CHILDHOOD MALTREATMENT AND THE ASSOCIATION

WITH LIFE DISSATISFACTION

by

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Abstract

This study examined the association between childhood maltreatment (witnessing violence in the household, and experiences of physical and emotional abuse by an adult prior to the age of 16,) and dissatisfaction with later life. Experiences in childhood have been shown to have influences on the developing child (both on the brain and body), with adverse experiences associated with increased risks for negative life outcomes (such as mental and physical illnesses). Dissatisfaction with life has also been shown to lead to negative health outcomes; therefore, the goal of this research was to determine if childhood maltreatment could predict life satisfaction/dissatisfaction.

As a secondary analysis, this study used data from more than twenty-five thousand individuals aged 15 and over who participated in the Canadian Community Health Survey-Mental Health (2012). The data were analyzed using bivariate and multivariate logistic regressions. Two regression models were developed. Model 1 utilized a cumulative count variable representing '*Number of Types of Childhood Maltreatment Experienced'* as the exposure variable, and model 2 utilized a binary exposure variable representing '*Ever Abused'* as the exposure variable. Life dissatisfaction was measured using the survey item, *"Using a scale of 0 to 10 where 0 means 'Very dissatisfied' and 10 means 'Very satisfied', how do you feel about your life as a whole right now?"*, where scores of 0 to 4 represented dissatisfaction.

Compared to individuals who did not experience maltreatment in childhood, experiencing four types was significantly associated with more than twice the odds of dissatisfaction with life (AOR= 2.356; CI 1.595- 3.481), and experiencing *any* maltreatment in childhood increased ones odds of later life dissatisfaction by 40% (AOR= 1.424; CI 1.119- 1.813). Both models controlled for: total household income, self-perceived physical health, self-perceived mental health, and measures of emotional and social support (*has people to depend on*, and *has close relationships*). The following variables were adjusted for, but determined statistically insignificant: age,

importance of religion, family mental health, and education. The findings from this study suggest childhood maltreatment predicts life satisfaction in later life, prompting further research into preventing and mitigating the effects of child maltreatment.

Co-Authorship

This thesis is the work of Ana Mrazovac, under the supervision of Dr. Heather Stuart at Queen's University in Kingston, Ontario.

The dataset utilized in this study was obtained from Statistics Canada's Canadian Community Health Survey-Mental Health (CCHS-MH) (2012). Extensive examinations of the literature, and discussions with Dr. Stuart lead to the conceptualization of this thesis. The development of the literature review, statistical analyses, interpretations and discussions of results were completed by Ana Mrazovac, with guidance and feedback from Dr. Stuart.

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List of Abbreviations

ACE	Adverse Childhood Experience
AOR	Adjusted Odds Ratio
CCHS-MH	Canadian Community Health Survey- Mental Health
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
CIE	Change in Estimate
HPA-Axis	Hypothalamic Pituitary Adrenal Axis
OR	Odds Ratio
SWLS	Satisfaction with Life Scale
UN	United Nations
VIF	Variance Inflation Factor

Chapter 1

Introduction

1.1 General Overview

Life satisfaction is the subjective, cognitive assessment of one's life, in which individuals evaluate their quality of life, and overall life as a whole based on perceived fulfillment of personal expectations or standards deemed important to the individual[1]. The predictors and criteria that one uses when judging their satisfaction with life varies in different cultures and situations, seen in individuals with low income tending to emphasize financial satisfaction as a predictor of their life satisfaction, while a stable and supportive home life has shown to be a better predictor of life satisfaction among those with high income statuses[2]. Research has also shown that collectivistic cultures tend to rate life satisfaction lower than individualistic cultures (due to their over-reliance on social appraisals), demonstrating how differences in cultural values and beliefs also play a role in predicting life satisfaction[3].

The United Nations (UN) 2019 Report on World Happiness presented data on average life satisfaction ratings across the world, finding large variations in ratings across more than 160 countries. Nordic countries like Finland and Norway reported the highest scores of life satisfaction (7.86 and 7.44 out of a possible 10, respectively), while the lowest scores were reported by Afghanistan (2.69/10), and South Sudan (2.82/10). Canadians rated their average life satisfaction as 7.18, indicating that they are among the most satisfied people in the world[4]. Differences in health and wealth of nations are shown to correspond with subsequent average life satisfaction ratings, indicating that both are important factors in the determination of life satisfaction. Studies have demonstrated that individuals who are more satisfied with life tend to be healthier, tend to have more income, be more educated, have more positive social relationships, and tend to be younger[5-11]. In addition, life satisfaction has been shown to be

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strongly associated with longevity, as dissatisfaction with life is a significant predictor of mortality[9].

Research in developmental neurobiology has shown that experiences in childhood have an impact on shaping a child's entire life. Early life experiences lay the foundations of a child's brain architecture, impacting development across several major domains (physical, emotional, cognitive, social), and in turn strongly influencing the abilities of a child to learn, their health and their behaviours throughout their lives. Children thrive when they are raised in environments conducive to positive childhood experiences, (such as stable homes with caretakers that provide love, attention, protection and support for the child), with studies showing the relationship between positive childhood experiences and adult health is dose responsive[12]. That is, the more positive events a child experiences, the better their adult health. The opposite is also true; the more adverse events a child experiences, the worse their adult health[13-16].

