**RESILIENCE IN THE FACE OF STRESSORS: RELATION TO POLYMORPHISMS IN
GENES CODING FOR NEUROPEPTIDE-Y AND BRAIN-DERIVED NEUROTROPHIC
FACTOR**

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ABSTRACT

The university experience can pose as a significant stressor and can lead to the development of a psychopathology. Resilience may be an important protective factor against mental illness. The goals of the present study were to examine the relationships between social behaviours (psychological well-being, loneliness, unsupportive interactions and social connectedness) with depressive symptomatology and whether these relationships were moderated by polymorphisms in the genes for Neuropeptide-Y (rs16147) and Brain-Derived Neurotrophic Factor (Val66Met, rs6265). First year undergraduate students (N=196) at Carleton University of Euro-Caucasian decent completed questionnaires and provided saliva samples for genotyping. Relationships were found between psychological well-being (self-acceptance, purpose in life, environmental mastery and positive relations with others), emotion-focused coping, social connectedness and loneliness, and depressive symptomatology, which were moderated by the NPY genotype. The relationship between psychological well-being (self-acceptance) and depressive symptomatology, were moderated by the BDNF genotype. Gender moderated the relationship between unsupportive interactions from parents and depressive symptomatology. Together, these findings suggest that NPY, BDNF and gender interact with social behaviors to predict depressive symptoms and may contribute to the understanding of resilience.

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Resilience in the face of stressors: relation to polymorphisms in genes coding for Neuropeptide-Y and Brain-Derived Neurotrophic Factor

Introduction

The transitional period from late adolescence to early adulthood, and from high school to the first-year of university, can pose a variety of challenges, ranging from academic responsibilities to potentially moving away from home, forming a new social network, and financial constraints (Zarrett & Eccles, 2006). As a result, an increase in the prevalence of distress, anxiety and depression among university students is frequent (Mahmoud, Staten, Hall, & Lennie, 2012). Thus, there have been increasing efforts to understand the role of these stressors on the mental health and overall well-being of this population.

It has been demonstrated that exposure to stressful life events may contribute to the development of a psychopathology, such as depression, anxiety and posttraumatic stress disorder (PTSD). This said, some individuals display considerable resilience, essentially thriving in the presence of adversity (Yehuda *et al.*, 2006; Bonanno, 2008). Resilience encompasses the ability to bounce back from a negative event or trauma and withstand the effects of stressful events that lead to the development of illness (Feder *et al.*, 2009). There are numerous attributes that make an individual resilient: strong social relationships and identity, optimism, adaptive coping skills, as well as interactions with genetic and environmental factors (Charney, 2004). It also appears that early life experiences play a role in the development of later disease. Early life trauma, more specifically, neglect, loss or sexual abuse have been associated with dramatic increases in the risk of developing depression (Heim *et al.*, 2008), possibly owing to disturbances of neuroendocrine stress responses and central nervous system functioning (Heim *et al.*, 2008).

Several studies have pointed to polymorphisms in genes associated with Neuropeptide-Y (NPY) and Brain-Derived Neurotrophic Factor (BDNF) in stress-related disorders.

Neuropeptide-Y acts as a mediator in behavioural stress responses and regulation, as well as in resilience to stress (Sommer *et al.*, 2011). It has been shown, for instance, that higher NPY levels were present in war veterans that did not go on to develop PTSD (Morgan, 2002), suggesting that NPY may operate in a protective capacity. Likewise, low levels of the growth factor, BDNF, has been linked to depression, possibly because synaptic plasticity associated with high levels of BDNF might influence coping processes, thereby promoting resilience (Taliaz *et al.*, 2011).

Given that gene polymorphisms may affect NPY or BDNF functioning, which may interact with early life experiences, the present investigation examined (1) the link between early life trauma, such as childhood maltreatment, neglect and sexual abuse, in relation to depression, and (2) whether these relations were moderated by single nucleotide polymorphisms (SNP) of NPY and BDNF. In essence, we sought to determine whether levels of resilience in a first-year university population varied in relation to polymorphisms tied to NPY and BDNF.

Early life trauma and onset of depression

Depression is a major cause of morbidity worldwide and exposure to early traumatic events is a significant risk factor (WHO, 2012; Kendler *et al.*, 2004). Early life trauma, such as childhood maltreatment, sexual abuse, parental neglect, extreme bullying, and the loss of a loved one can manifest in different ways depending on the personality of the individual who experiences the event. Some develop PTSD or mood disorders such as major depressive disorder (MDD) or anxiety, but others are able to overcome the traumatic event without any form of mental illness. The lifetime prevalence of those who will suffer from major depressive disorder (MDD) within US adults is about 16.5%, with woman being about 70% more likely to develop

depression than men (Hornung & Heim, 2014). Childhood trauma poses as a risk factor for depression in adulthood especially in response to stressors (Edwards *et al.*, 2003). Moreover, the risk of suicide in adolescence and adulthood increased by 2-5 fold if the individual experienced childhood adversity (Dube *et al.*, 2001) and even greater risk when multiple experiences occurred. The neurobiological consequences of childhood trauma are associated with increased rates of anxiety disorders, PTSD, substance abuse (Bremner *et al.*, 1993; McCauley *et al.*, 1997), chronic fatigue syndrome (Heim *et al.*, 2006), and cardiovascular disease (Dong *et al.*, 2004). During critical periods of neural plasticity over the course of development, brain regions involved in emotional regulation and facilitation of the stress response might be particularly affected by early life trauma. Maladaptation to stress and dysregulation of important neural circuits may be due to hyperactivity of the hypothalamic-pituitary-adrenal (HPA) axis owing to increased secretion of corticotropin releasing factor (CRF) (Heim *et al.*, 2008). Disruptions in the HPA axis cause changes in the pituitary responsiveness to CRF stimulation due to alterations in the paraventricular nucleus (PVN) resulting in an increase in adrenocorticotrophic hormone (ACTH).

Evidence from clinical studies examining childhood trauma in humans indicated that neuroendocrine stress response, glucocorticoid resistance and reduced hippocampal volume may involve the sensitization processes (Heim *et al.*, 2008). These changes closely resembled the neuroendocrine features of depression, including altered autonomic responses to stressors, as well as anxiety-like symptoms, anhedonia, cognitive impairment, increased sensitivity to pain and disturbed sleep (Ladd *et al.*, 2000). Consistent with these findings, women with a history of child abuse and major depression displayed a blunted ACTH response to a CRH challenge compared with healthy control subjects, but an exaggerated response when confronted by a

laboratory stressor (Heim *et al.*, 2008). These results suggest HPA functioning was down-regulated, possibly to protect brain functioning from excessive activation. However, in the context of stressful stimuli the HPA response could be elicited and could, in fact, be more powerful than otherwise expected. (Heim *et al.*, 2008).

The Stress Response

There are numerous hormones, neurotransmitters and neuropeptides involved in the acute stress response (Feder, Nestler & Charney, 2009). The fundamental component of the stress response comprises HPA axis functioning together with an initial appraisal of the stressor through prefrontal cortex (PFC) neuronal functioning in order to appraise the threat related to the situation. Upon being activated, the hypothalamus releases corticotropin-releasing hormone (CRH), triggering the anterior pituitary gland to release ACTH. The ACTH secretion stimulates the adrenal gland to release glucocorticoids (cortisol) and dehydroepiandrosterone (DHEA), which then signals the hippocampus so that further activation of this axis is diminished (Sapolsky 2000 or 2001).

Several of the components of the HPA axis may have direct effects on stress functioning, with cortisol typically considered to be the primary hormone that regulates stress reactions. Glucocorticoids, such as cortisol, are protective against some of the adverse effects of stressors (e.g., preclude excessive immune reactivity) and are involved in the production of energy resources acutely since they alert us of impending danger. Sustained exposure to high levels of cortisol can be harmful, leading to hippocampal cell loss, mood disorders, such as depression and anxiety, hypertension, immunosuppression, and cardiovascular problems (Karlman et al., 2002). The levels of glucocorticoids in circulation following stress responses are controlled by glucocorticoid mediated negative feedback (Dallman *et al.*, 1987; Jacobson and Sapolsky, 1991).

The process utilizes ligand-induced activation of mineralcorticoid receptors (MR) found in the hippocampus and glucocorticoid receptors (GR), which are found throughout the central nervous system. Psychological stressors cause hyperactivity in the HPA axis suggesting there were changes in the corticolimbic pathways responsible for processing information and how it is transferred to PVN. When levels of ACTH were increased, heightened and prolonged releases of corticosterone from the adrenal cortex ensued (Ladd *et al.*, 2000). These findings suggest there is a significant impact on the developing HPA axis, in turn, resulting in changes in the animal's responsiveness and sensitivity to psychological stress.

Genetic biomarkers

Several hormones and neurotransmitters are involved in the development of stress-related disorders, but of particular interest for this present investigation are NPY and BDNF gene polymorphisms. Neuropeptide-Y, is an abundant 36 amino acid neuropeptide with anxiolytic-like effects in rodents and it is thought to increase cognitive abilities under stressful situations (Sajdyk, Shekhar & Gehlert, 2004). It is a polypeptide expressed in brain regions, such as the amygdala and hippocampus, and is important in the emotion regulation and memory (Heilig, 2004), as well as largely expressed in the limbic system regions, which are responsible for fear conditioning and emotions (Adrian *et al.*, 1983). In this regard, when NPY was injected into the central nucleus of the amygdala, anxiety diminished (Alim *et al.*, 2012) and its administration lowered cortisol secretion in healthy participants (Antonijevic *et al.*, 2000). It seems that NPY is released together with norepinephrine (NE) when the sympathetic nervous system is strongly activated and is also responsible for inhibiting norepinephrine functioning from becoming excessively high (Southwick, 1999). It acts as a neurotransmitter in the brain, being secreted from the hypothalamus and is involved in appetite and food intake, reproduction and circadian

rhythms (Alim *et al.*, 2012). It was suggested that increased levels of NPY may allow for a greater ability to overcome the effects of stress.

Of interest is that NPY may contribute to resilience. For instance, post-war veterans who did not develop PTSD had higher levels of NPY than did traumatized combat veterans with chronic PTSD, concluding that NPY may be a factor involved in resilience (Morgan *et al.*, 2002). Likewise, Special Forces soldiers tended to have higher NPY levels than did other soldiers, possibly reflecting a dispositional characteristic, or one brought about by the high intensity training that occurs in the Special Forces units, Morgan *et al.*, 2002) and how individuals with increased NPY may possess a greater ability to overcome high amounts of stress.

Several studies have evaluated the link between NPY polymorphisms and their role in resilience to stress and stress-related disorders. An NPY promoter polymorphism (rs16147 or Leu7Pro7) has been identified in which an adenine (A) is substituted with guanine (G). Individuals with this rs16147 polymorphism displayed stronger bilateral amygdala activation when exposed to frightening faces (Domschke *et al.*, 2010), indicating a greater stress response. Based on post-mortem tissue examining the NPY promoter variant rs16147, it was suggested that the allelic variation of the NPY gene serves as a moderator of the reactivity of stress in humans. The rs16147 G-allele is associated with trait anxiety and depression appearing at a young age possibly owing to to early life adversity (Sommer *et al.*, 2010). Further, higher levels of NPY expression occurred in the anterior cingulate cortex (ACC), which is involved in emotional and affective processing (Sommer *et al.*, 2010). It was also seen that there was an age-related decline in NPY levels in the prefrontal cortex, supported by rodent studies; there is likely lower NPY signaling, potentially contributing to memory loss, increased sensitivity to stress, loss of appetite

and development of age-related psychopathologies. There is an association between NPY and depression such that depressed patients have decreased levels of plasma NPY, as well as those who have attempted suicide (Redrobe *et al.*, 2002). Likewise, depressed patients also exhibit increased cortisol levels, which may be attributed to NPY (Morgan *et al.*, 2002; Brown *et al.*, 2004).

Another gene polymorphism of interest in relation to the development of psychopathology is the Val66Met (rs6265) SNP of the BDNF gene (Buchmann *et al.*, 2012). Brain-derived neurotrophic factor is a 27kD polypeptide located on chromosome 11p14.1 and one of the most abundantly expressed neurotrophins in the brain (Sheikh *et al.*, 2010; Pruunsild *et al.*, 2007). In addition, BDNF is responsible for neuronal growth and plasticity in the hippocampal and amygdala neural circuits and they are lower in patients suffering from major depression (Gatt *et al.*, 2009). It provides trophic support for neurons and reduced in response to stressors (Martinowich *et al.*, 2007). The actions of BDNF are dictated by two cell surface receptors, the TrkB receptor tyrosine kinase and p75 neurotrophin receptor (p75^{NTR}) (Chao, 2003). Upon activation of these receptors, transcription events occur which affect cell cycle, neuron growth and synaptic plasticity (Rosenblum *et al.*, 2002; Chao *et al.*, 2006).

Several polymorphisms of the BDNF gene have been studied, but one that has been viewed as especially relevant in the vulnerability and development to depressive disorders is the Val66Met gene polymorphism, rs6265, comprising a single nucleotide polymorphism (SNP) involving a valine to methionine substitution in the 5' pro-region (Pruunsild *et al.*, 2007) resulting in two possible alleles: Val and Met. The polymorphism affects intracellular packaging of pro-BDNF, axonal transport and the secretion of BDNF at the synapse (Egal *et al.*, 2003; Chen *et al.*, 2004).

Depressive disorders are associated with disturbances in neurogenesis of the hippocampus and reductions in dendritic branching and cortical synaptogenesis (MacQueen & Frodl, 2011). Furthermore, BDNF expression is lowered in the hippocampus and PFC with exposure to stressors (Calabrese *et al.*, 2014). In relation to depression, the increased rumination is considered to be associated with the Met allele in comparison to non-depressed patients (Classen *et al.*, 2011), as well as decreased synaptic activity, abnormal activation in the hippocampus and reduced BDNF. Met carriers were also more likely to use emotion-focused coping over Val carriers (Caldwell *et al.*, 2013). The Met allele is associated with a decreased volume of gray matter in the PFC, especially in the anterior cingulate cortex (ACC), the dorsolateral PFC (DLPFC), hippocampus and amygdala (Pezawas *et al.*, 2004; Gerritsen *et al.*, 2012; Montag *et al.*, 2010). In relation to the thickness of DLPFC, it was shown in patients with greater PTSD symptom improvement, the BDNF Val66Met gene polymorphism was highly related to increased thickness in this area (Lyoo *et al.*, 2010).

Psychosocial factors: relation to stress and depressive disorders

Depressive symptoms are common among college students, and mental health problems have generally been on the rise (Hunt & Eisenberg, 2010). A range of psychosocial factors have been determined to be associated with the development and promotion of successful resilience such as active coping strategies (ex. problem solving, cognitive flexibility, and reappraisal), positive emotions (optimism), high levels of social support, social competence and finding meaning (Feder *et al.*, 2009).

Social support

Social support refers to support received through ties with other individuals, such as in the form of psychological (emotional support) and physical (contact from others in the form of

hugs, for example). Individuals need to feel like they are understood by those around them and have a sense of belonging; they want to feel included in a group. Strong, healthy relationships are key for maintaining good physical and mental well-being and it has been shown that positive social support can increase resilience to stress, help lower the risk of developing trauma-related psychopathology, such as depression and PTSD (Ozbay *et al.*, 2007; Southwick, Vythilingam & Charney, 2005). Social support is not only an important factor in decreasing functional impairments in those individuals suffering from depression, thereby increasing the likelihood of a successful recovery (Travis *et al.*, 2004).

Low social support has been associated with increased reactivity to stress, both in regard to physiological and neuroendocrine processes, increased heart rate, blood pressure (Stansfeld *et al.*, 1997; Uchino *et al.*, 1996) and cardiovascular problems (House *et al.*, 1988). Poor social support is often associated with the onset and relapse of depression or depressive symptomology (Paykel, 1994), negative treatment responses to dysthymia, seasonal mood disorders and medical illnesses such as cancer and multiple sclerosis (Oxman & Hull, 2001; Michalak *et al.*, 2003; Mohr, Classen & Barrera, 2004; Manne *et al.*, 1999). In relation, war veterans that returned from the Vietnam War reported low levels of social support upon arrival and high levels of stress and trauma, with feelings of anger, bitterness, resentment and loneliness. The lack of social support lead to detachment from those around them and a sense of rejection (Johnson *et al.*, 1997). They found that Vietnam veterans with higher levels of social support were far less likely to develop PTSD than those with low levels of support (Boscarino, 1995). The positive association between social support and mental health functioning is well established and social support is inversely related to risk of suicidality (Chiqueta & Stiles, 2007).

