used to show the effect of difficulties in emotion regulation on the relationship between sensory processing sensitivity and somatization (see Tables 5 a, b, c).

Table 5a

Model Summary of the Regression Analysis of somatization as the dependent variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
1	.767[a]	.589	.554	16.97894	.589	16.964	7	83	.000

a. Predictors: (Constant), ACE Total, LevelofEducation, Age, Gender, SPSTotal, AreaofResidence, ER Total

Table 5b

Anova Table of somatization as dependent variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34232.926	7	4890.418	16.964	.000[b]
	Residual	23927.601	83	288.284		
	Total	58160.527	90			

a. Dependent Variable: SOM Total

b. Predictors: (Constant), ACE Total, LevelofEducation, Age, Gender, SPSTotal, AreaofResidence, ER Total

Table 5c

Regression Coefficients of Somatization as dependent Variable

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	6.750	15.505		.435	.664
	Gender	-2.217	4.006	-.042	-.553	.582
	Age	.090	.182	.038	.492	.624
	Area of Residence	.149	4.010	.003	.037	.970
	Level of Education	-2.314	2.298	-.074	-1.007	.317
	SPS Total	.212	.096	.196	2.203	.030
	ER Total	1.048	.147	.642	7.151	.000
	ACE Total	-.275	.959	-.022	-.287	.775

a. Dependent Variable: SOM Total

Based on Table 5c, and looking at all the Beta values as well as the values of significance, we notice that both variables, the emotional regulation (DER Total), which is the mediating variable in this study, and the sensory processing sensitivity (SPS Total), which is the independent variable of our hypothesis, predict the second dependent variable, somatization. Specifically, sensory processing sensitivity contributed to somatization by 19.6% with a significance value of p=0.030 and emotional regulation contributed to somatization by 64. 2% with a significance value of p=0.000. In the multiple regression, when we controlled for the mediator (difficulties in ER), SPS (the independent variable) still significantly predicted somatization (the dependent variable). Therefore, we could not conclude that there is a mediation. So, the results indicated that difficulties in emotion regulation did not mediate the relationship between sensory processing sensitivity and somatization and, hence, hypothesis 2 was rejected.

Hypothesis 3: Sensory processing sensitivity predicts depression most at the higher levels of adverse childhood experiences (measured by ACE scale).

To test this hypothesis, multiple regression analysis was used to assess the effects of the moderating variable (adverse childhood experiences); specifically, we looked at the interaction effect between SPS and the ACE and whether or not such an effect was significant in predicting depression (see Tables 6 a, b, c).

Table 6a

Model Summary of the Regression Analysis of depression as the dependent variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.761[a]	.580	.566	.39867	.580	41.353	3

Table 6b

Anova Table of depression as dependent variable

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.717	3	6.572	41.353	.000[b]
	Residual	14.304	90	.159		
	Total	34.021	93			

a. Dependent Variable: DEP Mean

b. Predictors: (Constant), ZSPSxACE, ER Total, ACE Total

Table 6c

Regression Coefficients of Depression as the Dependent Variable

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics
		B	Std. Error	Beta	t	Sig.	Tolerance
1	(Constant)	.657	.117		5.629	.000	
	ACE Total	.008	.022	.025	.347	.729	.867
	DER Total	.030	.003	.754	10.486	.000	.902
	ZSPSxACE	-.025	.042	-.041	-.588	.558	.958

Based on Table 6c, and looking at the Beta value as well as the value of significance of the interaction effect variable (ZSPSxACE), we notice that it is not significant. Specifically, the interaction variable contributed to depression by 4.1% with a significance value of p=0.558. We

concluded that adverse childhood experiences had no moderating effect on the relationship between sensory processing sensitivity and depression and, hence, hypothesis 3 was rejected.

Hypothesis 4: Sensory processing sensitivity predicts somatization most at the higher levels of adverse childhood experiences (measured by ACE scale).