Adverse childhood experiences (ACEs) are stressful and traumatic events endured by the young child, which includes various forms of maltreatment (physical, emotional, sexual), neglect, parental abandonment, living in poverty, parents who are incarcerated, have mental health problems and/or who are substance abusers, as well as exposure to crime[14]. Studies have shown that with prolonged exposure to these negative events in childhood, healthy brain development is disrupted and children acquire a higher risk for learning problems, physical and mental ill health as adults, as well as become more likely to engage in risk-taking behaviours (such as smoking, drug abuse)[8].

Looking at the data obtained from the UN's Report on World Happiness, the countries with higher life satisfaction are also countries with low rates of child abuse. Finland (the country with the highest average life satisfaction) reports approximately 17% of its children (ages 0-15) experiencing some form of maltreatment in 2017[17], while in Afghanistan (the country with the lowest average life satisfaction) 91% of its children were reported experiencing some form of

maltreatment[18]. Canada's rate of child maltreatment is reported at approximately 33%[19], providing a basis for the theory that child maltreatment is associated with adult life satisfaction.

To date, few studies have assessed the direct association between childhood maltreatment and life satisfaction, with currently no studies having assessed this relationship using Canadian data. This study is a novel contribution to the existing body of literature on life satisfaction, that can provide governments and public health organizations with additional information regarding the importance of childhood experiences for the development of healthy, and satisfied adults.

1.2 Objective of Study

The main objective of this study is to determine if there is an association between experiences of maltreatment in childhood and adult life satisfaction. Two models, which test two distinct hypotheses, will be used to assess this relationship.

Hypothesis 1: Experiencing more types of maltreatment in childhood will be associated with a greater odds of life dissatisfaction in a dose-response manner.

Hypothesis 2: Experiencing *any* type of maltreatment in childhood will be associated with a greater odds of life dissatisfaction compared to those who did not experience any childhood maltreatment.

1.3 Overview of Study Design

This thesis project uses data from Statistics Canada's 2012 Canadian Community Health Survey-Mental Health (CCHS-MH). The study uses a cross-sectional cohort design, as participants of the CCHS-MH were surveyed at one moment in time in 2012, and then retrospectively assessed for their exposures to maltreatment prior to the age of 15.

1.4 Thesis Organization

        This thesis follows the *Traditional Thesis Format* of the *General Forms of Theses* outline provided by the Queen's University School of Graduate Studies[20]. Chapter 2 of this thesis consists of a literature review of the background information pertaining to life satisfaction and childhood maltreatment, as well as the relationship between the two, the prevalence of life satisfaction and childhood maltreatment in Canada, risk and protective factors of each, as well as potential confounders and effect modifiers. Chapters 3 and 4 consist of the methods used in this thesis, and results obtained from the data analyses. Chapter 5 is a general discussion of the findings from this study, which includes a summary of the findings, a comparison of the findings with the existing literature, strengths and limitations, as well as implications for future research and public health.

Chapter 2

Literature Review

2.1 Childhood Maltreatment

Early childhood is considered the most important developmental phase throughout the lifecourse, with critical development occurring in the physical, social/emotional, and cognitive domains during this time[21]. Research conducted in the neurobiological, behavioural, and social sciences fields have helped determine the variables and conditions that influence whether children get off to a promising or a worrisome start in life. These advancements in knowledge have revealed the importance of: (I) early life experiences, and the highly intertwined and interactive influences of genetics and environment on the development of the brain and evolution of behaviour; (II) the central role of relationships in early life as a source of either support and adaptation, or risk and dysfunction; and (III) the timing of early experiences is often important, whereby the developing child is vulnerable to risks and open to protective influences throughout these formative years and into adulthood[22].

Children are most dependent on their caregivers during their formative years, relying on them for regulation of their physiology and behaviour through the fulfillment of basic functions such as carrying, feeding, soothing, and nurturing. Almost 90% of brain development occurs by the age of three, with rapid brain growth and wiring occurring at estimated rates of 700-1000 synapse connections per second during this period[23]. This period is also associated with the development of basic sensation and perception systems (responsible for language, social behaviour and emotions), setting the foundation for further brain development and growth[22,23]. Research suggests that development is a hierarchical process of wiring the brain, in which higher-level processes are built upon the foundations of lower level processes. For example, the infant brain is tuned to be sensitive to language sounds, but not so broadly tuned as to be sensitive to all

possible sounds. With experience, their brains become accustomed most to their native language, and subsequent language development is then built upon this initial sensitivity[24].

Experience shapes the brain, particularly during this vital inflection point in the lifecourse trajectory, where repeated experiences (both positive and negative) will activate and strengthen corresponding neural connections and pathways, and a lack of certain experiences will lead to connections being weakened and eventually pruned[25]. Even though the brain remains 'plastic' throughout the lifecourse, allowing individuals to adapt to rapidly changing environments through the strengthening, weakening, pruning, and adding of synaptic connections and neurogenesis, brain plasticity is at its peak during these early childhood years and is therefore at its most sensitive to stimuli and experiences[26].