Unsupportive Social Interactions

Beyond the adverse effects of lacking social support, particularly negative outcomes may emerge as a result of unsupportive relations, which includes interactions with others that undermine or belittle the individual, causing them to develop lower self-esteem (Ingram *et al.*, 2001). It is important to mention that unsupportive interaction and social support are separate constructs. Unsupport includes distancing (e.g., “did not seem to want to hear about it”), bumbling (e.g., “did not seem to know what to say”), minimizing (e.g., “said that I should look on the bright side”), and blaming (e.g., “made ‘should’ or ‘shouldn’t have’ comments about my role in the event”) (Ingram *et al.*, 2001). Unsupportive relationships can cause an individual to become more reclusive and refuse to discuss problems they may be experiencing, for fear of judgment or being brushed off. Unsupport is predictive of future depressive symptoms (Figueiredo, Fries & Ingram, 2003; Ingram *et al.*, 1999) and have been linked to decreased psychological well-being (Ingram *et al.*, 2001). It can be particularly detrimental to those suffering from illness and especially when unsupport comes from a spouse or close family members and friends (Schrimshaw, 2003). Various examples of unsupportive interactions have been studied recently, such as in HIV patients, single mothers and breast cancer patients and its role in relation to depression.

Loneliness

Loneliness refers to the negative emotions that arise when an individual feels isolated from others or lacking a social support network in both quality and quantity (Perlman & Peplau, 1981). This state has profound effects both mentally and physically. For example, university students who leave their friends and families behind and don’t form new connections, can feel socially isolated. Individuals who live alone are at an increased risk of experiencing loneliness

(Routasalo *et al.*, 2006). Those lacking in social support and social interaction have a higher tendency to perceive interactions as negative. Social isolation is associated with lower self-esteem and higher negative affect (Cacioppo *et al.*, 2006). In adolescents, loneliness had a positive and significant influence on depression and is also associated with a poor adaptive response to stressors (Yaacob *et al.*, 2009). Feelings of loneliness have been associated with neuroendocrine, cardiovascular, and inflammatory stress responses. Loneliness is positively correlated with higher blood pressure and heightened levels of cortisol (Stephoe *et al.*, 2004).

The absence of positive social relationships is a significant risk factor for morbidity and mortality (Stephoe *et al.*, 2013). Lonelier individuals have an overstimulation of HPA-axis activity and hypervigilance to social threats (Cacioppo & Hawkley, 2009a), as well as showing larger morning increases in cortisol (Adam *et al.*, 2006). This heightened response to stress seen in this population has been correlated with changes to physical health such as cardiovascular problems (Cacioppo *et al.*, 2006). Moreover, loneliness is positively correlated with disruption in sleep, increases in blood pressure (Stephoe *et al.*, 2004) and decreased immunity (Dixon *et al.*, 2006; Glaser *et al.*, 2005). Taken together, feelings of loneliness ultimately were associated with an increased risk of mortality.

The environment has a significant influence on loneliness (Cacioppo & Cacioppo, 2014), but genetics may also play a role. The heritability of loneliness is suggested to be substantial. In large longitudinal surveys of twins, the heritability estimates obtained are just below 50% (Boomsma *et al.*, 2006; Boomsma *et al.*, 2005). Specific genotypes have been associated with greater levels of loneliness; boys with the Val/Val and girls with Met/Met genotype of the BDNF rs62625 polymorphism were lonelier (Goosens *et al.*, 2015).

Coping Strategies

Cognitive flexibility is an example of a coping strategy and is broadly defined as the ability to switch attention from one emotional category to another and is a key mechanism in the regulation of emotion (Joormann et al., 2007). This ability can be displayed in multiple ways, such as problem-solving, decision-making, and taking another individual's perspective. In relation to stressful experiences, cognitive flexibility can be demonstrated as an ability to transform one's appraisals and coping strategies according to changes in stressor demands, essentially adaptation to the situation at hand (Cheng et al., 2001). Specifically, when an individual encounters a stressful situation, the event is appraised as to whether it poses a threat to wellbeing (or self-esteem) followed by an evaluation as to whether the individual has the necessary resources to cope with the stressor demands (Lazarus & Folkman, 1986). Coping strategies may not occur in isolation, but multiple being utilized in the presence of a stressful event, since one type may prove to be ineffective (Matheson & Anisman, 2003).

Following the appraisal process, coping strategies are selected and are typically categorized into problem-focused (e.g., problem-solving and cognitive restructuring) and emotion-focused (e.g., rumination and blame). Depressed individuals are prone to emotion-focused coping, especially rumination and a decreased use of problem-focused coping, while seeking out social support (Matheson & Anisman, 2003; Kelly *et al.*, 2007). For example, dysthymic patients utilize more rumination and emotion-focused coping than non-depressed individuals and their inflexibility to combine multiple coping strategies may explain the risk of reoccurrence and is characteristic of the disorder (Kelly *et al.*, 2007). A combination of the coping strategies may prove to be more effective, when they are combined appropriately, such as when rumination (which might ordinarily be negative) is combined with cognitive restructuring to find meaning in a

situation (Kelly et al., 2007; Matheson & Anisman, 2003). Those with depression often have ineffective coping strategies such as continuous rumination, emotional expression and self-blame/guilt and reduced use of cognitive restructuring (Ravindran *et al.*, 2002). Individuals who are more flexible in their appraisals and coping strategies have been shown to report lower depressive symptoms, compared to individuals who are more rigid in their approach to coping (Cheng, 2001). Resilient individuals are thought to be better at utilizing reappraisal as a coping strategy and use it more frequently.

Hypotheses

The purpose of the present investigation was to examine whether relationships exist between polymorphisms in genes for NPY and BDNF with overall psychological well-being and levels of resilience, particularly among individuals who experienced early-life trauma or maltreatment. Moreover, we assessed whether the link between early experiences and the presence of the polymorphisms were moderated by social support and coping strategies. Thus we assessed whether

1. Negative early life experiences would be related to the occurrence of depressive symptoms as well as lower levels of resilience.
2. These relationships will be moderated by social support, loneliness, and coping styles endorsed.
3. This moderated relation would be further moderated by polymorphisms related to NPY (rs16147) and BDNF (Val66Met).

Methods

Participants. Participants were first-year undergraduate students recruited online through a computer registry (SONA system) at Carleton University (Appendix A). The 306 participants recruited (M age=19.75, SD =5.274) were 73.5% female (n =225, M age = 19.75, SD = 5.02) and 26.5% male (n =81, M age= 19.76, SD = 5.96). This sample comprised 64.1% (n =196) White/Caucasian, 8.5% (n =26) Black and 8.5% (n =26) Arab/West Asian, 7.2% (n =22) Asian, 5.2% (n =16) South Asian, 2.3% (n =7) Aboriginal, 2.0% (n =6) Other (i.e. a mixed ethnicity or an ethnicity not listed), 1.3% (n =4) South East Asian and 1.0% (n =3) Latin American/Hispanic.

Procedure. The study protocol was approved by the Psychology Research Ethics Board at Carleton University. Participant data were collected between fall 2015. Upon receipt of informed consent (Appendix B), participants were given a set of questionnaires for completion and provided a saliva sample. Upon completion, participants were debriefed (Appendix C) and issued 1.5% experimental credit through the SONA system.

Measures

Background Information. Participants provided demographic details, medical history and information regarding current and past places of residence (Appendix F).

Depressive symptoms. The presence and severity of typical depressive symptoms was assessed using the Beck Depression Inventory (BDI, 21-item version; Beck, Mendelson, Mock, & Erbaugh, 1961). This scale is a widely used psychometrically sound self-administered tool to assess the levels of depression in clinical and normal individuals. The BDI evaluates 21 depressive symptoms including: sadness, pessimism, past failure, self-dislike, self-criticism, suicidal ideation, crying, agitation, loss of interest, indecisiveness, worthlessness, loss of energy,

changes in sleeping patterns, irritability, changes in appetite, difficulty concentrating, tiredness or fatigue, and loss of interest in sex. For each item, individuals select the statement that best described their emotional feelings scored from 0-3. Lower numbers (e.g., 0) indicate a lower intensity of depressive symptoms, while higher number (e.g., 3) are related to greater intensity. The score indicates the overall intensity of depression: 0-9 indicates minimal depression, 10-18 indicates mild-moderate depression, 19-29 indicates moderate-severe depression, and 30+ indicates severe depression. The intensity of depression is computed by summing the scores across all 13 items resulting in scores ranging from 0 to 63. The BDI scale displayed good reliability (Cronbach's $\alpha = .9$)

As required by the Psychology Research Ethics Board at Carleton University, those individuals who had a total score of 30 or greater and those who scored 2a on item 9 of the BDI, which assesses suicidal ideation, were provided with an additional debriefing form which provides information about depression, and available resources (Appendix D). Those who scored 2b or greater on item 9 of the BDI were administered the suicidal ideation protocol (Appendix E) and given additional debriefing.

Coping styles and Perceived Coping Effectiveness. Coping style and perceived coping effectiveness were measured using the The Survey of Coping Profile Endorsement (SCOPE; Matheson & Anisman, 2003). This is a 50-item measure comprised of 13 coping strategies including problem-solving, cognitive restructuring, active distraction, cognitive distraction (avoidance), wishful thinking, rumination, humour, social support seeking, emotional expression, other-blame, self-blame, emotional containment, and passive resignation. Emotion focused coping comprised of avoidance, rumination, emotional expression, other blame, passive resignation, and wishful thinking; and problem focused coping comprised of problem solving,

cognitive restructuring, active distraction, humor, and social support. The participants indicate the extent to which they demonstrate each of the behaviours as way of coping in the face of stressors, using the general scale of 0 (Never) to 4 (Almost Always). Scores for each of the 13 strategies are calculated by taking an average score of the items that comprise each strategy. The SCOPE scale displayed good reliability (Cronbach's $\alpha = .89$). Cognitive Flexibility Questionnaire (CFQ; Gabrys, Matheson & Anisman, 2012) is a 28-item questionnaire assessing the degree to which individuals can control and modify their thoughts and behavior when confronted with stressful experiences. The participants indicate the extent to which they agree or disagree with the statement provided using a general scale of 1 (strongly disagree) to 7 (strongly agree). The CFQ scale displayed good reliability (Cronbach's $\alpha = .94$). Resilience Scale (Crump, 2015): 29-item scale to assess the degree of resilience an individual possesses, as well as social support and coping. The participant indicates the extent to which they possess the skills to overcome adversity using a general scale from 1 (strongly disagree) to 6 (strongly agree). The Resilience scale displayed good reliability in the present study (Cronbach's $\alpha = .93$).

Social Support and Identity. Social support and identity are measured using five scales. Unsupportive Social Interactions Inventory (USII; Ingram et al., 2001): two part 24-item scale that will assess the degree of unsupport participants perceive they have in their current relationships with friends and parents. The inventory is comprised of four subscales: distancing (e.g., “did not seem to want to hear about it”), bumbling (e.g., “did not seem to know what to say”), minimizing (e.g., “said that I should look on the bright side”), and blaming (e.g., “made ‘should’ or ‘shouldn’t have’ comments about my role in the event”). For each item, participants rated how frequent (0 = none; 4 = a lot) his or her friends and parents responded when he or she went to them for support. The USII is scored by calculating the mean rating across the items. In

the present study, this scale displayed good reliability (Cronbach's $\alpha = .95$). Social Connectedness Scale – Revised (SCS-R; Lee, Draper, & Lee, 2001): is a 20-item scale used to measure social connectedness as a psychological sense of belonging. They indicate the extent to which they feel connected to those around them using a scale of 1 (strongly disagree) to 6 (strongly agree) and a total score ranging from 20 to 120 is calculated by summing across all items with a higher score indicative of greater social connectedness. The SCS scale displayed good reliability (Cronbach's $\alpha = .93$). Inclusion of Other in the Self Scale - modified (I-O-SS; Aron, Aron, & Smollan, 1992): the original I-O-SS is a measure of self-other inclusion and relationship closeness. It is modified in this study to be used to determine the overlap one feels he or she has with various group identities. The participant lists all the groups they identify with and rates the inclusion they feel within each group on a scale from 1 (Remotely) to 7 (Core). The I-O-SS scale displayed good reliability (Cronbach's $\alpha = .79$). The Social Provisions Scale (Cutrona & Russell, 1987): this 24-item scale will assess the degree of support participants perceive they have in their current relationships to parents and peers. They indicated the extent to which they agreed or disagreed to the statements provided on a general scale from 1 (strongly agree) to 4 (strongly disagree). The SPS scale displayed good reliability (Cronbach's $\alpha = .92$).

Loneliness. UCLA Loneliness Scale Version 3 (UCLA L-Scale; Russell, 1996): 20-item scale designed to measure one's subjective feelings of loneliness as well as feelings of social isolation. They rate how included or isolated they feel with those around them based on a general scale from 1 (Never) to 4 (Always). Higher scores indicated greater subjective feelings of loneliness. The questionnaire concludes by asking whether the participant feels lonely and if so, to specify how long he or she has felt this way ranging from days to months to years. The UCLA-L scale displayed good reliability (Cronbach's $\alpha = .89$).

Early life trauma and rejection. Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman) consists of 18 hypothetical scenarios whereby the participants imagine making a request that places them in situations that make them vulnerable to rejection. They indicate their level of concern of the event on a scale of 1 (very unconcerned) to 6 (very concerned) and after they indicate how likely or not they will be rejected on a scale of 1 (very unconcerned) to 6 (very concerned). The RSQ scale displayed good reliability (Cronbach's $\alpha = .82$). Childhood Mistreatment Questionnaire (shortened version) (Demare, 1996): will assess the frequency of various forms of childhood mistreatment experienced. The participants indicate the amount of times each item occurred on a scale from 1 (Never) to 5 (very often). The CMQ scale displayed good reliability (Cronbach's $\alpha = .94$). The Traumatic Life Events Questionnaire (TLEQ) (Kubany et al., 2000) with four items added to assess additional life events; will identify significant traumatic life events at various points across the participant's life. This measure is comprised of 23 items that assess exposure to a broad spectrum of potentially traumatic events, ranging from natural disasters, accidents, assaults, and childhood abuses. Events are described in behaviourally descriptive terms. The frequency of occurrence of each event is assessed using a 7-point scale on which participants indicate whether each event has occurred from never (0) to more than five times (6). When events are endorsed, respondents are asked if they experienced intense fear, helplessness, or horror (the PTSD stressor criterion A2 in the DSM-IV), and how long ago the event occurred. The total number of traumatic events reported by participants is calculated by summing the number of items to which they had indicated experiencing fear, helplessness, or horror. Early life trauma was operationalized as events that occurred at or prior to the age of 13. As such, early trauma was computed by summing up all events that occurred at or prior to the age of 13. The TLEQ scale displayed moderate reliability (Cronbach's $\alpha = .65$).

Early Life Traumatic Inventory-short version (ELTI; Bremner, Bolus & Mayer, 2007) is a 27 item measure assessing various types of early life events including, general trauma, physical abuse, emotional abuse and sexual abuse. The ELTI scale displayed good reliability (Cronbach's $\alpha = .82$).

Psychological and Emotional well-being. These will be measured by 2 scales. Positive and Negative Affect Schedule (PANAS; Watson et al., 1988): is a 41-item scale that will identify different mood states in participants. Participants indicate how they feel at that very moment based on a 6-point likert scale ranging from 0 (not at all) to 6 (extremely). The scale identifies different mood states in individuals using two subscales, one measuring positive affect and the other measuring negative affect. In this present study, the PANAS scale displayed good reliability (Cronbach's $\alpha = .92$). Ryff's Well-Being Scales (Clarke, Marshall, Ryff, & Wheaton, 2001): are six 14-item scales designed to measure various dimensions of psychological well-being: self-acceptance (Cronbach's $\alpha = .93$), environmental mastery (Cronbach's $\alpha = .82$), positive relations with others (Cronbach's $\alpha = .88$), personal growth (Cronbach's $\alpha = .86$), purpose in life (Cronbach's $\alpha = .89$), and autonomy (Cronbach's $\alpha = .78$). Participants indicate the degree to which they agree with the statement provided using a scale of 1 (strongly disagree) to 6 (strongly agree). Scores are summed across the 14 items of each subscale resulting in a total between 14-84.

Stress. Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983) is a 14-item scale assessing perceived stress experienced in the last month. Participants indicate how they feel based on each question using a scale from 0 (never) to 4 (very often). The PSS scale displayed good reliability (Cronbach's $\alpha = .92$).

Salivary Collection and genotyping. The participants were asked to provide a saliva sample for the determination of several gene polymorphisms, namely those for NPY, rs1647, and the Val66Met polymorphism for the growth factor BDNF. NORGEN Saliva DNA Isolation Kits were used to collect saliva samples (~ 2 ml) for subsequent isolation and purification of DNA from the preserved samples, which were then stored at -80°C. Steps for collection, preservation, and isolation were followed as outlined in the kits' instructions. All samples were diluted in ultrapure water to a concentration of 20 ng/μl and measured to 35 μl prior to shipment. DNA samples were sent to the McGill University and Génome Québec Innovation Centre in Montreal, Quebec for SNP genotyping using Sequenom® iPLEX® Gold Genotyping Technology.

The genotype distribution of the NPY SNP, rs16147, varies across demographics (Sherry et al., 2001), therefore a homogenous ethnic sample was used in this study. Although data were collected from non-Caucasian participants ($n = 110$), only Caucasian participants ($n = 196$) were used for analyses involving genotype. The genotype distributions (Table 1) met Hardy-Weinberg Equilibrium expectations for all polymorphisms: rs16147 ($\chi^2 = 0.18$, $p = 0.51$), and rs6265 ($\chi^2 = 0.35$, $p = 0.84$).