To test this hypothesis, hierarchical multiple regression analysis was used to assess the effects of the moderating variable (adverse childhood experiences); specifically, we looked at the interaction effect between SPS and ACE and whether or not such an effect was significant in predicting somatization (see Tables 7a, b, c).

Table 7a

Model Summary of the Regression Analysis of Somatization as the Dependent Variable

				Std. Error	Change Statistics		
Model	R	R Square	Adjusted R Square	of the Estimate	R Square Change	F Change	df1
1	.555[a]	.308	.285	21.50110	.308	13.383	3

Table 7b

ANOVA Table of Somatization as Dependent Variable

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	18561.213	3	6187.071	13.383	.000[b]
	Residual	41606.745	90	462.297		
	Total	60167.957	93			

a. Dependent Variable: SOM Total

b. Predictors: (Constant), SPSxACE, SPSTotal, ACE Total

Table 7c

Regression Coefficients of Somatization as Dependent Variable

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance
1	(Constant)	12.298	18.210		.675	.501	
	SPSTotal	.421	.146	.387	2.889	.005	.427
	ACE	-7.579	6.390	-.607	-1.186	.239	.029
	Total SPSxACE	.064	.047	.735	1.341	.183	.026

Based on Table 7c, and looking at the Beta value as well as the value of significance of the interaction effect variable (ZSPSxACE), we notice that it is not significant. Specifically, the interaction variable contributed to somatization by 73.5% with a significance value of p=0.183. We concluded that adverse childhood experiences had no moderating effect on the relationship between sensory processing sensitivity and somatization and, hence, hypothesis 4 was rejected.

In summary, all four hypotheses were rejected. The relationship between sensory processing sensitivity and depression and somatization was not mediated by emotion regulation difficulties, nor moderated by adverse childhood experiences. However, results of the current study obtained two predicting variables for depression and somatization which were sensory processing sensitivity and emotion regulation difficulties. In other words, just as sensory processing sensitivity predicted depression and somatization, ER difficulties predicted depression and somatization, rather than mediated the relationship. Regarding adverse childhood experiences, it did not amplify the relationship between SPS and depression and somatization.

Chapter 5

Discussion

The purpose of this study was to investigate the relationship between SPS and depression on the one hand, and SPS and somatization, on the other; specifically, the roles of the mediating effect of difficulties in ER and the moderating effect of ACE in this relationship. The results presented in Chapter 4 will be discussed in this chapter and linked to existing literature. This chapter will also include clinical implications and limitations of the current study as well as recommendations for future research.

The Role of Emotion Regulation

In the current study, it was predicted that (1) emotion regulation mediates the relationship between sensory processing sensitivity and depression (hypothesis 1), and (2) ER mediates the relationship between SPS and somatization (hypothesis 2). Unlike the findings of Brindle et al. (2014) on this topic, neither hypotheses were confirmed in our study. In other words, the result of our first hypothesis did not show that ER mediated the relationship between SPS and depression; similarly, the second hypothesis did not provide evidence that ER mediated the relationship between SPS and somatization. Our results were inconsistent with the findings of Brindle et al. (2014), however, they were consistent with various studies that suggested a high correlation between SPS and ER difficulties such as that of Greven et al. (2019), Benham (2006), Liss et al. (2005) and Acevedo (2020). If we compare our study with that of Brindle et al. (2014), for instance, we find that lack of access to emotional regulation strategies, greater awareness of emotion, and lack of acceptance towards feeling distressed, acted as partial mediators between SPS and negative affect. Researchers in the study of Brindle et al., (2014) adopted a sample size of N=*157* and utilized the same measurement tool as the one used in the current study: The

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). One possible reason that the results of the current research were not in line with that of Brindle et al. (2014) is the small sample size (N=*94).* Another study by Bakker & Moulding, (2012) suggested that dispositional mindfulness (an adaptive ER strategy) mediated the relationship between SPS and psychological and physical health (i.e., somatic symptoms). The results of this study indicated that SPS is thought to lead to low dispositional mindfulness (which is an indicator of ER difficulties), which in turn leads to high trait anxiety, low well-being, and many psychosomatic symptoms (i.e., increased levels of psychopathologies). In the study by Bakker & Moulding, the sample size was N=*635*, which is considered an ideal one that may reflect more accurate results. Thus, it is possible that the small sample size in the current study could have engendered inaccurate results.