Experiences in these early years have an effect on the child's developmental trajectory and lifecourse, strongly influencing well-being, areas of emotional, social, regulatory, and moral capacities, obesity/stunting, mental health, heart disease, competence in literacy and numeracy, criminality, and economic participation throughout life[27]. Safe, stable environments that promote loving, secure relationships with caregivers who accept, appreciate, protect, encourage, and guide children are positive childhood experiences that increase the likelihood of successful child development. On the contrary, children who experience adverse events (such as various forms of maltreatment, like abuse and neglect) are at risk for observable negative changes in brain anatomy and gene expression (such as reduced growth in the hippocampus and left hemisphere), ultimately increasing their risk's for the development of mental health conditions like depression and anxiety disorders, in addition to learning and memory impairment[23].

The Bucharest Early Intervention Project (BEIP) is an ongoing longitudinal study initiated in the year 2000 which examined the effects of early institutionalization on brain and behaviour development for 136 children who were abandoned at or near the time of birth, while also studying the impact of foster care as an intervention[24]. Baseline assessments of the sample were conducted, and half the sample was then randomly assigned to high quality foster care

(which was designed specifically for this study), while the rest remained in institutional care. The children were seen for follow-up assessments at 30, 42, and 54 months, 8 years, and 12 years, and development was compared between the foster-care group, the institutionalized group, and a group of never institutionalized children (community controls). The authors hypothesized that the children raised in institutional settings would lack certain experiences that stimulate healthy brain growth (such as attention and unconditional love from a caregiver), resulting in negative impacts on brain development (such as the under-specification and miswiring of brain circuits), and ultimately, the development of individuals with both mental and physical health problems.

Indeed, the authors' hypothesized correctly; the institutionalized children displayed patterns of physical and cognitive growth that were stunted and delayed, with very different patterns of brain activity compared to the group of controls. The authors also found that the timing of early experiences is very important for the prevention and mitigation of negative early childhood experiences: children placed in foster care *before* the age of two displayed patterns of brain activity that were very similar to that of the control group, compared to children placed in foster care *after* the age of two. Through the assessment at 12 years of age, these effects were also observed in other domains, such as cognitive (i.e., IQ), language, and socio-emotional behaviours (i.e., attachment), and increased incidences of psychological disorders and impairment were also observed. The findings from this Project support the idea that the lack of positive experiences in childhood has detrimental effects on brain development that follows into adolescence, and that after two years of age, these effects tend to be worse due to the fact that brain processes become more entrenched by this point and are therefore harder to rewire.

The formation and refinement of neural networks continues into adolescence and early adulthood, with research showing that the brain undergoes a "rewiring" process that is not complete until approximately 25 years of age[28]. The brain stem, cerebellum, and the four lobes of the cerebral cortex are all areas of the brain actively maturing during adolescence. The frontal cortex, responsible for higher-order cognitive processing and executive functioning needed for

goal-directed behaviour (such as cognitive analysis, working memory, attention, and abstract thought) is a part of the brain in particular that continues developing into adulthood[29]. Studies have found that individuals who experience adverse events prior to the age of 18 have structural changes in areas of the frontal regions that are associated with complex cognitive functioning like emotional regulation and impulse control (such as frontal lobe, orbitofrontal cortex, and anterior cingulate cortex)[30]. Impulsivity has two main characteristics: (I) rapid, unplanned reactions, and (II) reduced concern for the consequences of actions (in other words, *acting before thinking*)[31]. Impulsive people are more likely to act erratically, and feel like their lives are unstable, and impulsivity has been shown to be associated with mental health conditions such as depression, suicidality and substance abuse[31].

In addition to impulsivity and a lack of emotional regulation, individuals who experience maltreatment in childhood are more likely to develop low-self esteem and shame/guilt towards themselves, as well as social problems such as difficulty with relating to and empathizing with others (i.e., social isolation)[31].

Similar to early childhood, adolescent brain development is a period of "use it or lose it", where brain connections that are stimulated and used repeatedly are strengthened, while unused connections are pruned away in response to the demands of the environment. Adolescents who "exercise" their brain by learning to order their thoughts, understand abstract concepts, and control their impulses are laying the neural foundations that will serve them for the remainder of their lives. The plasticity of the adolescent brain means it is also vulnerable to external inputs (such as psychosocial stressors, environmental exposures, drug and alcohol use, and protective factors). Negative experiences during this period act as chronic stress to the adolescent system, priming the brain for novelty seeking and drug use by altering brain function, disengaging coping mechanisms and negatively impacting the ability to execute rational decisions[25]. However, the adolescent brain is also vulnerable to protective factors, such as positive attributes of their environment (such as availability of healthy food, and safe home), and people close to them (such

Experiences of maltreatment during childhood and adolescence can have an impact across an entire lifetime, and even intergenerational impacts. Child maltreatment encompasses all types of abuse, neglect and negligence, as well as witnessing abuse within the household. The four main types of abuse (listed in decreasing order of frequency): Neglect, Physical Abuse, Sexual Abuse, and Emotional/Psychological Abuse[32]. A commonly cited fifth type of child maltreatment is exposure to family violence[33].