Table 1: Allelic distributions for polymorphisms in Caucasian participants ($n=196$)

	Homozygous Major	Heterozygous	Homozygous Minor
NPY rs16147	53 AA	95 AG	48 GG
BDNF rs6265	140 Val/Val	50 Val/Met	6 Met/Met

Statistical Analyses: Statistical analyses were performed using SPSS Statistics software for Windows 18.0 (SPSS Science, Chicago, IL, USA). For all analyses, standardized scores were used and statistical significance was determined at $p < 0.05$ (two-tailed). Differences between

depressive symptoms, psychological well-being, social connectedness, social support, unsupport, and feelings of loneliness were assessed through analysis of variance (ANOVA) followed by Bonferonni corrected *t*-tests to compare between individual groups. Hierarchical linear regressions were used to determine whether or not the NPY and BDNF genotype moderated the relationship between social support, unsupport, trauma, resilience, psychological well-being with depression scores and perceived stress (Preacher, Curran, & Bauer, 2006). Moderations were analyzed using bootstrapping procedures and confidence intervals based on 5000 resamples (Preacher, Rucker, & Hayes, 2007).

Results

Bivariate correlations

Correlational analyses indicated that depressive symptoms were positively related to childhood maltreatment, general life trauma, rejection sensitivity, perceived stress, early life trauma, loneliness, unsupport from friends and parents, negative coping and negative affect and negatively correlated with resilience, psychological well-being, social support, cognitive flexibility, positive coping and positive affect (*Table 2, 3, and 4*). Not surprisingly, psychological well-being was positively correlated to social support and loneliness was positively correlated to unsupport from friends and parents (*Table 3 and 4*).

Table 2: Bivariate correlations depicting relations between depressive symptoms, resilience, childhood maltreatment, perceived stress, rejection sensitivity and early life trauma (n=304)

	1	2	3	4	5	6
1.) Depressive Symptoms						
2.) Childhood Maltreatment	.45**					
3.) General Life Trauma	.34**	.47**				
4.) Rejection Sensitivity	.49**	.46**	.30**			
5.) Perceived Stress	.34**	.11	.11	.24**		
6.) Resilience	-.71**	-.36**	-.20**	-.47**	-.29**	
7.) Early life trauma	.45**	.66**	.68**	.35**	.09	-.24**

**p<.01

Table 3: Bivariate correlations depicting relations between depressive symptoms, unsupport, loneliness, and social connectedness (n=304).

	1	2	3	4
1.) Depressive symptoms				
2.) Loneliness	.65**			
3.) Unsupport-Friends	.43**	.64*		
4.) Unsupport-Parents	.46**	.42**	.44*	
5.) Social Support	-.50**	-.35**	-.38**	-.71**

**p<.01

Table 4: Bivariate correlations depicting relations between depressive symptoms, coping (negative and positive) and affect (positive and negative) (n=304).

	1	2	3	4	5
1.) Depressive symptoms					
2.) Cognitive flexibility	-.60**				
3.) Emotion focused coping	.66**	-.58**			
4.) Problem focused coping	-.31**	.38**	-.02		
5.) Positive affect	-.36**	.37**	-.28**	.38**	
6.) Negative affect	.56**	-.42**	.52**	-.14**	.07

**p<.01

Table 5: Bivariate correlations depicting relations between depressive symptoms and the six subscales of psychological well-being (n=304)

	1	2	3	4	5	6
1.) Depressive Symptoms						
2.) Autonomy	-.30**					
3.) Environmental Mastery	-.67**	.46**				
4.) Personal Growth	-.35**	.32**	.47**			
5.) Positive Relations with Others	-.57**	.18**	.52**	.43**		
6.) Purpose in Life	-.67**	.43**	.65**	.56**	.50**	
7.) Self-Acceptance	-.75**	.49**	.73**	.47**	.62**	.75**

**p < 0.01

Hierarchical regression analyses

Sex moderated the relationship between unsupport and depression scores, specifically in unsupportive interactions with parents, $b = -2.57$ (1.15), 95% CI [-4.83, -.30], $t = -2.23$, $p < .001$, whereas this was not evident when unsupport came from friends, $b = -2.02$ (1.32), 95% CI [-4.63, 0.59], $t = -1.53$, $p = .13$. High levels of unsupport were accompanied by elevated depression scores, which were higher in women, $b = 4.68$ (.53), 95% CI [3.65, 5.73], $t = 8.86$, $p < .01$ than men, $b = 2.12$ (1.02), 95% CI [0.11, 4.14], $t = 2.07$, $p = ns$ (Figure 1).

Figure 1: The relation between unsupport (parents) and depression score as a function of sex (Male vs. female)

It was hypothesized that the BDNF polymorphism (Val66Met, rs6265) would be associated with depressive symptomatology, social support and coping. The allelic distribution of the Val66Met polymorphism was 140 Val/Val individuals, 50 Val/Met individuals and 6 Met/Met individuals. Due to the infrequency of the Met/Met genotype ($n=6$), the data from the Val/Met and Met/Met genotypes were grouped together for analyses. The mean depression scores among individuals with the Val/Val genotype were ($M = 10.37$; $SE = 7.80$) and individuals with the Met/Met and Val/Met genotype ($M = 11.13$; $SE = 8.37$). After collapsing across the Val/Val and Met/Val carriers, differences were not detected in depression scores between these participants and those carrying the Val/Val allele, $F(1, 194) = 0.313$, $p = .731$.

Psychological well-being within the present context referred to an individual's relationships with others, confidence in navigating their environment and in themselves and their abilities to grow as a person. There was a negative relationship between psychological well-being and depression scores, $b = -.21$ (.09), 95% CI $[-.062, -.068]$, $t = .736$, $p = .065$). Regression analyses were conducted for each of the six subscales of the Ryff's Psychological Well-Being

scale: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance. More specifically, the relationship between self-acceptance and depression was moderated by the BDNF polymorphism; depression scores were more pronounced among pooled Met individuals than Val/Val carriers (*Figure 2*). There was a negative relationship between self-acceptance and depression score, ($b = -.26$ (.18), 95% CI [- .10, .62], $t = 1.42$, $p = .05$), such that lower levels of self acceptance demonstrated higher depression scores and were more prominent in pooled Met carriers, ($b = -.66$ (.18), 95% CI [- 1.02, -.31], $t = -3.67$, $p < .001$) than Val/Val carriers, ($b = -.40$ (.03), 95% CI [-.46, -.35], $t = -15.63$, $p < .001$). Significance was not found in the other five subscales of psychological well-being.

Figure 2: The relation between self-acceptance and depression as a function of BDNF genotype (Val/Met & Met/Met vs. Val/Val).

In contrast, the NPY polymorphism (rs16147) was a significant moderator in the relationships between several phenotypes. Since the mean depression scores among individuals with the AG and GG genotype were more similar ($M = 9.57$; $SE = 8.06$ and $M = 8.55$; $SE = 7.12$,

respectively) than individuals with the AA genotype ($M = 10.56$; $SE = 8.65$), all moderation analyses involving the NPY genotype compared the AA carriers to the pooled G carriers. After collapsing across the AG and GG carriers, differences were not detected in depression scores between these individuals and those who carried the AA genotype, $F(1, 194) = 1.699$, $p = .185$.

It was hypothesized that the NPY polymorphism would moderate the relationships between well-being, coping and unsupport with depressive symptoms. Hayes' (2013) PROCESS macro for moderation was used to examine the first relationship mentioned above wherein overall psychological well-being served as the predictor, NPY polymorphism as the moderator, and depression scores as the outcome variable. There was a negative relationship between overall psychological well-being and depression scores, but further regression analyses were conducted for each of the 6 subscales of Ryff's Psychological Well-Being scale: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance. More specifically, NPY genotype moderated the relationship between environmental mastery ($b = -.16$ (.09), 95% CI $[-.33, .02]$, $t = -1.77$, $p = .07$), positive relations with others ($b = -.15$ (.08), 95% CI $[-.30, .01]$, $t = -1.94$, $p = .05$), and self- acceptance ($b = -.11$ (.06), 95% CI $[-.22, .01]$, $t = -1.89$, $p = .06$), purpose in life, ($b = -.16$ (.08), 95% CI $[-.33, .01]$, $t = -1.96$, $p = .05$) and personal growth ($b = -.35$ (.12), 95% CI $[-.59, -.11]$, $t = -2.82$, $p < .01$) with depressive symptoms.

Figure 3: The relation between self-acceptance and depression score as a function of NPY genotype (AA vs. AG/GG).

Figure 4: The relation between purpose in life and depression score as a function of NPY genotype (AA vs. AG/GG).

Figure 5: The relation between positive relations with others and depression score as a function of NPY genotype (AA vs. AG/GG).

Figure 6: The relation between environmental mastery and depression score as a function of NPY genotype (AA vs. AG/GG).

The NPY genotype moderated the relationship between social connectedness, $b = -.10$ (.05), 95% CI [.02, .01], $t = 2.12$, $p = .035$ seen in Figure 7. There was a negative relationship between social connectedness and depression scores, as lower levels of social connectedness demonstrated higher depression scores, which were higher in AA carriers, $b = -.33$ (.04), 95% CI [-.41, -.25], $t = -8.07$, $p < .001$ than pooled G carriers, $b = -.23$ (.03), 95% CI [-.28, -.17], $t = -$

8.76, $p < .001$. The NPY genotype also moderated the relationship between loneliness and depression shown in Figure 8. There was a positive relationship between loneliness and depression scores for both AA and G carriers, $b = .15$ (.08), 95% CI [-.01, .30], $t = 1.88$, $p = .06$. Higher levels of loneliness are associated with higher depression scores, which were more pronounced in AA carriers, $b = .54$ (.07), 95% CI [.40, .67], $t = 8.00$, $p < .001$ and G carriers, $b = .39$ (.04), 95% CI [.31, .47], $t = 9.56$, $p < .001$.

Figure 7: The relation between social connectedness and depression score as a function of NPY genotype (AA vs AG/GG).

Figure 8: The relation between loneliness and depression score as a function of the NPY genotype (AA vs AG/GG).

After completing a factor analysis of the SCOPE, two factors were derived: emotion-focused and problem-focused coping. Emotion-focused coping includes rumination, avoidance, emotional expression, blame of others, self-blame, emotional containment, passive distraction and wishful thinking. Problem-focused coping includes problem solving, cognitive restructuring, active distraction, humour and social support. Problem-focused coping was not found to be significant. A moderating role of the NPY genotype was observed when the predictor variable comprised emotion-focused coping, $b = .38$ (.20), 95% CI [-.01, .77], $t = 1.95$, $p = .053$, for AA carriers ($b = 1.34$ (.17), 95% CI [1.01, 1.67], $t = 7.97$, $p < .001$) and pooled G carriers ($b = .96$ (.10), 95% CI [.76, 1.16], $t = 12.17$, $p < .001$). There was a positive relationship between levels of emotion-focused coping and depression scores, as higher levels of negative coping were associated with higher depression scores (*Figure 9*).

Figure 9: The relation between emotion-focused coping and depression score as a function of NPY genotype (AA vs. AG/GG).

Discussion

The transition from high school to university is a period that requires adjustment, accompanied by a variety of challenges, particularly those of a mental and emotional nature. The early university experience may represent a chronic stressor for some individuals and thus might be accompanied by a mood and anxiety disorder (Adlaf *et al.*, 2001). This outcome is largely related to the many demands an individual must balance, accompanied by factors such as moving away from home and pressures of forming new social networks. When left unmanaged, the compounding effects of stressors during the early university transitional period can lead to mental exhaustion (Tao *et al.*, 2009).

In line with these views, social connectedness in the present study was negatively related to depressive symptomatology. This is consistent with previous research that indicated that greater social ties may act as a buffer against the development of a psychopathology, such as depression or anxiety (Cairney *et al.*, 2003). Furthermore, as previously reported (Ryff, 1989), the present study demonstrated that four of the six dimensions of psychological well-being, including self-acceptance, environmental mastery, purpose in life and positive relations with others, were negatively correlated to symptoms of depression (Ryff, 1989). As expected, emotion-focused coping and loneliness, were positively associated with depressive symptomatology. This is consistent with earlier research (Anisman & Matheson, 2003) indicating that depressed patients typically foster the use of emotion- over problem-focused coping, which is typically evident in relatively resilient individuals (Cheng, 2001).

It was hypothesized that negative early life events would be related to the occurrence of depressive symptoms and lower levels of resilience. Significant correlations were, indeed, found between depressive symptomatology and resilience, childhood maltreatment, perceived stress, rejection sensitivity and early life trauma. There was a positive relationship between trauma

(early-life, general trauma and childhood maltreatment) and depression scores, but a negative relationship between depressive symptomatology and levels of resilience outlined in Table 2. Consistent with previous research (Edwards *et al.*, 2003), childhood trauma actually increased the risk of suicide by 2-5 fold (reflected through responses on the Beck Depression Inventory). The important point for the present purposes is that childhood is a critical period of development and brain regions involved in emotional regulation and stress response are particularly at risk (Heim *et al.*, 2008).

Moderating effects of BDNF

Neurobiological perspectives concerning the development of depression have pointed to the involvement of growth factors, such as BDNF, as being involved in neurogenesis and neuroplasticity (Hayley & Anisman, 2013). In this regard, major depressive disorder has been associated with disturbances of hippocampal neurogenesis and reductions in dendritic branching and cortical synaptogenesis (MacQueen & Frodl, 2011). The BDNF polymorphism, Val66Met, has been related to changes in the hippocampus, such that Val/Met carriers have a smaller hippocampal volume and lower hippocampal activation compared to Val/Val carriers. Predictable, those with the Val/Met genotype also performed more poorly on memory recall tasks than those with the Val/Val alleles, suggesting a hippocampal-dependent difference based on genotype (Chen *et al.*, 2008). The Met allele has been associated with increased rumination and those with the Met/Met conformation have decreased volume of the dorsolateral prefrontal cortex (decrease in cognition functioning), caudate nucleus and both the temporal and occipital lobe grey matter (Chen *et al.*, 2008).

The current study demonstrated that the BDNF polymorphism Val66Met moderated the relationship between self-acceptance (a component of psychological well-being) and depression

score. Specifically, carriers of the pooled Met genotype displayed higher depression scores than individuals with the Val/Val genotype. This is consistent with earlier research regarding Met carriers, as they had a higher predisposition to the development of psychopathology (Clasen *et al.*, 2011) compared to individuals who were homozygous for the Val allele. Whether this was due to increased levels of emotion-focused coping and increased rumination, remains uncertain. Furthermore, decreased hippocampal volume was associated with Met carriers and depressed patients, as well as those with poor self-acceptance (Pruessner *et al.*, 2005), supporting the contention that the negative relationship seen could be directly related to possession of the Met allele. Conversely, Val carriers showed the most adaptability and coping flexibility in relation to stressors, which can explain why the Val/Val carriers demonstrated lower depression scores and increased self-acceptance than the Met carriers. However, it is possible that interactions with other gene polymorphisms (i.e. OXTR or 5HTTLPR) or psychosocial factors (social support or coping) may also influence well-being.

Moderating effects of NPY

As hypothesized, the relationship between social behaviours and coping with depression scores were related to NPY polymorphism. The negative relationship between the four subscales of psychological well-being (self-acceptance, environmental mastery, purpose in life, and positive relations with others) with depression scores, was moderated by the NPY polymorphism. The present findings also revealed a positive relationship between both loneliness and social connectedness with depression scores, which were more pronounced among carriers of the AA genotype. There was also a positive relationship between emotion-focused coping and depression score, which was moderated by the NPY polymorphism, whereas problem-focused

coping was not significantly moderated by NPY in relation to depressive symptomatology. Due to the location of NPY receptors, which are abundant in limbic regions (Zhou *et al.*, 2008), coping, depression and well-being can be affected, as the amygdala is involved in coping and development of mood disorders. Furthermore, as rs16147 is a polymorphism in the promoter region, which affects levels of NPY expression *in vivo* (Zhou *et al.*, 2008), this may explain how the polymorphism affects the use of emotion-focusing coping and depression. In each moderating relationship associated with the NPY polymorphism, the AA individuals displayed higher depression scores than did the pooled G carriers, which is contradictory to previous research examining the role of the A allele in regards to resilience. Based on previous findings, it was expected that the AA carriers would have lower depression scores. The AA genotype has been associated as a protective factor in relation to stressors, whereas the G allele was associated with heightened stress responses and higher hippocampal and amygdala activation in response to threatening faces (Domschke *et al.*, 2009; Zhou *et al.*, 2008). The source for these different outcomes is uncertain, especially as so few studies have been conducted from which to draw information that may be relevant to these findings.