Although both of our mediation hypotheses were not confirmed, we found that ER had a direct effect on the relationship between SPS and depression/somatization, where ER difficulties was a predictor of both depression and somatization. Thus, as it has been found in previous research (Benham, 2006; Liss et al., 2005; Greven et al., 2019; Acevedo, 2020), SPS and difficulties in ER were highly correlated in this study, - in a manner that allowed ER to independently predict depression and somatization. Similar findings have also been found abundantly in the literature- outside the context of SPS- where difficulties in ER was a predictor of depression and somatization (Garnefski et al., 2004; Davoodi et al., 2019; Gratz et al., 2015); Compare et al., 2014; Aldao et al., 2010).

The Role of Adverse Childhood Experiences

In our study, we stated that sensory processing sensitivity (SPS) predicts depression (hypothesis 3) and somatization (hypothesis 4) most at the higher levels of adverse childhood

experiences. This statement was based on previous findings by Aron et al. (2012), Greven et al. (2019) and Acevedo (2020) which stated that HSPs who have been raised in harsh environments (i.e., ACE), were more likely to have depressive and somatic tendencies, that non-HSPs. Based on this, ACE was hypothesized to be a moderator, in the current study. However, our study could not show that adverse childhood experiences had a strengthening effect on the link between SPS and depression and somatization. This may be attributed to the relatively low reliability of the ACE scale paired with a small sample size that could have engendered unreliable results.

It may also be suitable to assume that the ACE scale is a more accurate tool in the west, as the majority of our sample (85.6%) were of Lebanese nationality. It is quite possible that the ACE scale did not seem to reflect the kinds of adversities children may have perceived as adverse or abusive, in Lebanon, hence the low reliability of the scale. Furthermore, although the confidentiality of the data was preserved, participants may have had difficulties in answering questions that may have seemed difficult for them (e.g., adverse childhood experiences scale). The high number of items in the scales used in this study may have also caused reluctance for participants to respond or may have caused random responses. Therefore, it seems more convenient that the scales that will be used in future studies are shorter. In addition to self-report based measurement tools, objective measurement tools and experimental methods can be used. Also, it is important to note that people may sometimes misremember retrospective childhood adversities, and/or be affected by their current emotional state in these recall situations. Such situations may create limitations on the basis of retrospective data.

Finally, the constructs that were investigated in the current study were “heavy” in nature; in other words, some were considered as psychopathologies (i.e., depression and somatization) and others (i.e., emotion regulation difficulties, sensory processing sensitivity, adverse childhood

experiences) were related to clinical problems that have been consistently shown to be linked to psychopathology. Thus, it would have been more appropriate to investigate these constructs on a clinical population, rather than on the general population. However, as this was inaccessible, we had to apply the study on a non-clinical population, in which participants may have also answered the survey with the attempt to protect their self-image as well as public image- despite the fact that the actual study was anonymous. All of the above-mentioned factors may have partially contributed to some of the reasons the hypotheses were rejected in this study.

Conclusion

The first aim of the current study was to replicate previous findings on the relationship between ER and mental and physical health; which was achieved. While SPS was highly correlated with difficulties in emotion regulation, it was also shown that difficulties in ER predicted depression and somatization. ER, however, did not mediate the relationship between SPS and depression/somatization, as we have hypothesized, it rather had a direct effect on the dependent variables, making it "powerful" enough to stand as its own independent variable.