2.2 Definitions of Abuse

According to Babakhanlou and Beattie (2019), neglect is the most prevalent form of child abuse[32]. It is described as the chronic inattention and persistent failure of the caregiver to provide for the child's basic needs in life, including: physical, emotional, educational, nutritional, and medical needs. Experiencing neglect as a child can lead to delays in development, in addition to physical and psychological harm. Physical abuse is one of the most common forms of child maltreatment, and occurs when a person in a position of trust or authority purposefully injures or threatens to injure a child. Sexual abuse occurs when any sexual activity is performed on a child that the child cannot understand or give their consent towards. Sexual abuse can be manifested through 'contact' or 'non-contact' abuse, such as: fondling, any form of penetration, oral-genital contact, exhibitionism, voyeurism and exposure to pornography. Approximately 20% of child maltreatment cases are because of sexual abuse, with 70-90% of cases being perpetrated by someone known to the child. Emotional/psychological abuse is characterized by chronic attacks on a child's self-esteem by a person who holds a position of trust or authority, which negatively affects the child's emotional, developmental, and psychological wellbeing. Examples of

emotional abuse include: degrading, corrupting, ignoring, isolating, rejecting, and exploiting. The final type of abuse is exposure to family violence, which is characterized by the exposure of a child to any violent and threatening behaviour occurring between intimate partners or family members[33]. Intimate partner violence is more than just physical violence (such as punching, kicking, hitting), as it encompasses emotional abuse as well (i.e., intimidation, humiliation, controlling actions).

These forms of abuse can occur to anybody, at any age, but when it occurs prior to the age of 18, by an individual older than 18 years of age, this characterizes child abuse (also known as child maltreatment)[19]. Childhood maltreatment can be linked to later physical, psychological, and behavioural consequences, in addition to costs to society as a whole. These consequences may be independent of each other, but also may be interrelated. For example, experiences of maltreatment in childhood may stunt physical development of the brain, which can lead to psychological problems as the child grows, thereby increasing the potential for later engaging in high-risk behaviours such as substance use. Children who experience maltreatment are often affected by other adverse experiences as well, (such as parental substance use, domestic violence, poverty) thereby making it even more difficult to separate the unique effects of maltreatment[35].

2.3 Prevalence of Childhood Maltreatment

Statistics Canada[19] used data from the 2014 General Social Survey on Victimization to determine that 33% of Canadians aged 15 and older experienced some form of maltreatment during childhood. Of the 33% reporting maltreatment during childhood, physical abuse was the most common form of maltreatment and was experienced by 26%; 8% reported experiencing sexual abuse and 5% reported experiencing both physical and sexual abuse during childhood. Data from the Uniform Crime Reporting Survey and the Homicide Survey show that youth under the age of 18 accounted for 16% of victims of violent crimes in Canada in 2015. Of this group, 30% of the youth were victims of family violence (i.e., violent acts committed by parents,

siblings, extended family members, and spouses). Childhood maltreatment was more common among males (32%) than females (27%). Males aged 15+ reported experiencing childhood physical abuse more often than females (31% vs. 22%, respectively), while females were three times more likely than males to report childhood sexual abuse (12% vs. 4%, respectively). More than half of all victims (66%) reported they were abused between 1 and 6 times, 20% reported between 7 and 21 times, and 15% reported they were abused more than 21 times. Approximately 10% of Canadians reported that as children, they had witnessed violence by their parent/guardian against another adult, and 70% of these individuals also reported that they themselves were victims of childhood abuse. Additionally, 40% of Indigenous children were found to be victims of childhood abuse, compared to 29% of non-Indigenous children. ==However, this statistic does not take into account the impact of colonialism and residential schooling on Indigenous families, nor measures of social supports available in their communities, therefore it is important to note that the prevalence of child abuse among Indigenous peoples is not related to their Indigenous ethnicity.==

The CDC-Kaiser Permanente Adverse Childhood Experiences Study[14] is one of the largest studies examining the association between negative experiences in childhood and the relationship with health and well-being in later life. Conducted from 1995 to 1997 and using a questionnaire, seven categories of adverse childhood experiences (ACEs) were studied: psychological, physical, or sexual abuse; violence against mother; or living with household members who were substance abusers, mentally ill or suicidal, or ever imprisoned. Researchers determined a statistically significant relationship between single categories of exposure, meaning that for any individual reporting having experienced any single one of the seven categories, the probability of experiencing any additional category ranged from 65%-93%.

2.4 Effects and Consequences of Child Maltreatment

Experiencing events of maltreatment in childhood has been extensively researched and shown to have damaging, and permanent effects on physical health, mental health, and well-being throughout the lifecourse[13-15]. A recent systematic review synthesized evidence from studies that examined the effect of multiple adverse experiences during childhood on adult health and lifestyle behaviors[15]. Pooled ORs indicated increased odds for all health outcomes for those who had at least four adverse events occur during childhood compared to those with none. Associations were weak/modest for physical inactivity, obesity and diabetes; moderate associations were found for smoking, heavy alcohol use, poor self-rated health, cancer, heart disease and respiratory disease; strong for sexual risk taking, mental ill health and problematic alcohol use; and strongest for problematic drug use and interpersonal and self-directed violence. This study provides insight into the negative transgenerational impacts that could occur as a result of experiencing adverse events in childhood. The outcomes most strongly associated with multiple adverse childhood experiences (ACEs) represent ACE risks for the next generation (i.e., violence, mental illness, and substance use).