The presence of the A allele was associated with a loss of an SP1 transcription factor binding site for the NPY polymorphism rs16147, which predicted decreased NPY expression, potentially having the effect of increasing vulnerability to psychopathology (Itokawa *et al.*, 2003). In relation to psychopathology, the A allele has been associated with a decreased risk of developing generalized anxiety disorder (GAD) in those who are experiencing low stressor conditions (Amstadter *et al.*, 2010). This, however, is contrary to findings among those who are experiencing high stressor conditions, such as a natural disaster, where individuals homozygous for the A allele were at increased risk of developing GAD. In high stress conditions, the G allele

has been associated with decreased risk of developing psychopathology such as depression and anxiety (Zhou *et al.*, 2008), which could explain the pooled G carriers reporting lower depression scores compared to the AA individuals. Since the rs16147 polymorphism is located on the G allele, it is seen to be potentially beneficial and may increase plasma levels of NPY, which accounts for how it might promote resilient behaviour under stress. In relation to the current study, the university experience is considered a high stress condition, therefore the lower depression scores seen in G carriers compared to AA carriers may be consistent with the G allele being protective, at least in this stressor condition.

Moderating effects of Sex

Sex differences have been reported in regards to depression, in that females are diagnosed with depression twice as often as males (WHO, 2012). In the current study, unsupportive interactions from parents (i.e., distancing, bumbling, minimizing, and blaming) were positively related to depressive symptomatology, more so in females than in males. This speaks to previous research indicating that unsupportive social interactions are accompanied by increased depressive symptoms, and may be related to the higher rate of depression seen in the female population (Edwards *et al.*, 2001; Jorden *et al.*, 2009; Mindes *et al.*, 2003). Previous findings have suggested that compared to males, females are also more likely to seek emotional support from others (Basow & Rubenfeld, 2003), which could explain why females are more affected by unsupportive interactions, especially from parents.

Friends/peers and parents/family are critical social supports, especially during periods of emotional and social adjustment. Parents play a key role during the adjustment to university, especially with emotional and financial support. A strong parent bond is also critical during

times when an individual is having difficulty forming social connections on campus, which could further lead to loneliness and psychopathology (Lapsley, Rice, & Fitzgerald, 1990). Conversely, unsupportive interactions from parents may increase the level of threat that adolescents perceive when appraising stressful events and it may reduce their perception of coping resources available to them (Lazarus & Folkman, 1984; Ingram *et al.*, 2001). As such, parental support and peer support act as an important buffer when adolescents are highly vulnerable to stress (Willis *et al.*, 1992).

Limitations and Conclusions

There are limitations associated with the current findings. First, even though the sample size was adequate for the behavioral analyses ($N = 306$), for the SNP analyses conducted only in Caucasians the N was borderline reliable ($N = 196$), especially as males and females differ appreciably in relation to depressive scores. Furthermore, the sample only included first year undergraduate students. Accordingly, it may be difficult to generalize to the entire university population as first year students are experiencing some unique transitional stressors that dissipate in second year. A larger, more diverse (i.e., age, education etc.) sample may also have allowed for greater generalizability to the population at large.

The current study examined measures of social behaviours through self-report questionnaires, which are subject to bias related to affective state, which may also influence memory of events they were asked to reflect on. Participants may also have felt uncomfortable answering questions honestly, due to the sensitive nature of some of these questions, such as experiences of sexual trauma. Three of the questionnaires examining early life and general trauma were retrospective; participants were asked to report the frequency of early life trauma, including childhood maltreatment and various other traumatic events. Given the focus and

sequence of questioning, this information may have provoked biased outcomes so that individuals who exhibited heightened symptoms of depression may have over-reported the frequency and impact of early life trauma.

In assessing the role of NPY and BDNF in relation to resilience and depression, it might be advantageous to include actual levels of these substrates in plasma. Inasmuch the presence of the Val66Met polymorphism is relevant, in the absence of direct measurement, it is uncertain whether plasma BDNF levels were actually lowered and were indeed related to depression (Karege *et al.*, 2002). Likewise, the NPY SNP rs16147 was examined, whereas plasma NPY was not, and thus once again the association between levels of NPY and resilience could not be determined with certainty.

In conclusion, the first year university experience can pose as a major stressor for students, so that some go on to develop a psychopathology, whereas others emerge without any negative outcomes. Resilience encompasses a variety of factors that may be key in overcoming stress and adversity during this transitional period. Social support and social connectedness help maintain positive well-being, increase resilience to stressors and lower risk of developing mental illness (Ozbay *et al.*, 2007; Southwick, Vythilingam & Charney, 2005). Conversely, loneliness and unsupport can exacerbate the effect of stressors (Cacioppo *et al.*, 2006; Edwards *et al.*, 2001). The current findings demonstrated a significant relationship between early-life trauma (childhood maltreatment and general trauma) with depressive symptomatology. Moreover, it appeared that genetic factors influenced individual differences related to stressors. In particular, an NPY polymorphism moderated the relationship between social connectedness, psychological well-being, emotion-focused coping and loneliness with depression, whereas BDNF moderated the relationship between self-acceptance and depression scores. Given the small number of male

and female participants, coupled with the frequent failures that have been reported concerning the links between specific SNPs and mental well-being, the conclusion drawn from the present study ought to be considered as being provisional pending a replication of the findings in larger set of individuals.

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Appendix A: Announcement for recruiting SONA participants.

Recruitment Notice

Study Title: Social Identity and Resilience

Abstract: This study assesses your social identity and coping abilities to determine how they contribute to your resiliency to the harmful effects of stressful events.

Description: The purpose of this study is to examine the factors that aid in your resilience to the negative health effects of stressful events. Additionally, we want to assess the social resources that you may have to help during stressful events (e.g., support from parents and peers). We are also interested in examining your stress management abilities (e.g., coping strategies and flexibility), mood (i.e. depression and anxiety), the presence of early life adversity and how these may be related to your well-being.

You will be asked to provide one saliva sample, and fill out questionnaires; some of the questions are of a sensitive nature in this study as we will be asking you personal questions which may cause discomfort. The study will take approximately 90 min. to complete.

****Please DO NOT eat, drink (other than water) or smoke **30 minutes** prior to the experiment****

This study has received clearance by the Carleton University Psychology Research Ethics Board (Reference #__).

Eligibility: First year undergraduate student at Carleton University, who can receive experimental credits for participation and are under the age of 30.

Compensation: 1.5% towards any eligible SONA course

Appendix B: Informed Consent

Informed Consent

The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent has to provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

Study title: Social Identity and Resilience

Contacts

The following people are involved in this research project and may be contacted at any time if you have further questions about this project, what it means, or concerns about how it was conducted:

Carly Crump, Graduate Researcher, Department of Neuroscience

Email: carlycrump@cmail.carleton.ca

Ajani Asokumar, Graduate Researcher, Department of Neuroscience

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Should you have any ethical concerns about this research, please contact Dr. Shelley Brown at: shelley.brown@carleton.ca (613-520-2600 ext. 1505). For any other concerns, please contact Dr. Joanne Pozzulo (Chair, Department of Psychology, 613-520-2600, ext 1412, (psychchair@carleton.ca)).

Study Personnel:

Carly Crump, Graduate Researcher, Department of Neuroscience

Ajani Asokumar, Graduate Researcher, Department of Neuroscience

Dr. Kim Matheson, Faculty Member, Department of Psychology

Dr. Hymie Anisman, Faculty Member, Department of Neuroscience

Purpose: The purpose of this study is to assess the factors that contribute to your resilience to the negative experience of stressful events. We will be evaluating the various social resources that you may use to cope with potentially stressful events (e.g., support from parents and peers). We are also interested in examining your stress management abilities (e.g., coping strategies and flexibility), mood (e.g., depression and anxiety) and the presence of early life trauma (childhood maltreatment, early life stressors and abuse). Further, it is also of interest to examine your sense

of belongingness and feelings of well-being. In addition, we are interested in looking at how genes may relate to your well-being and to determine the presence or absence of particular genes. By understanding the genetic and psychosocial factors that lead to different mood outcomes, we will gain a better understanding of how mood changes develop. This research will therefore help to develop improved approaches to both treat, and prevent mood disorders in the future.

What are we asking you to do?

We will be asking you to fill out a number of questionnaires regarding information related to your background (e.g., demographic, family, city of residence), medical history (e.g., current medications and history of illnesses and psychological disorders), stress management (e.g., coping styles), mood (e.g., feelings of depression and anxiety), sense of well-being, the quality of your interpersonal relationships (e.g., social support, group identities) and the presence of early life trauma (childhood maltreatment and early life stressors).

We are also asking participants to provide a DNA sample through the simple act of spitting into a tube however, due to the relatively large volume of saliva required (~1 ml) this can take up to 5 minutes.

This study should take approximately 90 minutes to complete.

What will I receive for my participation?

Within 1 week after completion of the study you will be assigned 1.5 % course credit.

Potential risks or causes of discomfort for participants

There are no physical risks in this study. There may be some discomfort or anxiety experienced when responding to some questions of a sensitive nature in this study. We will be asking you to fill out questionnaires related to stress management, interpersonal relationships with family and friends, and feelings of well-being. If this is the case, the Debriefing form at the end of the study contains contact information for people who are available to help. You can also choose to withdraw from the study at any point. We are looking to collect a saliva sample, which may take up to 5 minutes. Some participants may therefore feel discomfort or embarrassment about spitting into a tube in the presence of the researcher and other students, in which case you may feel free to leave the room and finish the sample. You will be asked to not drink, eat, smoke or chew gum for 30 minutes before providing this sample.

Anonymity and confidentiality

All information and samples collected from you for this study will be identified with a code number, as opposed to any personal identifiers such as your name or address. We will maintain a separate record that matches your personal identification details with this code number. This is necessary in order for us to re-contact you in the future (with your express permission to do so), and so that we can respect your right to withdraw from the study at a later date (to be described below). However, this record that allows your identity to be linked to your information will kept in a separate and secured location, and will only be accessible to the researchers, in order to maintain anonymity and confidentiality of your information. All personal identifying information will be destroyed within 3 years of collection. All information is stored on a server only accessible by this research lab.

Genetic testing: Common questions and concerns

What is DNA?

DNA is a large molecule that contains information necessary for our bodies to build all the components needed for our development, growth and survival. This information is commonly referred to as the genetic code or the DNA sequence. Some rare diseases can be attributed entirely to simple errors in our DNA sequence. However, the majority of common diseases (including depression) are caused by a combination of many different genetic factors, together with environmental factors (how we grew up, life events, etc).

What will my DNA be used for?

If you compare any two people, their DNA will be about 99% identical. We are interested in the 1% of DNA that is different between people. Our current plan is to investigate these differences, focusing on just a small proportion of your genes (we are targeting less than 100 of the ~30,000 genes that humans have) which we anticipate may be involved in risk of either anxiety or depression.

We are also planning future follow-up studies on your DNA, which will extend the analysis to substantially more genes – potentially all genes. Based on the results of the current study, there could be future interactions that may be of interest to study further including but not limited to: relationships between serotonin and depression as well as between neuropeptide Y and resilience, interactions between oxytocin and dopamine as well as other related genes which could be significant to positive outcomes related to social factors. These future studies will be limited to analyses of the DNA molecule and the genetic code, and will not involve any other use or manipulation of your DNA sample. At the end of this form, you have the option to opt-out of any such future uses of your DNA sample.

How long will my DNA be stored, and potentially used in research?

By providing a DNA sample and signing this form, you are indicating that you are willing for us to preserve and analyze your DNA sample for an extended period of time (3 years or less). During this period, use of the sample is guaranteed to be limited to studies that read the DNA molecule. Your saliva and any DNA samples will be destroyed, by incineration, no later than 3 years after saliva was collected.

Will I be told the results of my own genetic analysis?

No. Your DNA sample and genetic information will be identified by a code number, and not your name. This preserves confidentiality of this information. Returning your personal genetic information to you would require that confidentiality be compromised, so will be avoided. Furthermore, genetics in this study will not allow accurate prediction of whether or not you will develop any disease. Although in the future we hope to be able to use genetic materials to examine disease susceptibility, our research is in a preliminary phase and we are not currently able to provide this kind of information on an individual basis.

Can my DNA ever be used to identify me?

This is a complicated question to answer. Unless you have an identical twin (whose DNA will be identical to yours), your DNA is absolutely unique to you. It is this unique nature of genetic material that allows individuals to be identified based entirely on their DNA, through techniques

such as DNA fingerprinting. It is therefore theoretically possible that in the future, your identity could be determined from simply analyzing your DNA sample.

It is extremely unlikely, however, that you could be identified based on your DNA sample. In order to identify you based purely on your DNA sample, it would be necessary to compare your DNA sample that you provide today, with another DNA sample from you in a DNA database, which is linked to your identity. DNA databases do exist in countries including Canada, Australia, USA and UK, but are limited to samples from criminal offenders. Access to these databases is strictly limited to law enforcement agencies thus cannot be accessed by researchers. Access to DNA samples taken for this study will similarly be limited to the researchers, and will not be provided to any law enforcement agency unless we become legally obliged to do so (to our knowledge, this has never happened to any research group). Furthermore, these government DNA databases typically contain information about only 13 regions of human DNA, none of which are to be analyzed in the present study.

If you have any additional questions or concerns, please ask the researcher today, or contact any of the principal investigators at a later date.

Right to withdraw from this study

Participation in this study is entirely voluntary. At any point during the study you have the right to not complete certain questions or to withdraw with no penalty whatsoever and compensation will still be granted. Furthermore, if at a later date you wish to withdraw from the study, you can contact the principal investigators and we will destroy all of your records (questionnaire answers, responses from the interview, plus DNA sample) from this study. The only exception is where data has already been published. In this instance, unpublished data plus your DNA sample will be destroyed.

Declaration of consent

To use your DNA for any future research studies that are aimed at analyzing DNA sequence, please indicate below how you would like your sample to be treated in the future by selecting **one** of the three options. There are no obligations or penalties for you associated with your selection.

- ☐ Option 1: Use of my DNA/saliva sample must be strictly limited to the analysis of <100 genes, as described in the current research plan. This can only be done within a 3 year period of my saliva being collected.
- ☐ Option 2: I grant the researcher permission to re-contact me to seek consent to use my DNA/saliva samples in future research studies.
Email: _____ Phone Number: _____
- ☐ Option 3: I grant the researcher permission to use my DNA/saliva samples for any future research studies, limited to analyses of the DNA molecule.

This study has been cleared by the Carleton University Psychology Research Ethics Board (Ethics # _____)

Signatures

I have read the above form and understand the conditions of my participation. My participation in this study is voluntary, and I understand that if at any time I wish to leave the experiment, I may do so without having to give an explanation and with no penalty whatsoever. Furthermore, I am also aware that the data gathered in this study are confidential and anonymous with respect to my personal identity. My signature indicates that I agree to participate in this study.

Participant's Full Name: _____ Participant's Signature:

Researcher's Name: _____ Researcher's Signature:

Date _____

Appendix C: Written Debriefing for all student participants

What are we trying to learn in this research?

Individuals are faced with a variety of stressful events over the course of their life, and these types of events may have important consequences for one's well being. One such stressor is the start of one's university career. The experience of stressors can be buffered by the quality of relationships and group-ties you may have as an adult, your coping abilities, and perceived social support. Recently, there have been research efforts made to better understand the association between one's stress management abilities and depressive and anxiety symptoms. Specifically, individuals who are better able to appraise stressful events and are able to use various and appropriate coping strategies tend to report decreased levels of stress and less frequent reports of emotional and physical distress. Therefore, it is possible that one can be more resilient to the impact of life stressors based on the relationship between one's social identity and stress management abilities. A decreased level of resilience factors may lead to higher depression and anxiety symptoms. Additionally, when under distress, our relationships to those around us may be crucial to our well-being, and may be influenced by the type of support we receive. For instance, experiencing unsupportive social interactions may lead to greater feelings of anxiety, whereas these feelings may be decreased by social support. Recently research has focused on important genetic factors which may underlie variations in resilience levels and increase susceptibility to develop depression and anxiety related illnesses.

In addition to the questionnaires, you were asked to provide a saliva sample. Genetic material (e.g., DNA) can be extracted from our saliva. Therefore we were interested in examining the relationships between your responses on some of the questionnaires (e.g., social identity and depressive symptoms) and certain genes (genes make up our DNA and may code for different traits such as, eye color). Multiple forms of the same gene are present within the population, wherein one or more forms of the gene might be related to our well-being (e.g., depression). You were asked to provide a saliva sample, genetic material (e.g., DNA) can be extracted from this saliva sample. Therefore we were interested in examining the relationships between your responses on some of the questionnaires (e.g., sense of well-being, depressive symptoms) and certain genes.

In this study, we are interested in examining the relationships between your group identity and how this influences your perceived social support, stress management abilities, and overall sense of well-being. As well as, how some genetic factors might relate to various factors of resilience and prosocial behaviours. We are also interested in examining the relationship between different forms of genes and how these may make an individual more or less susceptible to mental health related illnesses. We hope that this research will determine what factors may influence one's resilience to the harmful physical and mental health effects of stressful events.

What if I have questions later?

Please contact

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Ethical concerns: Dr. Shelley Brown, Chair of Carleton University Ethics Committee for Psychological Research, 613-520 2600 ext. 1505, shelley.brown@carleton.ca

Any other concerns: For any other concerns, please contact Dr. Joanne Pozzulo (Chair, Department of Psychology, 613-520-2600, ext. 1412, psychchair@carleton.ca)

Is there anything that I can do if I found this experiment to be emotionally draining?