The second aim was to extend on previous findings related to SPS and mental health; this was achieved through investigating the moderating effect of ACE on this relationship, regardless of the eventual rejection of the hypothesis. In fact, upon further analysis of the data--although not hypothesized upon-- it was found that SPS played the role of the mediator between ACE and depression/somatization. This result, in addition to SPS predicting depression and somatization in our study, as is the case with a lot of previous research (Brindle et al., 2014; Booth et al., 2015; Aron et al., 2005; Liss et al., 2005; Bakker & Moulding, 2012; Liss et al., 2008; Grimen & Diseth, 2016; Greven et al., 2019; Acevedo, 2020; Ahadi & Basharpoor, 2010; Benham, 2006;

Liss et al., 2005) showed the significance and centrality of SPS as a construct. Needless to say, SPS and its correlates have to be studied further in future studies.

Finally**, s**tudies on sensory processing sensitivity have been flourishing and their link to various psychopathologies have been supported. Our study has contributed modestly to an understanding of the factors that lead to a person's vulnerability towards depression and somatization.

Clinical Implications

These findings may be of interest for mental health professionals when encountering SPS and difficulties in ER, allowing them to examine these factors in the treatment of psychological problems. An understanding of SPS and ER is crucial in assisting individuals who present to clinical settings in improving well-being and life satisfaction, and preventing negative effects and impairment among highly sensitive individuals. Understanding the factors underlying the negative outcomes for SPS may support researchers and program developers in designing prevention and intervention programs methodically (Acevedo, 2020).

This research has also integrated pieces of information that have suggested the effect of maladaptive emotion regulation on depressive and somatic tendencies, and, conversely, the effect of adaptive emotion regulation on improved mental and physical health. These findings allow a clear perspective on one of the most important treatment elements when dealing with SPS, depression, somatization and childhood adversities: adaptive emotion regulation strategies.

Limitations of the Current Study

The current findings need to be considered with respect to the limitations of the current study. Specifically, the current study employed a cross-sectional study. Although a cross-sectional methodology provides important information about relationships between constructs

and variables, a cause and effect relationship cannot be directly established through this type of design. Furthermore, the sample size was compromised and relatively small. The ideal sample size for 3 predictor variables was N=*539*. However, as it was expected to be challenging to obtain, a smaller sample size was adopted N= *94*. It was still suitable to carry on with the study with 94 participants, yet, we cannot state that it was the ideal sample size. Another limitation was that one of the scales utilized had low reliability (r=6.87), paired with a small sample size, was assumed to engender unreliable results when it came to ACE. The findings of the current study are also unsuitable for generalization to the general population.

Future Research Recommendations

Roughly 20%–30% of the population are considered HSPs. Research evidence suggests that higher SPS is linked to a range of psychopathologies, specifically internalizing and stress-related problems such as higher levels of anxiety, depression, and social anxiety; lower levels of subjective happiness and life satisfaction; and higher stress-management difficulties including emotion regulation difficulties, increased levels of stress, physical symptoms resulting from ill health, greater work displeasure, and need for recovery from work-related factors (Greven et al., 2019). Yet, studies also suggest that higher SPS is linked to a variety of positive outcomes, such as being more creative, empathic, and having good mental health when environments are supportive. The findings of this research provide an understanding of how both SPS and difficulties in ER predict certain psychopathologies, namely, depression and somatization. For future research however, the constructs should be addressed using experimental methods and laboratory-based methods; for example, participants low and high in SPS could be assessed as to their acceptance and regulation strategies with emotions induced in the laboratory, such as while watching emotive film clips. The role of ACE was unclear and needs to be studied in research

that adopts a larger and more representative sample. The more positive outcomes of SPS may be explored by examining the relationship between SPS and positive factors like creativity, empathy, listening skills, etc. It is also recommended to explore the effects of adaptive emotion regulation strategies as predictors for improved mental health and decreased psychopathologies. This may be accomplished in two methods: 1- Using an experimental design which compares groups of individuals who have depressive and somatic symptoms and difficulties in ER, where one group is enrolled in mental health care and learns how to use effective ER strategies, and another group is not enrolled in any type of mental health care. Results may further confirm previous findings on the importance of using specific healthy ER strategies to buffer depressive and somatic tendencies. 2- Using a cross-sectional design that explores the relationship between specific items that measure adaptive ER (such as acceptance, positive reappraisal, impulse control, distress tolerance and/or others) and levels of psychopathologies. Future research may also be conducted to explore additional risk factors specific to SPS, other than emotion regulation difficulties; for instance, investigating the roles of poverty or trauma on SPS and psychopathologies. Findings may bolster the abilities of clinicians to prevent and treat psychopathologies in SPS.