The literature also shows that maltreatment experienced in childhood (specifically physical abuse, sexual abuse, exposure to intimate partner violence) is associated with a number of mental disorders (depression, bipolar disorder, general anxiety disorder, alcohol abuse/dependence, drug abuse/dependence, suicidal ideation and attempts) in a dose-response manner, with increasing number of abuse types experienced in childhood associated with greater odds of these mental disorders. These findings remain even after adjusting for sociodemographic covariates, with odds ratios ranging from 1.4 to 7.9[16].

Previous research has also assessed the association between childhood abuse and physical health outcomes, and one report conducted by Statistics Canada using the 2012 CCHS-Mental Health Survey[13] showed that all types of abuse were associated with an increased likelihood of having a physical condition (odds ranging from 1.4 for being slapped on the face, head or ears or

hit/spanked with something hard to 2.0 for sexual abuse). This study found that experiencing any type of abuse in childhood was associated with increased odds of arthritis, back problems, high blood pressure, migraine headaches, chronic bronchitis/emphysema/COPD, cancer, stroke, bowel disease, and chronic fatigue syndrome. In addition, a dose-response relationship was observed, with increasing number of abuse types experienced in childhood associated with greater odds of most conditions.

When looking into the relationship between the breadth of exposure to maltreatment or household adverse experiences and ten leading risk factors for disease, a statistically significant graded relationship was found. As the number of adverse experiences in childhood increased, the presence and number of these risk factors increased as well[14]. The risk factors included in the analysis were: smoking, severe obesity, physical inactivity, depressed mood, suicide attempts, alcoholism, any drug abuse, parenteral drug abuse, 50+ sexual partners, and a history of having a sexually transmitted disease. Among individuals with no childhood exposures, 56% had none of the ten risk factors for disease, compared to 14% of individuals with ≥4 categories of childhood exposure who had none of the risk factors. Risk factors tend to cluster in socially patterned ways, (for example, children living in adverse childhood social circumstances are more likely to be of low birth weight, and be exposed to a poor diet, childhood infections and passive smoking[27]), therefore these findings emphasize the importance of studying groups of risk factors and their effects on disease, as opposed to individual effects. The relationship between adverse experiences in childhood and the leading causes of death in adulthood was studied as well. A graded relationship to the breadth of childhood exposures was found with ischemic heart disease, cancer, chronic lung disease, skeletal fractures, liver disease and poor self-rated health. These findings suggest a strong and cumulative impact on adult health status as a consequence of experiencing adverse events in childhood, and these findings remain significant even when replicated and conducted in low-, middle- and high-income countries[14].

An additional mental health problem that can arise in one's life after experiencing maltreatment as a child is living with toxic stress. Being able to tolerate and manage stressors in life is an important part of a healthy development. When a stressor arises and we feel threatened, the body and brain prepare to combat this experience by releasing adrenaline, stress hormones (such as cortisol), and increasing the heart rate and blood pressure. After the stressor is removed (or if a child receives attention and support from an adult), these physiological effects are buffered, and the biochemical reactions that occur as a result of stressful events return to baseline - which encourages the development of a healthy stress response system[35]. The literature shows that in supportive and resource-rich environments, stress-response systems aid in shaping brain development in ways that are conducive to executive function and high levels of self-control[36].

However, if the stress response is prolonged, and buffering, protective relationships with the caregiver are unavailable for the child, the body endures unrelieved activation of its stress management system, and this is referred to as *toxic stress*[35]. Examples would include environments of neglect, abuse, severe maternal depression, extreme poverty, household violence, and food scarcity. Experiencing toxic stress is dangerous, especially for children, as prolonged activation of the stress response overloads their developing systems, and overtime this results in a stress-response system set permanently on high-alert. The literature shows that prolonged activation of stress hormones in childhood can weaken and reduce neural connections in specific parts of the developing brain (such as the areas responsible for learning, and reasoning), promoting highly reactive behavior and poor executive function ability[36]. In addition, experiencing prolonged cortisol release as a child has been shown to lead to immune dysregulation, which results in chronic inflammation of the body and thus puts the child at an increased risk for infections, and stress-related diseases (such as, depressive disorders, behavioural dysregulation, post-traumatic stress disorder, and psychosis). Long-term consequences, which may not manifest until adulthood, include a damaged, weakened system and

weakened brain architecture, which can result in maladaptive coping mechanisms, poor stress management, unhealthy lifestyles, and both mental and physical illnesses[35].

Research has shown that children who experienced abuse consistently score lower on all tests of cognitive ability, especially in relation to reading and mathematics, compared to non-abused children[37]. They are 2.5 times as likely to repeat a grade as their non-abused peers. The high levels of anxiety (and stress) that chronically abused children live with interferes with tasks that require abstract reasoning, including reading and math. Abused children also tend to demonstrate more behavioural problems at school; they are often angry, anxious, distractible, lacking self-control, and are more aggressive towards both peers and teachers. One study summarizes this quite well, *"As a population, neglected and abused children are known to question their own perceptions, fear adults, avoid the unknown and suffer from anxiety and depression which can dull the senses. These reactions to unsafe family life can make learning difficult..."(pg.22)* [37].