Thank you very much for your participation in this study. If you feel any distress at the moment, from related to answering some of the personal questions during this study, you should be aware that these are legitimate feelings and it is understandable that thinking about past stressful experiences can induce feelings of distress. If you are experiencing any distress from completing these measures, please consult the resources below:

Carleton University Health and Counseling Services at: 613-520-6674,

Ottawa Distress Centre: (613) 238 1089, Web Site: www.dcottawa.on.ca.

Mental Health Crisis Line: within Ottawa (613) 722-6914, outside Ottawa 1-866-996-0991, Web Site: <http://www.crisisline.ca/>

Want to know more about this subject? You can read the following studies by going to these links below:

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2795557/>

<http://www.sciencemag.org/content/328/5984/1408.short>

Appendix D: Additional debriefing form.

Additional Debriefing

(This debriefing will be provided to those who select 2a or higher on question 9 of the BDI)

Depression is a condition that can occur for many reasons, including workplace, school, or relationship stressors, traumatic life events, discrimination, as well as physical/biological imbalances. Approximately 10-15% of people will suffer some degree of depression during their lifetime. With advances in modern medicine, most people can readily be treated for this illness, which if unattended can be long lasting and affect many aspects of one's life. The symptoms of depression comprise:

- Poor or depressed mood, or a reduction in the pleasure gained from otherwise positive experiences
- Sleep disturbances
- Eating disturbances (loss of appetite, or overeating despite not being hungry), which may be linked to weight changes
- Lack of sexual interest
- Fatigue and lethargy (you don't feel like doing anything)
- An inability to focus (e.g., you have a hard time reading)
- Reduced interactions with family and friends
- Thoughts of suicide

Someone who is depressed may experience several (3-4), but not necessarily all of the above symptoms.

It is likewise the case that 60% of individuals will encounter a severe traumatic event in their lives and of these people, a fair number will develop symptoms that cause severe anxiety. Illnesses of this nature, including posttraumatic stress disorder (PTSD) can be treated. Once again, if unattended, the repercussions can be severe. Symptoms include:

- Hyperarousal (e.g., feelings of anxiety and reactivity even to minor situations)
- Intrusive thoughts (memories of the event come into your head frequently)
- Avoiding thoughts or stimuli related to the event

These symptoms can persist for more than a month following the event, and influence your day-to-day functioning.

Your responses to this survey suggest that you may be experiencing one of the above disorders. If you are not already receiving attention for this problem, it is suggested that you contact your family physician. It is not a good idea to allow problems to fester, as ruminating over these problems will typically not make them go away. Your family physician or counsellor will usually be able to help you or to refer you to someone who can. If you do not have a family physician, then you can contact either of the following:

Mental Health Crisis Line: within Ottawa (613) 722-6914, outside Ottawa 1-866-996-0991,
Web Site: <http://www.crisisline.ca/>

Ottawa Distress Centre: (613) 238 1089, Web Site: www.dcottawa.on.ca

Appendix E: Suicidal Ideation Protocol.

Suicidal Ideation Protocol

IN-PERSON/TELEPHONE SITUATIONS

Item 9 (from 21-item version; Item 7 on 13-item version) on the Beck is checked immediately (e.g., while getting credit information and debriefing ready).

If the Beck 9 is 0 or 1, nothing is done except give credit and debriefing. The debriefing includes a summary of the goals of the study as well as a list of contact numbers (e.g., Health and Counseling Services).

If the Beck 9 is a 2a, the participant is reminded of counseling services available at Carleton, and in the community. Credit and debriefing are subsequently given. If there are many participants (group questionnaire setting) and it is not feasible to remind the participant privately in the study room of services, then the participant will be taken to a private room, with the researcher saying that they are being taken to be debriefed, and they will be reminded of services available there. Credit and debriefing sheet are provided.

If the Beck 9 is 2b, c or 3:

If possible, the participant is spoken to privately. If speaking with the participant privately in the study room is not feasible (group setting), then the participant will be taken to a private room, with the researcher saying they are being taken to be debriefed. The researcher will state that they have noticed the Beck item, and that they are concerned about their welfare. The summarized seven-step protocol (below) is then implemented. The summarized seven-step protocol (below) is then implemented.

The following will be assessed:

1. The length of time that participant has had suicidal thoughts.
2. Whether the participant has talked to anyone regarding these thoughts.
3. Whether the participant is currently seeing a therapist.
4. Whether the participant has a plan and the means to carry out their plan
5. Whether the thought to carry out their plan is imminent
6. If plan is imminent then the protocol outlined below will be followed.

NOTE: Keep a written record documenting the assessment.

ADDITIONAL DETAILS:

The plan and means. The participant is questioned about the plan and the means to carry out this plan. Examples of plans are such things as taking large amounts of painkillers, and means are having lots of painkillers available. You don't have to give examples of plans, just ask whether they have thought about how they would do it.

If there are no plans, or there are plans but no means (e.g., take painkillers but none around), remind the participant of counseling services available in the community and also the ER at the

hospital. If the participant is also seeing a therapist, it is suggested that the participant speak with the therapist about this. Then the credit and debriefing are given.

If there are both plans and means, the participant is asked whether thoughts to carry out this plan are imminent (that is, are they thinking of doing this very soon? For example, within the next day).

If not imminent, OR have plans and means but don't think they would carry them out (e.g., yes, I've thought about doing it occasionally and have the meds but realize I could not go through with it), the participant is reminded of counseling services available in the community, and also the ER at the hospital. If also seeing a therapist, it is suggested that the participant speak with their therapist about this. Then the credit and debriefing are given.

If means are available and plan is imminent, and there is good reason to believe that then individual may in fact carry out the suicidal thoughts soon, then the participant is informed that you will be calling 911 because you are very concerned that they will harm themselves. During the 911 call, the police are informed of the individual's imminent intent to commit suicide. The person's name and phone are given to the police. This step involves breaking confidentiality, but the welfare of the participant takes priority (APA and CPA and Tri-Council guideline 3.1). 911 will take it from there. **The situation is documented, and your supervisor and ethics chair are contacted.**

Things NOT TO DO in both in-person and telephone situations

***Do not** give out your lab number as a resource for somewhere to call for help.*

***Do not** give out home phone numbers of research personnel.*

Do not intervene directly with the participant. That is, **do not** escort the person to the hospital or health services. If a participant does call the lab for help, refer them again to the resources, such as Health Services or the Distress Centre or hospital. Assess for immediacy of suicidal intention, and follow the steps outlined above, such as finding out if there is someone else there, calling 911 directly if there is imminent suicidal intent, etc.

Do not engage in a helping relationship with the person. Provide the information about resources, but, for example, **do not** make follow-up calls to check up on the person and see how they are doing.

Do not do any of this assessment and suicidal screening if you do not feel confident about it. Refer it to your supervisor.

BDI item 9

9. ☐ 0 = I don't have thoughts of harming myself
 ☐ 1 = I have thoughts of harming myself but I would not carry them out

- ___ 2a = I feel I would be better off dead
- ___ 2b = I have definite plans about committing suicide
- ___ 2c = I feel my family would be better off if I were dead
- ___ 3 = I would kill myself if I could

Appendix F - Measures Background Information

The purpose of the following set of questions is to collect demographic information about various aspects of your life. Although some of the questions may seem unrelated to the present study (e.g. weight, height, religion, etc...) these factors may be important determinants of your health and well-being.

1. Sex: Female/ Male (please select one)

2. Age: _____

3. What is your citizenship status?

_____ Canadian citizen			
_____ Landed immigrant	Since what year? _____	Country of origin _____	
_____ Student visa	Since what year? _____	Country of origin _____	
_____ Temporary visa	Since what year? _____	Country of origin _____	
_____ Refugee	Since what year? _____	Country of origin _____	

4. What is your first language? _____
 If your first language is not English, how long have you been **fluent** in reading, writing and comprehension of the English language? _____

5. What is your ethnic/racial background? *Please select the one that best applies to you.*

_____ Asian (e.g., Chinese, Japanese, Korean)
_____ South Asian (e.g., East Indian, Pakistani, Punjabi, Tamil, Sri Lankan)
_____ South East Asian (e.g., Cambodian, Indonesian, Laotian)
_____ Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan)
_____ Black (e.g., African, Haitian, Jamaican, Somali)
_____ Latin American/Hispanic
_____ Aboriginal
_____ White/Euro-Caucasian
_____ Other (please specify): _____

6. What is your religious affiliation? *Please select the one that best applies to you.*

- ☐ None—Atheist (e.g., belief that there is NO God)
☐ None—Agnostic (e.g., belief that the existence of God cannot be known)
☐ Protestant (e.g., United, Anglican, Baptist, Presbyterian, Lutheran, Pentecostal, Mennonite, “Christian”)
☐ Catholic (e.g., Roman Catholic, Ukrainian Catholic)
☐ Jewish
☐ Muslim
☐ Buddhist
☐ Hindu
☐ Sikh
☐ Bahá’í
☐ Other (please specify): _____

7. How long have you been a resident of Ottawa, Ontario? _____

8. If you just moved to Ottawa to attend University, how far is your former place of residence?

- ☐ I was already living in Ottawa before attending Carleton University
☐ Less than an hour from Ottawa
☐ 1+ hour from Ottawa
☐ 3+ hours from Ottawa
☐ 5+ hours from Ottawa..... Please specify the city _____
☐ Outside of Ontario/Quebec..... Please specify the province _____
☐ Outside of Canada..... Please specify the country _____

9. If you just moved to Ottawa to attend University, how long did you live in your former place of residence? _____

10. If you just moved to Ottawa, how often do you go back to your former place of residence?

11. If you just moved to Ottawa, have you been away from home before?

☐ YES ☐ NO

If YES, please indicate how often: _____ and for how long: _____

12. What is your current living arrangement? *Please select the one that best applies to you.*

- ☐ Living alone in residence (at Carleton University)
☐ Living alone off-campus
☐ Living with friends in residence (at Carleton University)
☐ Living with friends off-campus
☐ Living with roommates in residence (at Carleton University)
☐ Living with roommates off-campus
☐ Living with parents
☐ Living with spouse/significant other
☐ Living with spouse/significant other and young children (13 years and younger)
☐ Living with spouse/significant other and older children (13 years and older)
☐ Living alone with young children (13 years and younger)
☐ Living alone with older children (13 years and older)
☐ Other (please specify) _____

13. Do you have any relatives or close friends in Ottawa? ☐ YES ☐ NO

If YES, how many? _____

14. What is your current relationship status? *Please select the one that best applies to you.*

- ☐ Single, and not seeing anyone
☐ Going out with someone
☐ In a serious dating relationship
☐ Have recently broken up ... Please specify how many weeks ago you broke up _____
☐ Living with an intimate other
☐ Engaged
☐ Married
☐ Separated/Divorced Please specify how many months ago you separated _____
☐ Widowed

15. Is your current (or most recent) partner: Male _____ OR Female _____?

16. Please provide your current height: _____ (ft) OR _____ (metres)
 Please provide your current weight: _____ (lb) OR _____ (kg)

17. What level of education have you completed?

- ☐ 8 years or less of elementary school
☐ some high school but no diploma
☐ a high school diploma or equivalent
☐ 1 to 3 years of college/university (including study at a technical college or CEGEP)
☐ an undergraduate university degree
☐ a master's degree
☐ a doctoral degree
☐ a professional degree [medicine (M.D.), dentistry (D.D.S.), law, etc.]

18. Have you had or do you currently have any health related (i.e., medical) illnesses or physical conditions? *Please select the one that best applies to you.*

- ☐ NO, I don't
☐ YES, I did but I no longer do
☐ YES, I do

If YES, please specify illness/condition you had/have

If YES, please specify any current treatment you are receiving

19. Do you currently have a psychological disorder/condition (e.g. depression, anxiety, etc.)?

- ☐ NO, I don't
☐ YES, I do

If YES, please specify disorder/condition _____

If YES, are you currently being treated for this disorder/condition?

- ☐ NO, I'm not
☐ YES I am

If YES, please specify treatment type (e.g. medications, therapy). _____

20. Have you ever in the past had a psychological disorder/condition (e.g. depression, anxiety, etc.) but no longer do?

_____ NO, I haven't

_____ YES, I have

If YES, please specify the disorder/condition you had _____

21. In your opinion, how would you describe your health?

_____ Poor

_____ Fair

_____ Good

_____ Very good

_____ Excellent

22. Are you on any of the following medications (please check all that apply)?

Anti-inflammatories (please specify) _____

Anti-depressants (please specify) _____

Anti-anxieties (please specify) _____

Allergy medication (please specify) _____

Other prescription drugs (please specify) _____

23. What is your estimate of your family's gross income per year? *Please select the one that best applies to you.*

_____ under \$15,000

_____ \$60,000 - \$74,999

_____ \$15,000 - \$29,999

_____ \$75,000 - \$89,999

_____ \$30,000 - \$44,999

_____ \$90,000 - \$104,999

_____ \$45,000 - \$59,999

_____ \$105,000 or more

24. What is your employment status?

_____ Employed Part-time

_____ Employed Full-time

_____ Unemployed

_____ Retired

_____ Other : _____

Appendix G

Beck Depression Inventory (BDI)- 21 item scale

On this questionnaire are groups of statements. Please read the entire group of statements in each category. Then pick out ONE statement in that group which best describes the way you feel. Check off the number beside the statement you have chosen.

1. ☐ 0 = I do not feel sad
☐ 1 = I feel sad or blue
☐ 2a = I am blue or sad all of the time and I can't snap out of it
☐ 2b = I am so sad or unhappy that it is very painful
☐ 3 = I am so sad or unhappy that I can't stand it

2. ☐ 0 = I am not particularly pessimistic or discouraged about the future
☐ 1 = I feel discouraged about the future
☐ 2a = I feel I have nothing to look forward to
☐ 2b = I feel I won't ever get over my troubles
☐ 3 = I feel that the future is hopeless and things cannot improve

3. ☐ 0 = I do not feel like a failure
☐ 1 = I feel I have failed more than the average person
☐ 2a = I feel I have accomplished very little that is worthwhile or that means anything
☐ 2b = As I look back on my life, all I can see is a lot of failures
☐ 3 = I feel I am a complete failure as a person

4. ☐ 0 = I am not particularly dissatisfied
☐ 1a = I feel bored most of the time
☐ 1b = I don't enjoy things the way I used to
☐ 2 = I don't get satisfaction out of anything anymore
☐ 3 = I am dissatisfied with everything

5. ☐ 0 = I don't feel particularly guilty
☐ 1 = I feel bad or unworthy a good part of the time
☐ 2a = I feel quite guilty
☐ 2b = I feel bad or unworthy practically all of the time now
☐ 3 = I feel as though I am very bad or worthless

6. ☐ 0 = I don't feel I am being punished
☐ 1 = I have a feeling that something bad may happen to me
☐ 2 = I feel I am being punished or will be punished
☐ 3a = I feel I deserve to be punished
☐ 3b = I want to be punished

7. ___ 0 = I don't feel disappointed in myself
 ___ 1a = I am disappointed in myself
 ___ 1b = I don't like myself
 ___ 2 = I am disgusted with myself
 ___ 3 = I hate myself
8. ___ 0 = I do not feel I am any worse than anybody else
 ___ 1 = I am very critical of myself for my weaknesses or mistakes
 ___ 2a = I blame myself for everything that goes wrong
 ___ 2b = I feel I have many bad faults
9. ___ 0 = I don't have thoughts of harming myself
 ___ 1 = I have thoughts of harming myself but I would not carry them out
 ___ 2a = I feel I would be better off dead
 ___ 2b = I have definite plans about committing suicide
 ___ 2c = I feel my family would be better off if I were dead
 ___ 3 = I would kill myself if I could
10. ___ 0 = I don't cry anymore than usual
 ___ 1 = I cry more now than I used to
 ___ 2 = I cry all the time now. I can't stop it
 ___ 3 = I used to be able to cry but now I can't cry at all even though I want to
11. ___ 0 = I am no 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
12. ___ 0 = I have not lost interest in other people
 ___ 1 = I am less interested in other people than I used to be
 ___ 2 = I have lost most of my interest in other people and I have little feeling for them
 ___ 3 = I have lost all my interest in other people and don't care about them at all
13. ___ 0 = I make decisions about as well as ever
 ___ 1 = I am less sure of myself now and try to put off making decisions
 ___ 2 = I can't make decisions anymore without help
 ___ 3 = I can't make decisions at all anymore
14. ___ 0 = I don't feel I look any worse than I used to
 ___ 1 = I am worried that I am looking old or unattractive
 ___ 2 = I feel that there are permanent changes in my appearance and they make me look unattractive
 ___ 3 = I feel that I am ugly or repulsive looking