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Appendix A

Participant Information Letter

Dear Ms./Mr.
I am Riwa Corban, a student at Haigazian University from the Department of Social and Behavioral Sciences. I am currently carrying out a research study titled "The Relationship between Sensory Processing Sensitivity and Depression and Somatization and the roles of Emotion Regulation and Adverse Childhood Experiences" advised by Dr. Hanine Hout.
You are being asked to take part in this study since you are fluent in English language and between the ages of 18-64.
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 examining the relationship between being sensory processing sensitivity and depression, and somatization. Moreover, the study aims to understand the roles of emotion regulation and adverse childhood experiences when it comes to the relationship between being highly sensitive and developing depression and somatization. The research findings will guide new research by further explaining the factors that potentially link SPS to the development of psychopathologies and health issues. Findings will also assist mental health professionals in making more concise diagnosis, setting more accurate treatment plans and carrying on with treatments more efficiently. 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 5 questionnaires. Your participation will involve completing a survey that entails statements that you will have to rate based on agreement and a demographic form for approximately (20) minutes.
  Participation in this project is voluntary (if there is any form of compensation, please state here). 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 (if identifying information will be gathered, state who will have access to them, whether they will be disclosed to third parties and how you will ensure the privacy and welfare of participants).
- Data you provide along with data from all participants in the present research will be stored in aggregate in a password protected folder. 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. 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 entitled. Discontinuing participation in no way affects your relationship with Haigazian University.

- This research study has been reviewed and has received clearance from the Haigazian University ethics committee (Dr. Hanine Hout). If you have any further concerns about your rights as a research participant, please, do not hesitate to contact Dr. Hanine Hout, Assistant Professor in the SBS at Haigazian University
  Telephone: 961 1 349 230, ext. 331
  Email: hanine.hout@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. However, adverse childhood experiences may be a sensitive and triggering topic for some participants. Therefore, the survey will initially include an informed consent, a contact email or number for the researcher in case you have any questions or comments regarding the study, and will have a referral section that includes contacts of a mental health center, in case of adverse impact.
- You will receive no direct benefits from participating in this research; however your participation does help researchers better understand the relationship between being highly sensitive and developing depressive and somatic symptoms, and the roles that emotion regulation and adverse childhood experiences have on this relationship.

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

Name: Riwa Corban
Affiliation: Clinical Psychology Masters student at Haigazian University
Email: rcorban@students.haigazian.edu.lb

Name: Dr. Hanine Hout
Affiliation: Assistant Professor in the SBS at Haigazian University
Telephone: 961 1 349 230, ext. 331
Email: hanine.hout@haigazian.edu.lb

Appendix B

Participant Consent

The Relationship between Sensory Processing Sensitivity and Depression and Somatization and the roles of Emotion Regulation and Adverse Childhood Experiences

Please read the following statements and place a check mark in the boxes adjacent to them.

- ☐ I have volunteered to participate in this research project conducted for purposes of study. My participation is voluntary and does not involve payment of any kind.
- ☐ I agree to participate in this research project conducted for purposes of study. My decision is voluntary and does not involve payment of any kind.
- ☐ 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 an answering a questionnaire for approximately 40 minutes.
- ☐ I have been assured that the researcher will maintain my identity confidential.
- ☐ I have been assured that the information from this survey will be used for the purpose of academic study only / publication / educational use.
- ☐ I have received the assurance that this research study has been duly reviewed and approved by the Haigazian University ethics committee.
- ☐ 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 (if identified) at any time.

☐ I have read, listened and fully understand the explanation given to me. All my questions have been satisfactorily answered.