Toxic stress can be avoided if the environments that children grow and develop in are nurturing, stable and engaging. The physical presence of the mother has shown to act as a buffer on the hypothalamic-pituitary-adrenal axis (HPA axis), mediating the effects of stress on development. However, chronic stress experienced in the context of poverty can adversely affect the style of caregiving that parents provide, with studies showing when families are faced with stressful psychosocial and physical conditions within the home, parents are at greater risk for becoming less sensitive and warm in their patterns of caregiving. This results in lower levels of maternal sensitivity and attention, increasing the likelihood that children will demonstrate difficulty regulating emotion and behavior[36].

The most serious consequence of any type of maltreatment is death of the child. Manitoba Family Services showed that fatality rates from physical violence range between 4-6%, with an increase in the rate to 10% if the injured child is returned to the violent home[37]. Most child deaths occur in children under the age of six, where the younger the child, the higher the

incidence of death. It has even been suggested that as many as 10% of the deaths attributed to Sudden Infant Death Syndrome actually may be homicides[37].

In addition to the many negative impacts experiences of maltreatment can have on the developing child's health, maltreatment also has negative societal consequences. A study conducted by the Centers for Disease Control and Prevention (CDC)[38,39] developed estimates for the cost of child maltreatment in the United States using 2015 data. Nonfatal incidents of child maltreatment were estimated to account for a lifetime cost of $831,000 per child, compared to fatal incidents that were estimated to account for a lifetime cost of $16.6 million per child victim. Thus annually, the United States is estimated to spend from $428 billion to upwards of $2 trillion on child maltreatment related costs. Included in this study were costs associated with tangible fees (i.e., child welfare, health care, juvenile justice) and intangible fees (i.e., pain, suffering, grief).

Comparably, a Report to the Law Commission of Canada (2003)[37] estimated that as a country, Canada spends minimum ~$16 billion annually on costs associated with child maltreatment. Areas of cost that were assessed and modestly gauged were related to: judicial services, social services, education, health, employment, and personal costs. By 2018, the estimated lower bound of annual costs to Canadian society increased to $23 billion, with no improvements on lessening the burden forecasted[40]. Therefore, in addition to trying to mitigate the negative health effects seen in children who experience abusive relationships during childhood, the economic losses support a strong financial case to invest more in helping parents, guardians and others in contact with children to provide nurturing environments.

2.5 Factors Associated with Childhood Maltreatment

A combination of individual, relational, community, and societal-level factors have been shown to contribute to the risk of child maltreatment. Even though children are not responsible for the maltreatment they may experience, particular factors have been isolated that increase a

child's chance of being maltreated. These risk factors include: children younger than four years of age, and special needs of the child that may increase caregiver burden (i.e., disabilities, mental health issues, and chronic physical illness). The known risk factors fall into three categories: individual, family, and community-level risk factors. The individual-level risk factors include: parental history of child abuse and/or neglect, substance abuse and/or mental health issues in the family, parental characteristics (i.e., young age, low education, poverty, single parenthood, large number of dependent children), and parents' lack of understanding of children's needs, child development and parenting skills. Family-level risk factors include: social isolation, family stress (i.e., separation or divorce, poor coping mechanisms, violence in the household), and parenting stress. Community-level risk factors include: poor social connections, community violence, and concentrated neighborhood disadvantage (i.e., high poverty, high unemployment rates, high density of alcohol outlets)[41].

2.6 Protective Factors for Child Maltreatment

Research has shown that the course of development for a child can be influenced by effective interventions that work to change the balance between risk and protection, thereby shifting the odds in favor of more adaptive outcomes.[22] A variety of protective factors and primary prevention approaches can be promoted and undertaken by communities and individuals to help with reducing and mitigating the consequences of child maltreatment. Protective factors are conditions/attributes of individuals, families, communities, and/or society that promote well-being and reduce the risk for negative outcomes (short-term and long-term consequences included). Protective factors can thus act to buffer the effects of maltreatment experienced in childhood. The literature highlights three distinct levels on which protective factors can be promoted for victims of child maltreatment: the individual level, the relationship level, and the community level[34]. On the individual level, these factors include: having a sense of purpose, self-efficacy, problem-solving skills, self-regulation skills, relational skills, and involvement in

positive activities (i.e., hobbies, sports). On the relationship level, protective factors include having positive peers, parent/caregiver well-being, parental employment, parental education, adequate housing, access to health care and social services, nurturing parenting skills, and concrete support for basic needs. Community level includes a positive school environment, having a stable living situation, and a positive community environment that supports parents. Communities can also ensure that public health and private agencies have the appropriate tools (such as evidence-informed interventions, properly trained staff, assessments) to provide children and their families with timely, appropriate care to prevent child maltreatment and alleviate its effects.