15. ___ 0 = I can work about as well as before
 ___ 1a = It takes extra effort to get started at doing something
 ___ 1b = I don't work as well as I used to
 ___ 2 = I have to push myself very hard to do anything
 ___ 3 = I can't do any work at all
16. ___ 0 = I can sleep as well as usual
 ___ 1 = I wake up more tired in the morning than I used to
 ___ 2 = I wake up 1-2 hours earlier than usual and find it hard to get back to sleep
 ___ 3 = I wake up early every day and can't get more than 5 hours sleep
17. ___ 0 = I don't get anymore tired than usual
 ___ 1 = I get tired more easily than I used to
 ___ 2 = I get tired from doing anything
 ___ 3 = I get too tired to do anything
18. ___ 0 = My appetite is no worse than usual
 ___ 1 = My appetite is not as good as it used to be
 ___ 2 = My appetite is much worse now
 ___ 3 = I have no appetite at all any more
19. ___ 0 = I haven't lost much weight, if any, lately
 ___ 1 = I have lost more than 5 pounds
 ___ 2 = I have lost more than 10 pounds
 ___ 3 = I have lost more than 15 pounds
20. ___ 0 = I am no more concerned about my health than usual
 ___ 1 = I am concerned about aches and pains or upset stomach or constipation or other unpleasant feelings in my body
 ___ 2 = I am so concerned with how I feel or what I feel that it's hard to think of much else
 ___ 3 = I am completely absorbed in what I feel
21. ___ 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 H

Unsupportive Social Interactions Inventory (USII)

Please think about times you've turned to **your friends** for support in regards to a situation that was bothering you (i.e. frustrations or disappointments with friends, family, school, health, work or anything else that is important to you). For each of the statements below, **please circle the number that indicates how frequently your friends responded in this way when you went to them for support.**

	None				A lot
1. Would not seem to want to hear about it.	0	1	2	3	4
2. Would refuse to take me seriously.	0	1	2	3	4
3. Would change the subject before I wanted to.	0	1	2	3	4
4. Would refuse to provide the type of help or support I was asking for.	0	1	2	3	4
5. When I was talking about it, the person wouldn't give me enough time, or would make me feel like I should hurry.	0	1	2	3	4
6. Would discourage me from expressing feelings such as anger, hurt or sadness.	0	1	2	3	4
7. Would not seem to know what to say, or would seem afraid of saying or doing the "wrong" thing.	0	1	2	3	4
8. Would seem to be telling me what he or she thought I wanted to hear.	0	1	2	3	4
9. From voice tone, expression, or body language, I would get the feeling he or she was uncomfortable talking about it.	0	1	2	3	4
10. Would try to cheer me up when I was not ready to.	0	1	2	3	4
11. Would respond with uninvited physical touching (e.g., hugging).	0	1	2	3	4
12. Would do things for me that I would want to do and could do myself.	0	1	2	3	4
13. Would feel that I should stop worrying about the event and just forget about it.	0	1	2	3	4
14. Would tell me to be strong, to keep my chin up, or that I should not let it bother me.	0	1	2	3	4
15. Would feel that I should focus on the present or the future and that I should forget about what has happened and get on with my life.	0	1	2	3	4

	None					A lot
16. Would feel that it could have been worse or was not as bad as I thought.	0	1	2	3	4	
17. Would say that I should look on the bright side.	0	1	2	3	4	
18. Would feel that I was overreacting.	0	1	2	3	4	
19. Would ask “why” questions about my role in the event.	0	1	2	3	4	
20. Would make “Should or shouldn’t have” comments about my role in the event.	0	1	2	3	4	
21. Would tell me that I had gotten myself into the situation in the first place, and now must deal with the consequences.	0	1	2	3	4	
22. Would blame me, or try to make me feel responsible for the event.	0	1	2	3	4	
23. Would make “I told you so” or similar comments.	0	1	2	3	4	
24. Would seem to be disappointed in me.	0	1	2	3	4	

Please think about times you’ve turned to **your parents** for support in regards to a situation that was bothering you (i.e. frustrations or disappointments with friends, family, school, health, work or anything else that is important to you). For each of the statements below, **please circle the number that indicates how frequently your parents responded in this way when you went to them for support.**

	None					A lot
1. Would not seem to want to hear about it.	0	1	2	3	4	
2. Would refuse to take me seriously.	0	1	2	3	4	
3. Would change the subject before I wanted to.	0	1	2	3	4	
4. Would refuse to provide the type of help or support I was asking for.	0	1	2	3	4	
5. When I was talking about it, the person wouldn’t give me enough time, or would make me feel like I should hurry.	0	1	2	3	4	
6. Would discourage me from expressing feelings such as anger, hurt or sadness.	0	1	2	3	4	
7. Would not seem to know what to say, or would seem afraid of saying or doing the “wrong” thing.	0	1	2	3	4	

	None					A lot
8. Would seem to be telling me what he or she thought I wanted to hear.	0	1	2	3	4	
9. From voice tone, expression, or body language, I would get the feeling he or she was uncomfortable talking about it.	0	1	2	3	4	
10. Would try to cheer me up when I was not ready to.	0	1	2	3	4	
11. Would respond with uninvited physical touching (e.g., hugging).	0	1	2	3	4	
12. Would do things for me that I would want to do and could do myself.	0	1	2	3	4	
13. Would feel that I should stop worrying about the event and just forget about it.	0	1	2	3	4	
14. Would tell me to be strong, to keep my chin up, or that I should not let it bother me.	0	1	2	3	4	
15. Would feel that I should focus on the present or the future and that I should forget about what has happened and get on with my life.	0	1	2	3	4	
16. Would feel that it could have been worse or was not as bad as I thought.	0	1	2	3	4	
17. Would say that I should look on the bright side.	0	1	2	3	4	
18. Would feel that I was overreacting.	0	1	2	3	4	
19. Would ask “why” questions about my role in the event.	0	1	2	3	4	
20. Would make “Should or shouldn’t have” comments about my role in the event.	0	1	2	3	4	
21. Would tell me that I had gotten myself into the situation in the first place, and now must deal with the consequences.	0	1	2	3	4	
22. Would blame me, or try to make me feel responsible for the event.	0	1	2	3	4	
23. Would make “I told you so” or similar comments.	0	1	2	3	4	
24. Would seem to be disappointed in me.	0	1	2	3	4	

Appendix I

Cognitive Flexibility Questionnaire (CFQ)

The purpose of this questionnaire is to determine what individuals generally think, feel, and do when experiencing stressful situations. Of course, you may respond differently depending on the situation, but think of what you usually do when you are under a lot of stress. Using the scale below, indicate the extent to which you agree or disagree with the following statements. Please answer according to what you *actually* think/feel/do rather than what you think is the correct response.

<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Slightly Disagree</i>	<i>Neutral</i>	<i>Slightly Agree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5	6	7

Generally, in stressful situations...

1. I weigh out many options before choosing how to take action.	1	2	3	4	5	6	7
2. I can't focus on anything when I am upset.	1	2	3	4	5	6	7
3. It's hard to think of different ways of dealing with the situation	1	2	3	4	5	6	7
4. I control my thoughts and feelings by putting the situation in context.	1	2	3	4	5	6	7
5. I can remain in control over my thoughts and emotions.	1	2	3	4	5	6	7
6. It's difficult to let go of intrusive thoughts or emotions.	1	2	3	4	5	6	7
7. It's hard for me to put things in perspective when I'm upset.	1	2	3	4	5	6	7
8. I have a hard time managing my emotions.	1	2	3	4	5	6	7
9. I take the time to see things from different perspectives before reacting.	1	2	3	4	5	6	7
10. I feel like I lose control over my thoughts and emotions.	1	2	3	4	5	6	7
11. It's hard for me to shift my attention away from negative thoughts or feelings.	1	2	3	4	5	6	7
12. I find it easy to look for something positive, even when I am stressed.	1	2	3	4	5	6	7
13. I control negative thoughts and emotions by modifying the way I think about the situation.	1	2	3	4	5	6	7

14. It is easy for me to ignore distracting thoughts.	1	2	3	4	5	6	7
15. It's hard for me to ignore negative emotions once they have been provoked.	1	2	3	4	5	6	7
16. I can think of multiple coping options before deciding how to respond.	1	2	3	4	5	6	7
17. I get easily distracted by upsetting thoughts or feelings.	1	2	3	4	5	6	7
18. I approach the situation from multiple angles.	1	2	3	4	5	6	7
19. My thoughts and emotions interfere with my ability to concentrate.	1	2	3	4	5	6	7
20. I take the time to think of more than one way to resolve the problem.	1	2	3	4	5	6	7
21. It is easy for me to shift my attention to other things if I am upset.	1	2	3	4	5	6	7
22. I manage my thoughts or feelings by reframing the situation.	1	2	3	4	5	6	7
23. I find it difficult to think of many options for resolving the situation.	1	2	3	4	5	6	7
24. Putting a positive spin on a bad experience comes fairly easy to me.	1	2	3	4	5	6	7
25. I find it easy to set-aside unpleasant thought or emotions.	1	2	3	4	5	6	7
26. It is easy for me to reassess a negative experience into a positive one.	1	2	3	4	5	6	7
27. I can easily suppress upsetting memories.	1	2	3	4	5	6	7

Appendix J

Positive and Negative Affect Schedule (PANAS)

(Newer Version)

Mood

Using the rating scale beside each item, please indicate how much each adjective describes **how you feel at the moment**. There are no right or wrong answers, we just want you to be as honest as possible in indicating how you're feeling right now.

Active	Not at all	0	1	2	3	4	5	6	Extremely
Afraid	Not at all	0	1	2	3	4	5	6	Extremely
Alert	Not at all	0	1	2	3	4	5	6	Extremely
Angry	Not at all	0	1	2	3	4	5	6	Extremely
Annoyed	Not at all	0	1	2	3	4	5	6	Extremely
Anxious	Not at all	0	1	2	3	4	5	6	Extremely
Ashamed	Not at all	0	1	2	3	4	5	6	Extremely
Attentive	Not at all	0	1	2	3	4	5	6	Extremely
Confused	Not at all	0	1	2	3	4	5	6	Extremely
Contempt	Not at all	0	1	2	3	4	5	6	Extremely
Depressed	Not at all	0	1	2	3	4	5	6	Extremely
Determined	Not at all	0	1	2	3	4	5	6	Extremely
Disdain	Not at all	0	1	2	3	4	5	6	Extremely
Disgust	Not at all	0	1	2	3	4	5	6	Extremely
Distressed	Not at all	0	1	2	3	4	5	6	Extremely
Embarrassed	Not at all	0	1	2	3	4	5	6	Extremely
Enraged	Not at all	0	1	2	3	4	5	6	Extremely
Enthusiastic	Not at all	0	1	2	3	4	5	6	Extremely
Excited	Not at all	0	1	2	3	4	5	6	Extremely
Frustrated	Not at all	0	1	2	3	4	5	6	Extremely
Guilty	Not at all	0	1	2	3	4	5	6	Extremely
Happy	Not at all	0	1	2	3	4	5	6	Extremely
Helpless	Not at all	0	1	2	3	4	5	6	Extremely

Hostile	Not at all	0	1	2	3	4	5	6	Extremely
Humiliated	Not at all	0	1	2	3	4	5	6	Extremely
Indifferent	Not at all	0	1	2	3	4	5	6	Extremely
Infuriated	Not at all	0	1	2	3	4	5	6	Extremely
Inspired	Not at all	0	1	2	3	4	5	6	Extremely
Interested	Not at all	0	1	2	3	4	5	6	Extremely
Irritable	Not at all	0	1	2	3	4	5	6	Extremely
Jittery	Not at all	0	1	2	3	4	5	6	Extremely
Nervous	Not at all	0	1	2	3	4	5	6	Extremely
Proud	Not at all	0	1	2	3	4	5	6	Extremely
Regretful	Not at all	0	1	2	3	4	5	6	Extremely
Responsible	Not at all	0	1	2	3	4	5	6	Extremely
Sad	Not at all	0	1	2	3	4	5	6	Extremely
Scared	Not at all	0	1	2	3	4	5	6	Extremely
Strong	Not at all	0	1	2	3	4	5	6	Extremely
Unhappy	Not at all	0	1	2	3	4	5	6	Extremely
Upset	Not at all	0	1	2	3	4	5	6	Extremely
Worried	Not at all	0	1	2	3	4	5	6	Extremely

Appendix K

Social Connectedness Scale - Revised

Instructions: The following are a number of statements that reflect various ways in which we view ourselves. Rate the degree to which you agree or disagree with each statement using the following scale (1= Strongly Disagree and 6= Strongly Agree). There is no right or wrong answer. Do not spend too much time with any one statement and do not leave any unanswered.

	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Mildly Disagree</i>	<i>Mildly Agree</i>	<i>Agree</i>	<i>Strongly Agree</i>
	1	2	3	4	5	6
1. I feel comfortable in the presence of strangers.	1	2	3	4	5	6
2. I am in tune with the world.	1	2	3	4	5	6
3. Even among my friends, there is no sense of brother/sisterhood.	1	2	3	4	5	6
4. I fit in well in new situations.	1	2	3	4	5	6
5. I feel close to people.	1	2	3	4	5	6
6. I feel disconnected from the world around me.	1	2	3	4	5	6
7. Even around people I know, I don't feel that I really belong.	1	2	3	4	5	6
8. I see people as friendly and approachable.	1	2	3	4	5	6
9. I feel like an outsider.	1	2	3	4	5	6
10. I feel understood by the people I know.	1	2	3	4	5	6
11. I feel distant from people.	1	2	3	4	5	6
12. I am able to relate to my peers.	1	2	3	4	5	6
13. I have little sense of togetherness with my peers.	1	2	3	4	5	6
14. I find myself actively involved in people's lives.	1	2	3	4	5	6

	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Mildly Disagree</i>	<i>Mildly Agree</i>	<i>Agree</i>	<i>Strongly Agree</i>
	1	2	3	4	5	6
15. I catch myself losing a sense of connectedness with society.	1	2	3	4	5	6
16. I am able to connect with other people.	1	2	3	4	5	6
17. I see myself as a loner.	1	2	3	4	5	6
18. I don't feel related to most people.	1	2	3	4	5	6
19. My friends feel like family.	1	2	3	4	5	6
20. I don't feel I participate with anyone or any group.	1	2	3	4	5	6

Appendix L

Assessment of Social Identity

Adapted from: Aron, A., Aron E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, 63, 596-612.

Instructions: Please list all (up to 25) groups or identities (e.g., Canadian, psychology student, teenager) you are a member of and choose the picture that best describes the level of overlap you feel you have with each group/identity (1 – no overlap; 7 – complete overlap). If you would rather not mention any specific group membership by name, please list it as an anonymous name (e.g., Group 6) and answer accordingly.

1. _____	1	2	3	4	5	6	7
2. _____	1	2	3	4	5	6	7
3. _____	1	2	3	4	5	6	7
4. _____	1	2	3	4	5	6	7
5. _____	1	2	3	4	5	6	7
6. _____	1	2	3	4	5	6	7
7. _____	1	2	3	4	5	6	7
8. _____	1	2	3	4	5	6	7
9. _____	1	2	3	4	5	6	7
10. _____	1	2	3	4	5	6	7

11.	_____	1	2	3	4	5	6	7
12.	_____	1	2	3	4	5	6	7
13.	_____	1	2	3	4	5	6	7
14.	_____	1	2	3	4	5	6	7
15.	_____	1	2	3	4	5	6	7
16.	_____	1	2	3	4	5	6	7
17.	_____	1	2	3	4	5	6	7
18.	_____	1	2	3	4	5	6	7
19.	_____	1	2	3	4	5	6	7
20.	_____	1	2	3	4	5	6	7
21.	_____	1	2	3	4	5	6	7
22.	_____	1	2	3	4	5	6	7
23.	_____	1	2	3	4	5	6	7
24.	_____	1	2	3	4	5	6	7
25.	_____	1	2	3	4	5	6	7

Appendix M

Ryff's Well-Being Scales

AUTONOMY

	<i>Strongly Disagree</i>	<i>Moderately Disagree</i>	<i>Slightly Disagree</i>	<i>Slightly Agree</i>	<i>Moderately Agree</i>	<i>Strongly Agree</i>
	1	2	3	4	5	6
1. Sometimes I change the way I act or think to be more like those around me.	1	2	3	4	5	6
2. I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people.	1	2	3	4	5	6
3. My decisions are not usually influenced by what everyone else is doing.	1	2	3	4	5	6
4. I tend to worry about what other people think of me.	1	2	3	4	5	6
5. Being happy with myself is more important to me than having others approve of me.	1	2	3	4	5	6
6. I tend to be influenced by people with strong opinions.	1	2	3	4	5	6
7. People rarely talk me into doing things I don't want to do.	1	2	3	4	5	6
8. It is more important to me to "fit in" with others than to stand alone on my principles.	1	2	3	4	5	6
9. I have confidence in my opinions, even if they are contrary to the general consensus.	1	2	3	4	5	6
10. It's difficult for me to voice my own opinions on controversial matters.	1	2	3	4	5	6
11. I often change my mind about decisions if my friends or family disagree.	1	2	3	4	5	6
12. I am not the kind of person who gives in to social pressures to think or act in certain ways.	1	2	3	4	5	6
13. I am concerned about how other people evaluate the choices I have made in my life.	1	2	3	4	5	6
14. I judge myself by what I think is important, not by the values of what others think is important.	1	2	3	4	5	6