☐ I, therefore, choose to voluntarily participate in this research study.

☐ I have received a copy of this consent form co-signed by the researcher.

Participant consent	Investigator
Date: _____	Date:
_____	
Name: _____	Name:
_____	
Signature: _____	Signature:
_____	

Appendix C

The Highly Sensitive Person Scale (HSPS)

INSTRUCTIONS: This questionnaire is completely anonymous and confidential. Answer each question according to the way you personally feel, using the following scale:

1	2	3	4	5	6	7
Not at All			Moderately			Extremely

____ 1. Are you easily overwhelmed by strong sensory input?

____ 2. Do you seem to be aware of subtleties in your environment?

____ 3. Do other people's moods affect you?

____ 4. Do you tend to be more sensitive to pain?

____ 5. Do you find yourself needing to withdraw during busy days, into bed or into a darkened room or any place where you can have some privacy and relief from stimulation?

____ 6. Are you particularly sensitive to the effects of caffeine?

____ 7. Are you easily overwhelmed by things like bright lights, strong smells, coarse fabrics, or sirens close by?

____ 8. Do you have a rich, complex inner life?

____ 9. Are you made uncomfortable by loud noises?

___ 10. Are you deeply moved by the arts or music?

___ 11. Does your nervous system sometimes feel so frazzled that you just have to go off by yourself?

___ 12. Are you conscientious?

___ 13. Do you startle easily?

___ 14. Do you get rattled when you have a lot to do in a short amount of time?

___ 15. When people are uncomfortable in a physical environment do you tend to know what needs to be done to make it more comfortable (like changing the lighting or the seating)?

___ 16. Are you annoyed when people try to get you to do too many things at once?

___ 17. Do you try hard to avoid making mistakes or forgetting things?

___ 18. Do you make a point to avoid violent movies and TV shows?

___ 19. Do you become unpleasantly aroused when a lot is going on around you?

___ 20. Does being very hungry create a strong reaction in you, disrupting your concentration or mood?

___ 21. Do changes in your life shake you up?

___ 22. Do you notice and enjoy delicate or fine scents, tastes, sounds, works of art?

___ 23. Do you find it unpleasant to have a lot going on at once?

___ 24. Do you make it a high priority to arrange your life to avoid upsetting or overwhelming situations?

___ 25. Are you bothered by intense stimuli, like loud noises or chaotic scenes?

___ 26. When you must compete or be observed while performing a task, do you become so nervous or shaky that you do much worse than you would otherwise?

___ 27. When you were a child, did parents or teachers seem to see you as sensitive or shy?

Appendix D

The Beck Depression Inventory (BDI-II)

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully. And then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