2.7 Life Satisfaction

Life satisfaction is often used interchangeably with happiness, but they are quite distinct concepts. Happiness is an immediate and temporary experience felt in the moment, and alone does not make for a fulfilling or satisfying life. Life satisfaction is a global evaluation; an overall assessment of feelings and attitudes about one's life as a whole that is based on one's subjective judgment of factors considered to be of the most value and meaning in life[5]. The well renowned scholar Ruut Veenhoven, known for his world authority on the scientific study of happiness and subjective enjoyment in life, defined life satisfaction as, *"The degree to which a person positively evaluates the overall quality of his/her life as a whole. In other words, how much the person likes the life he/she leads"(pg.1)*[5]. People compare themselves to an internal standard they have set; people construct their own standard and compare themselves to what they would have liked to have achieved by a certain time. For example, while one person may consider money and power as factors critical to being satisfied with life, another person may consider having close relationships with family and friends the most important factors determining life satisfaction. Life satisfaction is distinct from happiness and positive affect because the latter are emotional, rather than cognitive.

There are two main types of theories regarding life satisfaction: bottom-up versus top-down[5]. Bottom-up theories maintain that people experience satisfaction throughout many domains of life (such as work, relationships, family and friends, health and fitness), and our overall satisfaction with life is a combination of our satisfaction in these domains. Top-down theories maintain that our overall life satisfaction influences/determines our life satisfaction throughout the many different domains. However, regardless of the theory, it is acknowledged by most that it is enough knowing that overall life satisfaction and satisfaction in the multiple domains of life are closely related. Being well satisfied with one's life not only has positive effects on happiness, but one's quality of life, mental and physical health and overall well-being are also then positively affected.

2.8 Prevalence of Life Satisfaction/Dissatisfaction

In 2019, Statistics Canada[6] released data from the 2017 Canadian Community Health Survey assessing the statistics of life satisfaction in the population. They used one particular question from the survey, which asked participants to rate their current life satisfaction on an 11-point scale (0 to 10). They attributed a value of 6+ as "satisfied/very satisfied", and a value of 4 or less as "dissatisfied/very dissatisfied". Individuals with a value of 5 were categorized as "neither satisfied nor dissatisfied". Statistics Canada reported that 51.2% of Canadians aged 12 and older were satisfied with their life, with an additional 41.7% reporting that they were *very* satisfied. This proportion of people who reported being satisfied/very satisfied in 2017 (92.9%) has remained stable since 2015 (93.1%). Among those who reported life dissatisfaction, dissatisfaction was more prevalent for males than for females (2.4%, 1.9%), and males had a slightly higher prevalence of reporting "very dissatisfied" (0.6%) compared to females (0.5%). Previous research has shown that people with good mental and physical health are more likely to be satisfied with life[5; 7-9]; therefore, this study conducted by Statistics Canada was able to confirm this and found that Canadians who reported their overall health was excellent or very good were

most likely to be satisfied/very satisfied with their lives (98.1% vs. 0.6% who reported

dissatisfaction). In contrast, individuals who reported fair/poor health were more likely to be

dissatisfied/very dissatisfied with their life (17.5% vs. 63.6% who reported satisfaction).

2.9 Factors Associated with Life Satisfaction

The health effects of being well satisfied with one's life has also been studied, with much

evidence indicating that dissatisfaction is indicative of early mortality and increased risk for

health disorders[7-9]. Particularly, the association between life satisfaction and mental health has

been studied, with one 35-year longitudinal study showing a significant reciprocal causative

relationship between mental health and life satisfaction ($p<0.05$), even after adjusting for

confounding factors such as genetic and environmental influences[7].

Another study combined data from the CCHS from 2003 to 2012 and assessed the

association between mental health and life satisfaction. The authors found that individuals who

reported poor or fair self-reported mental health had a particularly low life satisfaction; with

greater odds associated with one's subjective mental health evaluation than with the actual mood

or anxiety disorder status[10]. This suggests that one's subjective evaluation of their mental health

includes the presence of any mood or anxiety disorder (as well as any other parameters outside of

the mood and anxiety status that have an impact on one's subjective mental health status). This

study also found that higher household income was associated with higher life satisfaction, but to

a lesser extent than with increased self-reported mental health. Therefore, self-reported mental

health and household income will be included as potential confounders in my analysis.

In 2008, researchers analyzed data from the 2005 Behavioral Risk Factor Surveillance

System[8] (a random-digit telephone survey of the U.S. population aged 18+) to determine if there

was an association between life satisfaction level and health-related quality of life, chronic illness

and adverse health behaviors. Life satisfaction was assessed by inquiring, "*In general, how

satisfied are you with your life?*" The responses were divided into three groups: *very satisfied,*

satisfied, and *dissatisfied/very dissatisfied*. After adjusting for sociodemographic factors, individuals who reported that they were dissatisfied/very dissatisfied with their lives were found to be significantly more likely to have physical and mental distress, activity limitations, insufficient sleep and an increased prevalence of fair/poor general health compared to those who were very satisfied with their lives. Additionally, researchers found that as life satisfaction decreased, the prevalence of adverse health behaviors increased (smoking, drinking heavily), as did the prevalence of chronic illness (this includes: obesity, asthma, arthritis, diabetes and heart disease). This study corroborates previous findings in the literature[7-10] suggesting that there is an association between ratings of life satisfaction and the health status of the individual (i.e., individuals with good mental health and physical health are more likely to be satisfied with life), as well as suggests an association between an increased risk for engaging in risk-taking behaviours (smoking, drinking) as the level of life satisfaction decreases.