ENVIRONMENTAL MASTERY

	<i>Strongly Disagree</i>	<i>Moderately Disagree</i>	<i>Slightly Disagree</i>	<i>Slightly Agree</i>	<i>Moderately Agree</i>	<i>Strongly Agree</i>
	1	2	3	4	5	6
1. In general, I feel I am in charge of the situation in which I live.	1	2	3	4	5	6
2. The demands of everyday life often get me down.	1	2	3	4	5	6
3. I do not fit very well with the people and the community around me.	1	2	3	4	5	6
4. I am quite good at managing the many responsibilities of my daily life.	1	2	3	4	5	6
5. I often feel overwhelmed by my responsibilities.	1	2	3	4	5	6
6. If I were unhappy with my living situation, I would take effective steps to change it.	1	2	3	4	5	6
7. I generally do a good job of taking care of my personal finances and affairs.	1	2	3	4	5	6
8. I find it stressful that I can't keep up with all of the things I have to do each day.	1	2	3	4	5	6
9. I am good at juggling my time so that I can fit everything in that needs to get done.	1	2	3	4	5	6
10. My daily life is busy, but I derive a sense of satisfaction from keeping up with everything.	1	2	3	4	5	6
11. I get frustrated when trying to plan my daily activities because I never accomplish the things I set out to do.	1	2	3	4	5	6
12. My efforts to find the kind of activities and relationships that I need have been quite unsuccessful.	1	2	3	4	5	6
13. I have difficulty arranging my life in a way that is satisfying to me.	1	2	3	4	5	6
14. I have been able to build a home and a lifestyle that is much to my liking.	1	2	3	4	5	6

PERSONAL GROWTH

<i>Strongly Disagree</i>	<i>Moderately Disagree</i>	<i>Slightly Disagree</i>	<i>Slightly Agree</i>	<i>Moderately Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5	6

1. I am not interested in activities that will expand my horizons.	1	2	3	4	5	6
2. In general, I feel that I continue to learn more about myself as time goes by.	1	2	3	4	5	6
3. I am the kind of person who likes to give new things a try.	1	2	3	4	5	6
4. I don't want to try new ways of doing things – my life is fine the way it is.	1	2	3	4	5	6
5. I think it is important to have new experiences that challenge how you think about yourself and the world.	1	2	3	4	5	6
6. When I think about it, I haven't really improved much as a person over the years.	1	2	3	4	5	6
7. In my view, people of every age are able to continue growing and developing.	1	2	3	4	5	6
8. With time, I have gained a lot of insight about life that has made me a stronger, more capable person.	1	2	3	4	5	6
9. I have a sense that I have developed a lot as a person over time.	1	2	3	4	5	6
10. I do not enjoy being in new situations that require me to change my old familiar way of doing things.	1	2	3	4	5	6
11. For me, life has been a continuous process of learning, changing, and growth.	1	2	3	4	5	6
12. I enjoy seeing how my views have changed and matured over the years.	1	2	3	4	5	6
13. I gave up trying to make big improvements or changes in my life a long time ago.	1	2	3	4	5	6
14. There is truth to the saying you can't teach an old dog new tricks.	1	2	3	4	5	6

POSITIVE RELATIONS WITH OTHERS

	<i>Strongly Disagree</i>	<i>Moderately Disagree</i>	<i>Slightly Disagree</i>	<i>Slightly Agree</i>	<i>Moderately Agree</i>	<i>Strongly Agree</i>
	1	2	3	4	5	6
1. Most people see me as loving and affectionate.	1	2	3	4	5	6
2. Maintaining close relationships has been difficult and frustrating for me.	1	2	3	4	5	6
3. I often feel lonely because I have few close friends with whom to share my concerns.	1	2	3	4	5	6
4. I enjoy personal and mutual conversations with family members or friends.	1	2	3	4	5	6
5. It is important to me to be a good listener when close friends talk to me about their problems.	1	2	3	4	5	6
6. I don't have many people who want to listen when I need to talk.	1	2	3	4	5	6
7. I feel like I get a lot out of my friendships.	1	2	3	4	5	6
8. It seems to me that most other people have more friends than I do.	1	2	3	4	5	6
9. People would describe me as a giving person, willing to share my time with others.	1	2	3	4	5	6
10. I have not experienced many warm and trusting relationships with others.	1	2	3	4	5	6
11. I often feel like I'm on the outside looking in when it comes to friendships.	1	2	3	4	5	6
12. I know that I can trust my friends, and they know they can trust me.	1	2	3	4	5	6
13. I find it difficult to really open up when I talk with others.	1	2	3	4	5	6
14. My friends and I sympathize with each other's problems.	1	2	3	4	5	6

<u>PURPOSE IN LIFE</u>						
<i>Strongly Disagree</i>	<i>Moderately Disagree</i>	<i>Slightly Disagree</i>	<i>Slightly Agree</i>	<i>Moderately Agree</i>	<i>Strongly Agree</i>	
1	2	3	4	5	6	
1. I feel good when I think of what I've done in the past and what I hope to do in the future.	1	2	3	4	5	6
2. I live life one day at a time and don't really think about the future.	1	2	3	4	5	6
3. I tend to focus on the present, because the future nearly always brings me problems.	1	2	3	4	5	6
4. I have a sense of direction and purpose in life.	1	2	3	4	5	6
5. My daily activities often seem trivial and unimportant to me.	1	2	3	4	5	6
6. I don't have a good sense of what it is I'm trying to accomplish in life.	1	2	3	4	5	6
7. I used to set goals for myself, but that now seems like a waste of time.	1	2	3	4	5	6
8. I enjoy making plans for the future and working to make them a reality.	1	2	3	4	5	6
9. I am an active person in carrying out the plans I set for myself.	1	2	3	4	5	6
10. Some people wander aimlessly through life, but I am not one of them.	1	2	3	4	5	6
11. I sometimes feel as if I've done all there is to do in life.	1	2	3	4	5	6
12. My aims in life have been more a source of satisfaction than frustration to me.	1	2	3	4	5	6
13. I find it satisfying to think about what I have accomplished in life.	1	2	3	4	5	6
14. In the final analysis, I'm not so sure that my life adds up to much.	1	2	3	4	5	6

SELF-ACCEPTANCE

<i>Strongly Disagree</i>	<i>Moderately Disagree</i>	<i>Slightly Disagree</i>	<i>Slightly Agree</i>	<i>Moderately Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5	6

1. When I look at the story of my life, I am pleased with how things have turned out.	1	2	3	4	5	6
2. In general, I feel confident and positive about myself.	1	2	3	4	5	6
3. I feel like many of the people I know have gotten more out of life than I have.	1	2	3	4	5	6
4. Given the opportunity, there are many things about myself I would change.	1	2	3	4	5	6
5. I like most aspects of my personality.	1	2	3	4	5	6
6. I made some mistakes in the past, but I feel that all in all everything has worked out for the best.	1	2	3	4	5	6
7. In many ways, I feel disappointed about my achievements in life.	1	2	3	4	5	6
8. For the most part, I am proud of who I am and the life I lead.	1	2	3	4	5	6
9. I envy many people for the lives they lead.	1	2	3	4	5	6
10. My attitude about myself is probably not as positive as most people feel about themselves.	1	2	3	4	5	6
11. Many days I wake up feeling discouraged about how I have lived my life.	1	2	3	4	5	6
12. The past had its ups and downs, but in general, I wouldn't want to change it.	1	2	3	4	5	6
13. When I compare myself to friends and acquaintances, it makes me feel good about who I am.	1	2	3	4	5	6
14. Everyone has their weaknesses, but I seem to have more than my share.	1	2	3	4	5	6

Appendix N
UCLA L-Scale (Version 3)

	<i>Never</i>	<i>Rarely</i>	<i>Sometimes</i>	<i>Always</i>
	1	2	3	4
1. How often do you feel that you are “in tune” with the people around you?	1	2	3	4
2. How often do you feel that you lack companionship?	1	2	3	4
3. How often do you feel that there is no one you can turn to?	1	2	3	4
4. How often do you feel alone?	1	2	3	4
5. How often do you feel part of a group of friends?	1	2	3	4
6. How often do you feel that you have a lot in common with the people around you?	1	2	3	4
7. How often do you feel that you are no longer close to anyone?	1	2	3	4
8. How often do you feel that your interests and ideas are not shared by those around you?	1	2	3	4
9. How often do you feel outgoing and friendly?	1	2	3	4
10. How often do you feel close to people?	1	2	3	4
11. How often do you feel left out?	1	2	3	4
12. How often do you feel that your relationships with others are not meaningful?	1	2	3	4
13. How often do you feel that no one really knows you well?	1	2	3	4
14. How often do you feel isolated from others?	1	2	3	4
15. How often do you feel you can find companionship when you want it?	1	2	3	4
16. How often do you feel that there are people who really understand you?	1	2	3	4
17. How often do you feel shy?	1	2	3	4
18. How often do you feel that people are around you but not with you?	1	2	3	4
19. How often do you feel that there are people you can talk to?	1	2	3	4
20. How often do you feel that there are people you can turn to?	1	2	3	4
21. If you feel lonely, how long have you been feeling this way?				
_____ I’m not lonely;				
OR please specify: for the past _____ days; OR _____ months; OR _____ years				

Appendix O

Social Provisions Scale – General Version

Instructions: In answering the following questions, think about your current relationships with friends, family members, co-workers, community members, and so on. Please indicate to what extent each statement describes your current relationship with other people. Use the following scale to indicate your opinion.

<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1	2	3	4

So, for example, if you feel a statement is very true of your current relationships, you would respond with a 4 (strongly agree). If you feel a statement clearly does not describe your relationships, you would respond with a 1 (strongly disagree).

1. There are people I can depend on to help me if I really need it.	1	2	3	4
2. I feel that I do not have close personal relationships with other people.	1	2	3	4
3. There is no one I can turn to for guidance in times of stress.	1	2	3	4
4. There are people who depend on me for help.	1	2	3	4
5. There are people who enjoy the same social activities I do.	1	2	3	4
6. Other people do not view me as competent.	1	2	3	4
7. I feel personally responsible for the well-being of another person.	1	2	3	4
8. I feel part of a group of people who share my attitudes and beliefs.	1	2	3	4
9. I do not think other people respect my skills and abilities.	1	2	3	4
10. If something went wrong, no one would come to my assistance.	1	2	3	4
11. I have close relationships that provide me with a sense of emotional security and well-being.	1	2	3	4
12. There is someone I could talk to about important decisions in my life.	1	2	3	4
13. I have relationships where my competence and skill are recognized.	1	2	3	4
14. There is no one who shares my interests and concerns.	1	2	3	4
15. There is no one who really relies on me for their well-being.	1	2	3	4
16. There is a trustworthy person I could turn to for advice if I were having problems.	1	2	3	4
17. I feel a strong emotional bond with at least one other person.	1	2	3	4
18. There is no one I can depend on for aid if I really need it.	1	2	3	4
19. There is no one I feel comfortable talking about problems with.	1	2	3	4
20. There are people who admire my talents and abilities	1	2	3	4
21. I lack a feeling of intimacy with another person.	1	2	3	4
22. There is no one who likes to do the things I do.	1	2	3	4
23. There are people who I can count on in an emergency.	1	2	3	4
24. No one needs me to care for them.	1	2	3	4

Appendix P

Survey of Coping Profiles Endorsed (50-item SCOPE)

The purpose of this questionnaire is to find out how many people deal with more general problems or stresses in their lives. The following are activities that you may have done. After each activity, please indicate the extent to which you would use this as a way of dealing with problems or stresses of recent weeks.

<i>Ordinarily, in recent weeks have you:</i>	<i>Never</i>	<i>Seldom</i>	<i>Sometimes</i>	<i>Often</i>	<i>Almost always</i>
1. accepted that there was nothing you could do to change your situation?	0	1	2	3	4
2. tried to just take whatever came your way?	0	1	2	3	4
3. talked with friends or relatives about your problems?	0	1	2	3	4
4. tried to do things which you typically enjoy?	0	1	2	3	4
5. sought out information that would help you resolve your problems?	0	1	2	3	4
6. blamed others for creating your problems or making them worse?	0	1	2	3	4
7. sought the advice of others to resolve your problems?	0	1	2	3	4
8. blamed yourself for your problems?	0	1	2	3	4
9. exercised?	0	1	2	3	4
10. fantasized or thought about unreal things (eg., the perfect revenge, or winning a million dollars) to feel better?	0	1	2	3	4
11. been very emotional compared to your usual self?	0	1	2	3	4
12. gone over your problems in your mind over and over again?	0	1	2	3	4
13. asked others for help?	0	1	2	3	4
14. thought about your problems a lot?	0	1	2	3	4
15. became involved in recreation or pleasure activities?	0	1	2	3	4
16. worried about your problems a lot?	0	1	2	3	4
17. tried to keep your mind off things that are upsetting you?	0	1	2	3	4
18. tried to distract yourself from your troubles?	0	1	2	3	4
19. avoided thinking about your problems?	0	1	2	3	4
20. made plans to overcome your problems?	0	1	2	3	4
21. told jokes about your situation?	0	1	2	3	4
22. thought a lot about who is responsible for your problems (besides yourself)?	0	1	2	3	4
23. shared humorous stories etc. to cheer yourself and others up?	0	1	2	3	4
24. told yourself that other people have dealt with problems such as yours?	0	1	2	3	4
25. thought a lot about how you have brought your problems on yourself?	0	1	2	3	4

Ordinarily, in recent weeks have you:

	<i>Never</i>	<i>Seldom</i>	<i>Sometimes</i>	<i>Often</i>	<i>Almost always</i>
26. decided to wait and see how things turn out?	0	1	2	3	4
27. wished the situation would go away or be over with?	0	1	2	3	4
28. decided that your current problems are a result of your own past actions?	0	1	2	3	4
29. gone shopping?	0	1	2	3	4
30. asserted yourself and taken positive action on problems that are getting you down?	0	1	2	3	4
31. sought reassurance and moral support from others?	0	1	2	3	4
32. resigned yourself to your problems?	0	1	2	3	4
33. thought about how your problems have been caused by other people?	0	1	2	3	4
34. daydreamed about how things may turn out?	0	1	2	3	4
35. been very emotional in how you react, even to little things?	0	1	2	3	4
36. decided that you can grow and learn through your problems?	0	1	2	3	4
37. told yourself that other people have problems like your own?	0	1	2	3	4
38. wished I was a stronger person or better at dealing with problems?	0	1	2	3	4
39. looked for how you can learn something out of your bad situation?	0	1	2	3	4
40. asked for God's guidance?	0	1	2	3	4
41. kept your feelings bottled up inside?	0	1	2	3	4
42. found yourself crying more than usual?	0	1	2	3	4
43. tried to act as if you were not upset?	0	1	2	3	4
44. prayed for help?	0	1	2	3	4
45. gone out?	0	1	2	3	4
46. held in your feelings?	0	1	2	3	4
47. tried to act as if you weren't feeling bad?	0	1	2	3	4
48. taken steps to overcome your problems?	0	1	2	3	4
49. made humorous comments or wise cracks?	0	1	2	3	4
50. told others that you were depressed or emotionally upset?	0	1	2	3	4

Appendix Q Resilience Scale

The purpose of this questionnaire is determine how well people push through or persevere when facing a negative situation and assessing their means to do so. Rate the degree to which you agree or disagree with each statement using the following scale (1= strongly disagree and 6= strongly agree). There is no right or wrong answer.