0. I do not feel sad.

1. I feel sad much of the time.

2. I am sad all the time.

3. I am so sad or unhappy that I can't stand it.

2. Pessimism

0. I am not discouraged about my future.

1. I feel more discouraged about my future than I used to.

2. I do not expect things to work out for me.

3. I feel my future is hopeless and will only get worse.

3. Past Failure

0. I do not feel like a failure.

1. I have failed more than I should have.

2. As I look back, I see a lot of failures.

3. I feel I am a total failure as a person.

4. Loss of Pleasure

0. I get as much pleasure as I ever did from the things I enjoy.

1. I don't enjoy things as much as I used to.

2. I get very little pleasure from the things I used to enjoy.

3. I can't get any pleasure from the things I used to enjoy.

5. Guilty Feelings

0. I don't feel particularly guilty.

1. I feel guilty over many things I have done or should have done.

2. I feel quite guilty most of the time.

3. I feel guilty all of the time.

6. Punishment Feelings

0. I don't feel I am being punished.

1. I feel I may be punished.

2. I expect to be punished.

3. I feel I am being punished.

7. Self-Dislike

0. I feel the same about myself as ever.

1. I have lost confidence in myself.

2. I am disappointed in myself.

3. I dislike myself.

8. Self-Criticalness

0. I don't criticize or blame myself more than usual.

1. I am more critical of myself than I used to be.

2. I criticize myself for all of my faults.

3. I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

0. I don't have any thoughts of killing myself.

1. I have thoughts of killing myself, but I would not carry them out.

2. I would like to kill myself.

3. I would kill myself if I had the chance.

10. Crying

0. I don't cry any more than I used to.

1. I cry more than I used to.

2. I cry over every little thing.

3. I feel like crying, but I can't.

11. Agitation

0. I am no more restless or wound up than usual.

1. I feel more restless or wound up than usual.

2. I am so restless or agitated, it's hard to stay still.

3. I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0. I have not lost interest in other people or activities.

1. I am less interested in other people or things than before.

2. I have lost most of my interest in other people or things.

3. It's hard to get interested in anything.

13. Indecisiveness

0. I make decisions about as well as ever.

1. I find it more difficult to make decisions than usual.

2. I have much greater difficulty in making decisions than I used to.

3. I have trouble making any decisions.

14. Worthlessness

0. I do not feel I am worthless.

1. I don't consider myself as worthwhile and useful as I used to.

2. I feel more worthless as compared to others.

3. I feel utterly worthless.

15. Loss of Energy

0. I have as much energy as ever.

1. I have less energy than I used to have.

2. I don't have enough energy to do very much.

3. I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

0. I have not experienced any change in my sleeping.

1a I sleep somewhat more than usual.

1b I sleep somewhat less than usual.

2a I sleep a lot more than usual.

2b I sleep a lot less than usual.

3a I sleep most of the day.

3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability

0. I am not more irritable than usual.

1. I am more irritable than usual.

2. I am much more irritable than usual.

3. I am irritable all the time.

18. Changes in Appetite

0. I have not experienced any change in my appetite.

1a My appetite is somewhat less than usual.

1b My appetite is somewhat greater than usual.

2a My appetite is much less than before.

2b My appetite is much greater than usual.

3a I have no appetite at all.

3b I crave food all the time.

19. Concentration Difficulty

0. I can concentrate as well as ever.

1. I can't concentrate as well as usual.

2. It's hard to keep my mind on anything for very long.

3. I find I can't concentrate on anything.

20. Tiredness or Fatigue

0. I am no more tired or fatigued than usual.

1. I get more tired or fatigued more easily than usual.

2. I am too tired or fatigued to do a lot of the things I used to do.

3. I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0. I have not noticed any recent change in my interest in sex.

1. I am less interested in sex than I used to be.

2. I am much less interested in sex now.

3. I have lost interest in sex completely.

Appendix E

The Cohen-Hoberman Inventory for Physical Symptoms (CHIPS)

Mark the number for each statement that best describes HOW MUCH THAT PROBLEM HAS BOTHERED OR DISTRESSED YOU DURING THAT PAST TWO WEEKS INCLUDING TODAY. Mark only one number for each item. At one extreme, 0 means that you have not been bothered by the problem. At the other extreme, 4 means that the problem has been an extreme bother.

HOW MUCH WERE YOU BOTHERED BY:

1. Sleep problems (can't fall asleep, wake up in middle of night or early in morning) 0 1 2 3 4
2. Weight change (gain or loss of 5 libs. or more) 0 1 2 3 4
3. Back pain 0 1 2 3 4
4. Constipation 0 1 2 3 4
5. Dizziness 0 1 2 3 4
6. Diarrhea 0 1 2 3 4
7. Faintness 0 1 2 3 4
8. Constant fatigue 0 1 2 3 4
9. Headache 0 1 2 3 4
10. Migraine headache 0 1 2 3 4
11. Nausea and/or vomiting 0 1 2 3 4
12. Acid stomach or indigestion 0 1 2 3 4
13. Stomach pain (e.g., cramps) 0 1 2 3 4

14. Hot or cold spells 0 1 2 3 4

15. Hands trembling 0 1 2 3 4

16. Heart pounding or racing 0 1 2 3 4

17. Poor appetite 0 1 2 3 4

18. Shortness of breath when not exercising or working hard 0 1 2 3 4

19. Numbness or tingling in parts of your body 0 1 2 3 4

20. Felt weak all over 0 1 2 3 4

21. Pains in heart or chest 0 1 2 3 4

22. Feeling low in energy 0 1 2 3 4

23. Stuffy head or nose 0 1 2 3 4

24. Blurred vision 0 1 2 3 4

25. Muscle tension or soreness 0 1 2 3 4

26. Muscle cramps 0 1 2 3 4

27. Severe aches and pains 0 1 2 3 4

28. Acne 0 1 2 3 4

29. Bruises 0 1 2 3 4

30. Nosebleed 0 1 2 3 4

31. Pulled (strained) muscles 0 1 2 3 4

32. Pulled (strained) ligaments 0 1 2 3 4

33. Cold or cough 0 1 2 3 4

Appendix F

The Difficulties in Emotion Regulation Scale (DERS-16)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale above (1–5) on the line beside each item.

1----------2----------3----------4----------5

Almost never Sometimes About half the time Most of the time Almost always

0-10% 11-35% 36-65% 66-90% 91-100%

_____1) I have difficulty making sense out of my feelings.

_____2) I am confused about how I feel.

_____3) When I am upset, I have difficulty getting work done.

_____4) When I am upset, I become out of control.

_____5) When I am upset, I believe that I will remain that way for a long time.

_____6) When I am upset, I believe that I'll end up feeling very depressed.

_____7) When I am upset, I have difficulty focusing on other things.

_____8) When I am upset, I feel out of control.

_____9) When I am upset, I feel ashamed with myself for feeling that way.

_____10) When I am upset, I feel like I am weak.

_____11) When I am upset, I have difficulty controlling my behaviors.

_____12) When I am upset, I believe that there is nothing I can do to make myself feel better.

_____13) When I am upset, I become irritated with myself for feeling that way.

_____14) When I am upset, I start to feel very bad about myself.

_____15) When I am upset, I have difficulty thinking about anything else.

_____16) When I am upset, my emotions feel overwhelming.

Appendix G

The Adverse Childhood Experiences Scale (ACES)

While you were growing up, during your first 18 years of life:

1. Did a parent or other adult in the household often …

Swear at you, insult you, put you down, or humiliate you?

or

Act in a way that made you afraid that you might be physically hurt?

Yes No If yes enter 1 _____

2. Did a parent or other adult in the household often …

Push, grab, slap, or throw something at you?

or

Ever hit you so hard that you had marks or were injured?

Yes No If yes enter 1 _____

3. Did an adult or person at least 5 years older than you ever…

Touch or fondle you or have you touch their body in a sexual way?

or

Try to or actually have oral, anal, or vaginal sex with you?

Yes No If yes enter 1 _____

4. Did you often feel that …

No one in your family loved you or thought you were important or special?

or

Your family didn't look out for each other, feel close to each other, or support each other?

Yes No If yes enter 1 _____

5. Did you often feel that …

You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you?

or

Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?

Yes No If yes enter 1 _____

6. Were your parents ever separated or divorced?

Yes No If yes enter 1 _____

7. Was your mother or stepmother:

Often pushed, grabbed, slapped, or had something thrown at her?

or

Sometimes or often kicked, bitten, hit with a fist, or hit with something hard?

or

Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?

Yes No If yes enter 1 _____

8. Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?

Yes No If yes enter 1 _____

9. Was a household member depressed or mentally ill or did a household member attempt suicide?

Yes No If yes enter 1 _____

10. Did a household member go to prison?

Yes No If yes enter 1 _____

Appendix H

Demographics Sheet

What is your gender? _____
What is your age? _____
What is your nationality? _____
Do you live in Lebanon?

- Yes
- No

What is your highest level of education?

- Middle school
- High school
- Bachelor's degree
- Master's degree
- Ph.D. or higher

What is your marital status?

- Single
- Married
- Divorced
- Widowed
- In a relationship