<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Mildly Disagree</i>	<i>Mildly Agree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5	6

1.) I have the confidence to persevere.	1	2	3	4	5	6
2.) I have the means to accomplish anything I set my mind to.	1	2	3	4	5	6
3.) I know I can bounce back whenever I am faced with a setback.	1	2	3	4	5	6
4.) I have a good support system.	1	2	3	4	5	6
5.) I give up when I feel overwhelmed.	1	2	3	4	5	6
6.) I shut out the world when I am upset.	1	2	3	4	5	6
7.) I can block out negativity well.	1	2	3	4	5	6
8.) I don't sweat the small stuff.	1	2	3	4	5	6
9.) I ask for help when needed since some problems are too large to tackle alone.	1	2	3	4	5	6
10.) I tell myself tomorrow is a new day.	1	2	3	4	5	6
11.) I easily get consumed with anger and frustration.	1	2	3	4	5	6
12.) I can adapt well to new situations and conditions.	1	2	3	4	5	6
13.) I problem solve ways to persevere.	1	2	3	4	5	6
14.) I can handle things on my own.	1	2	3	4	5	6

15.) I can thrive under pressure.	1	2	3	4	5	6
16.) I can prioritize tasks at hand.	1	2	3	4	5	6
17.) I self-sabotage when stressed. (i.e restriction of food, ruminating)	1	2	3	4	5	6
18.) I engage in positive activities (meditation, exercise, etc.) to relieve stress.	1	2	3	4	5	6
19.) I feel I have a sense of control in my daily life.	1	2	3	4	5	6
20.) I have good impulse control.	1	2	3	4	5	6
21.) I set realistic goals to work toward to give a sense of accomplishment.	1	2	3	4	5	6
22.) I see experiences as opportunities to grow and build from.	1	2	3	4	5	6
23.) I don't see how I can move past negative situations.	1	2	3	4	5	6
24.) I'm usually optimistic. I see difficulties as temporary and expect to overcome them.	1	2	3	4	5	6
25.) I cry, panic and lose control of my emotions when facing a difficult situation.	1	2	3	4	5	6
26.) I can tolerate ambiguous or uncertain situations.	1	2	3	4	5	6
27.) I'm able to recover emotionally from losses and ambiguous situations.	1	2	3	4	5	6

Appendix R

Perceived Stress Scale

The questions in this scale ask you about your feeling and thoughts during the last month. In each case you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

In the last month...	Never		Sometimes		Very Often
1. How often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. How often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. How often have you felt nervous and "stressed"?	0	1	2	3	4
4. How often have you dealt successfully with irritating life hassles?	0	1	2	3	4
5. How often have you felt that you were effectively coping with important changes that were occurring in your life?	0	1	2	3	4
6. How often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
7. How often have you felt that things were going your way?	0	1	2	3	4
8. How often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
9. How often have you been able to control irritations in your life?	0	1	2	3	4
10. How often have you felt that you were on top of things?	0	1	2	3	4
11. How often have you been angered because of things that happened that were outside of your control?	0	1	2	3	4
12. How often have you found yourself thinking about things that you have to accomplish?	0	1	2	3	4
13. How often have you been able to control the way you spend your time?	0	1	2	3	4
14. How often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Appendix S

Early Trauma Inventory Self Report-Short Form (ETISR-SF)

J. Douglas Bremner, Emory University School of Medicine, Atlanta GA

Part 1. General Traumas. After the age of 18

1. Were you ever exposed to a life-threatening natural disaster?..... YES NO
2. Were you involved in a serious accident? YES NO
3. Did you ever suffer a serious personal injury or illness?YES NO
4. Did you ever experience the death or serious illness of a parent or a primary caretaker?
..... YES NO
5. Did you experience the divorce or separation of your parents? YES NO
6. Did you experience the death or serious injury of a sibling? YES NO
7. Did you ever experience the death or serious injury of a friend? YES NO
8. Did you ever witness violence towards others, including family members? YES NO
9. Did anyone in your family ever suffer from mental or psychiatric illness or have a “breakdown”?
..... YES NO
10. Did your parents or primary caretaker have a problem with alcoholism or drug or drug abuse?
..... YES NO
11. Did you ever see someone murdered?YES NO

Part 2. Physical Punishment. Before the age of 18

1. Were you ever slapped in the face with an open hand? YES NO
2. Were you ever burned with hot water, a cigarette or something else? YES NO
3. Were you ever punched or kicked? YES NO
4. Were you ever hit with an object that was thrown at you? YES NO
5. Were you ever pushed or shoved? YES NO

Part 3. Emotional Abuse. Before the age of 18

1. Were you often put down or ridiculed? YES NO
2. Were you often ignored or made to feel that you didn't count? YES NO
3. Were you often told you were no good? YES NO
4. Most of the time were you treated in a cold, uncaring way or made to feel like you were not loved?
..... YES NO
5. Did your parents or caretakers often fail to understand you or your needs?..... YES NO

Part 4. Sexual Events. Before the age of 18

1. Were you ever touched in an intimate or private part of your body (e.g breast, thighs, genitals) in a way that surprised you or made you feel uncomfortable? YES NO
2. Did you ever experience someone rubbing their genitals against you?..... YES NO
3. Were you ever forced or coerced to touch another person in an intimate or private part of their body?
..... YES NO

4. Did anyone ever have genital sex with you against your will? YES NO

5. Were you ever forced or coerced to perform oral sex on someone against your will?.YES NO

6. Were you ever forced or coerced to kiss someone in a sexual rather than an affectionate way?

..... YES NO

If you responded “YES” for any of the above events, answer the following for the one that has had the greatest impact on your life. In answering consider how you felt at the time of the event.

1. Did you experience emotions of intense fear, horror or helplessness?..... YES NO

2. Did you feel out-of-your-body or as if you were in a dream? YES NO

Appendix T

Rejection Sensitivity Questionnaire

Each of the items below describes things college students sometimes ask of other people. Please imagine that you are in each situation. You will be asked to answer the following questions:

- 1) How concerned or anxious would you be about how the other person would respond?
- 2) How do you think the other person would be likely to respond?

1. You ask someone in class if you can borrow his/her notes.

How concerned or anxious would you be over whether or not the person would want to lend you his/her notes?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect that the person would willingly give me his/her notes.	Very Unlikely					Very Likely
	1	2	3	4	5	6

2. You ask your boyfriend/girlfriend to move in with you.

How concerned or anxious would you be over whether or not the person would want to move in with you?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect that he/she would want to move in with me.	Very Unlikely					Very Likely
	1	2	3	4	5	6

3. You ask your parents for help in deciding what programs to apply to.

How concerned or anxious would you be over whether or not your parents would want to help you?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect that they would want to help me.	Very Unlikely					Very Likely
	1	2	3	4	5	6

4. You ask someone you don't know well out on a date.

	Very Unconcerned					Very Concerned
	1	2	3	4	5	6

How concerned or anxious would you be over whether or not the person would want to go out with you?	Very Unlikely					Very Likely
	1	2	3	4	5	6

I would expect that the person would want to go out with me.

5. Your boyfriend/girlfriend has plans to go out with friends tonight, but you really want to spend the evening with him/her, and you tell him/her so.

How concerned or anxious would you be over whether or not your boyfriend/girlfriend would decide to stay in?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect that the person would willingly choose to stay in.	Very Unlikely					Very Likely
	1	2	3	4	5	6

6. You ask your parents for extra money to cover living expenses.

How concerned or anxious would you be over whether or not your parents would help you out?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect that my parents would not mind helping me out	Very Unlikely					Very Likely
	1	2	3	4	5	6

7. After class, you tell your professor that you have been having some trouble with a section of the course and ask if he/she can give you some extra help.

How concerned or anxious would you be over whether or not your professor would want to help you out?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect that my professor would want to help me out	Very Unlikely					Very Likely
	1	2	3	4	5	6

8. You approach a close friend to talk after doing or saying something that seriously upset him/her.

How concerned or anxious would you be over whether or not your friend would want to talk with you?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect that he/she would want to talk with me to try to work things out.	Very Unlikely					Very Likely
	1	2	3	4	5	6

9. You ask someone in one of your classes to coffee.

How concerned or anxious would you be over whether or not the person would want to go?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect that the person would want to go with me.	Very Unlikely					Very Likely
	1	2	3	4	5	6

10. After graduation, you can't find a job and ask your parents if you can live at home for a while.

How concerned or anxious would you be over whether or not your parents would want you to come home?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect I would be welcome at home.	Very Unlikely					Very Likely
	1	2	3	4	5	6

11. You ask your friend to go on a vacation with you over Spring Break.

How concerned or anxious would you be over whether or not your friend would want to go with you?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6
I would expect that he/she would want to go with me.	Very Unlikely					Very Likely
	1	2	3	4	5	6

12. You call your boyfriend/girlfriend after a bitter argument and tell him/her you want to see him/her.

How concerned or anxious would you be over whether or not your boyfriend/girlfriend would want to see you?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6

I would expect that he/she would want to see me.	Very Unlikely					Very Likely
	1	2	3	4	5	6

13. You ask a friend if you can borrow something of his/hers.

How concerned or anxious would you be over whether or not your friend would want to loan it to you?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6

I would expect that he/she would willingly loan me it.	Very Unlikely					Very Likely
	1	2	3	4	5	6

14. You ask your parents to come to an occasion important to you.

How concerned or anxious would you be over whether or not your parents would want to come?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6

I would expect that my parents would want to come.	Very Unlikely					Very Likely
	1	2	3	4	5	6

15. You ask a friend to do you a big favor.

How concerned or anxious would you be over whether or not your friend would do this favor?	Very Unconcerned					Very Concerned
	1	2	3	4	5	6

I would expect that he/she would willingly do this favor for me.	Very Unlikely					Very Likely
	1	2	3	4	5	6

16. You ask your boyfriend/girlfriend if he/she really loves you.

Very Unconcerned	Very Concerned
---------------------	-------------------

	1	2	3	4	5	6
How concerned or anxious would you be over whether or not your boyfriend/girlfriend would say yes?	Very Unlikely					Very Likely
I would expect that he/she would answer yes sincerely.	1	2	3	4	5	6

17. You go to a party and notice someone on the other side of the room and then you ask them to dance.

	Very Unconcerned					Very Concerned
How concerned or anxious would you be over whether or not the person would want to dance with you?	1	2	3	4	5	6
I would expect that he/she would want to dance with me.	Very Unlikely					Very Likely
	1	2	3	4	5	6

18. You ask your boyfriend/girlfriend to come home to meet your parents.

	Very Unconcerned					Very Concerned
How concerned or anxious would you be over whether or not your boyfriend/girlfriend would want to meet your parents?	1	2	3	4	5	6
I would expect that he/she would want to meet my parents.	Very Unlikely					Very Likely
	1	2	3	4	5	6

Appendix U

TLEQ

The purpose of this questionnaire is to identify significant life experiences in one's life. The events listed below are far more common than many people realize. Please read each question carefully and circle the answers that best describe your experience.

1. Have you ever experienced a natural disaster (a flood, hurricane, earthquake, etc.)?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror at what happened? yes / no

Were you seriously injured? yes / no

Was someone you cared about or close by seriously injured or killed? yes / no

Did you think you or a loved one was in danger of being killed by the disaster? yes / no

2. Were you involved in a motor vehicle accident for which you received medical attention or that badly injured or killed someone?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

3. Have you been involved in any other kind of accident where you or someone else was badly hurt? (examples: a plane crash, a drowning or near drowning, an electrical or machinery accident, an explosion, home fire, chemical leak, or overexposure to radiation or toxic chemicals)

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

4. Have you lived, worked, or had military service in a war zone? yes / no

If yes, were you ever exposed to warfare or combat? (for example: in the vicinity of a rocket attack or people being fired upon; seeing someone getting wounded or killed)

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

5. Have you experienced the unexpected and sudden death of a close friend or loved one?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

6. Has a loved one (who is living) ever experienced a life threatening or permanently disabling accident, assault, or illness? (examples: spinal cord injury, rape, life threatening virus)

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

7. Have you ever had a life threatening illness?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

8. Have you been robbed or been present during a robbery – where the robber(s) used or displayed a weapon?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

9. Have you ever been hit or beaten up and badly hurt by a stranger or someone you didn't know very well?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

10. Have you seen a stranger (or someone you didn't know very well) attack or beat up another someone and seriously injure or kill them?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

11. Has anyone threatened to kill you or cause you serious physical harm?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Did you experience fear, helplessness, or horror when it happened? yes / no

Was this person a stranger? yes / no friend or acquaintance? yes / no

relative? yes / no intimate partner? yes / no

12. While growing up, were you physically punished in a way that resulted in bruises, burns, cuts, or broken bones?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

Did you experience fear, helplessness, or horror when it happened? yes / no

13. While growing up, did you see or hear family violence? (such as your father hitting your mother; or any family member beating up or inflicting burns, bruises, or cuts on another family member)

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

Did you experience fear, helplessness, or horror when it happened? yes / no

- 14. Have you ever been slapped, punched, kicked, beaten up, or otherwise physically hurt by your spouse (or former spouse), a boyfriend/girlfriend, or some other intimate partner?**
 never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago

Did you experience fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

Has more than one intimate partner physically hurt you? yes / no

If yes, how many have hurt you? _____

- 15. Before your 13th birthday: Did anyone – who was at least 5 years older than you – touch or fondle your body in a sexual way or make you touch or fondle their body in a sexual way?**
 never once twice 3 times 4 times 5 times more than 5 times

If this happened:

Did you experience fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

Was the person a stranger? yes / no friend or acquaintance? yes / no

parent or caregiver? yes / no other relative? yes / no

Was threat or force used? yes / no

Was there oral, anal, or vaginal penetration? yes / no

- 16. Before your 13th birthday: Did anyone close to your age touch sexual parts of your body or make you touch sexual parts of their body –against your will or without your consent?**
 never once twice 3 times 4 times 5 times more than 5 times

If this happened:

Did you experience fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

Was the person a stranger? yes / no friend or acquaintance? yes / no

parent or caregiver? yes / no other relative? yes / no

Was threat or force used? yes / no

Was there oral, anal, or vaginal penetration? yes / no

- 17. After your 13th birthday and before your 18th birthday: Did anyone touch sexual parts of your body or made you touch sexual parts of their body – against your will or without your consent?**
 never once twice 3 times 4 times 5 times more than 5 times

If this happened:

Did you experience fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no
 Was the person a stranger? yes / no friend or acquaintance? yes / no
 parent or caregiver? yes / no other relative? yes / no
 Was threat or force used? yes / no
 Was there oral, anal, or vaginal penetration? yes / no

18. After your 18th birthday: Did anyone touch sexual parts of your body or made you touch sexual parts of their body – against your will or without your consent?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

Did you experience fear, helplessness, or horror when it happened? yes / no
 Were you seriously injured? yes / no
 Was the person a stranger? yes / no friend or acquaintance? yes / no
 parent or caregiver? yes / no other relative? yes / no
 Was threat or force used? yes / no
 Was there oral, anal, or vaginal penetration? yes / no

19. Has anyone stalked you – in other words: followed you or kept track of your activities – causing you to feel intimidated or concerned for your safety?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? ____ In the past year; ____ 2-5 years ago; ____ 6-10 years ago
 ____ 10-15 years ago; ____ when you were less than 5 years old
 Was the person a stranger? yes / no friend or acquaintance? yes / no
 relative? yes / no other relative? yes / no
 Did you experience fear, helplessness, or horror when it happened? yes / no

20. Have you ever had a miscarriage?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? ____ In the past year; ____ 2-5 years ago; ____ 6-10 years ago
 Did you experience fear, helplessness, or horror when it happened? yes / no
 Were you seriously injured? yes / no

21. Have you ever had an abortion?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? ____ In the past year; ____ 2-5 years ago; ____ 6-10 years ago
 Did you experience fear, helplessness, or horror when it happened? yes / no

22. Have you ever had something happened to you that you believe represented an experience of discrimination (e.g., religious, racial, sex)?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

Was the source of the discrimination a stranger? yes / no
 friend or acquaintance? yes / no
someone in your workplace/school? yes / no
an organization/institution yes / no

Did you experience fear, helplessness, or horror when it happened? yes / no

23. Have you experienced (or seen) any other events that were life threatening, caused serious injury, or were highly disturbing and distressing? (examples: lost in the wilderness; a serious animal bite; violent death of a pet; being kidnapped and held hostage; seeing a mutilated body or parts)

never once twice 3 times 4 times 5 times more than 5 times

Please describe: _____

If this happened:

Did you experience fear, helplessness, or horror when it happened? yes / no
Were you seriously injured? yes / no

24. If any of the events (listed above) happened to you, check ONE event that currently causes you the most distress?

_____ 1: Natural disaster	_____ 13: Family violence growing up
_____ 2: Motor Vehicle Accident	_____ 14: Assault by partner
_____ 3: Other kind of accident	_____ 15: Sexual assault before 13 by someone 5 years older
_____ 4: Exposure to Warfare/Combat	_____ 16: Sexual assault before 13 by
someone of the same age
_____ 5: Death of loved one	_____ 17: Sexual assault from 13-18
_____ 6: Illness/accident of loved one	_____ 18: Sexual assault after 18
_____ 7: Personal illness	_____ 19: Experience of being stalked

_____ 8: Robbery with weapon	_____ 20: Miscarriage
_____ 9: Personally hurt by stranger	_____ 21: Abortion
_____ 10: Witnessed attack by stranger	_____ 22: Discrimination experience
_____ 11: Threatened with injury/death	_____ 23: Other distressing event
_____ 12: Physically punished growing up	

How much distress (anxiety, worry, sadness, or grief) does this event cause you?

None	No	Slight	Moderate	Considerable	Extreme
Happened	Distress	Distress	Distress	Distress	Distress

25. While growing up, were you ever psychologically bullied?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

How much distress (anxiety, worry, sadness, or grief) did this event cause you?

None	No	Slight	Moderate	Considerable	Extreme
Happened	Distress	Distress	Distress	Distress	Distress

26. While growing up, were you ever physically bullied?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old

How much distress (anxiety, worry, sadness, or grief) did this event cause you?

None	No	Slight	Moderate	Considerable	Extreme
Happened	Distress	Distress	Distress	Distress	Distress

27. While growing up, was your father or mother emotionally abusive towards one another (such as name calling, degrading and yelling at one another)?

never once twice 3 times 4 times 5 times more than 5 times

If this happened:

**When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old**

How much distress (anxiety, worry, sadness, or grief) did this event cause you?

None	No	Slight	Moderate	Considerable	Extreme
Happened	Distress	Distress	Distress	Distress	Distress

28. While growing up did your parents get divorced?

Yes _____ No _____

If this happened:

**When did it happen? _____ In the past year; _____ 2-5 years ago; _____ 6-10 years ago
 _____ 10-15 years ago; _____ when you were less than 5 years old**

How much distress (anxiety, worry, sadness, or grief) did this event cause you?

None	No	Slight	Moderate	Considerable	Extreme
Happened	Distress	Distress	Distress	Distress	Distress

Appendix V

DNA collection

DNA will be extracted from saliva samples using individually wrapped collection kits, purchased from NORGEN BIOTEK CORPORATION (Thorold, ON, Canada), shown in the picture below.

Simple instructions (including diagrams) are provided within each kit in English and French.