A study conducted in the United Kingdom[9] in 2009 identified socio-psychological predictors of mortality over a 20-year follow-up period among elderly individuals (aged 65+). The authors assessed three distinct areas in the UK differentiated by socioeconomic status of the region, and administered surveys inquiring about: self-rated health, activities of daily living, psychological morbidity, social networks and support, service use, social activities, loneliness, socio-demographic characteristics, and life satisfaction. Life satisfaction was assessed using Neugarten's Life Satisfaction Scale, with higher scores indicating greater well-being. Life satisfaction was a statistically significant predictor of mortality among the sample. The hazard ratio was significantly decreased for each unit increase in the Neugarten Life Satisfaction Scale Score (HR: 0.985; CI 0.970-0.999; P=0.040). The authors also conducted gender and age-specific analyses and determined that the hazard ratios for females and for those aged 85+ were significantly reduced with each unit increase in life satisfaction [(HR: 0.979; CI 0.062-0.996; P=0.015); (HR: 0.980; CI 0.902-0.997; P=0.037), respectively].

More recently, a study conducted by researchers at Chapman University[42] followed participants longitudinally for nine years to determine if intra-individual variability in life satisfaction was associated with risk of mortality. As in the current analysis, life satisfaction was assessed by the single-item measure, "*All things considered, how satisfied are you with your life?"* and responses ranged from 0-10, with larger numbers indicating more life satisfaction. Mean levels of life satisfaction (and standard deviations) across the nine-year study period were determined for each participant. After adjusting for age, gender, education and health conditions, each standard deviation increase in mean level of life satisfaction was significantly associated with 18% reduced risk of mortality. Additionally, greater variability in life satisfaction across the nine years was associated with an increased risk of mortality as well, suggesting that high levels of variability in life satisfaction (potentially indicative of instability) are detrimental to longevity.

The lifecourse theory (also known as lifecourse perspective) is a framework through which one's health can be viewed and explained. It focuses on the importance of time and context to explain human development, retrospectively examining an individual's life experiences through time to understand current patterns of health and disease while noting that life experiences (both past and present) are largely influenced by social, economic and cultural contexts[43]. This theory helps with the understanding of why variability in life satisfaction throughout the lifecourse can be detrimental to longevity. Higher life satisfaction is associated with health, therefore as life satisfaction changes through different stages of life and critical development, there will be an effect on one's mental and physical well-being that may add additional risk, or act interactively with biological and social factors to attenuate or exacerbate risks to health in later life.

2.10 Measurement Approaches of Life Satisfaction

Subjective well-being (the scientific term for happiness and life satisfaction) did not become a topic of interest in research until 1973, when it became common for news sources to

report on the "state of the nation" in terms of happiness, satisfaction with life and other indicators of subjective well-being[44]. In 1984, researchers conducted a study assessing and comparing various measures of subjective well-being and happiness by the following four criteria: 1.*Criterion validity* (the degree to which the scales predicted daily moods over time as well as peer reports of happiness and satisfaction); 2.*Convergent validity* (the degree to which the scales correlated with each other); 3.*Content validity* (the degree to which the scales reflected various component of well-being); 4.*Construct Validity* (the degree to which the scales correlated with several personality dimensions as would be theoretically predicted)[44]. The researchers evaluated five measures that were designed as single item scales, and six that were designed as multi-item measures of subjective well-being. Results determined that the 5-item SWLS (Satisfaction With Life Scale) was the superior instrument for measuring life satisfaction, showing high temporal reliability, a high alpha for internal consistency and good convergence with other measures. All five of its items are directed at assessing overall life satisfaction (or closely related concepts like contentedness).

The SLWS is commonly regarded as the 'gold standard' in research for measuring the life satisfaction component of subjective well-being, as it has accumulated validity evidence in hundreds of studies and has resulted in significant scientific advances across a range of disciplines (such as, behavioural economics, clinical psychology and leisure studies)[45]. The SLWS consists of five items inquiring about one's global life satisfaction:
(I) In most ways my life is close to my ideal; (2) The conditions of my life are excellent; (3) I am satisfied with my life; (4) So far I have gotten the important things I want in life; and (5) If I could live my life over, I would change almost nothing[46].

Often, the evaluation of life satisfaction is included in population-based surveys with extremely large sample sizes, so utilizing a multi-item measure to assess life satisfaction is not always ideal and can prove quite time-consuming. In 1965, Hadley Cantril was the first to assess life satisfaction using a single-item measure when he developed the Self-Anchoring Scale

(commonly known as Cantril's ladder)[47]. The respondents are asked to imagine a ladder with steps numbered from zero at the bottom to 10 at the top, with the top representing the best possible life for you and the bottom representing the worst possible life for you. They are then asked, "*On which step of the ladder would you say you personally feel you stand at this time?"*, and respondents will self-anchor themselves based on their subjective evaluation of their life as a whole. The appeal of using single-item life satisfaction measures is in their simplicity, ease of administration, and high response rates. Previous studies have shown that the percentage of participants responding with, 'I don't know' to these questions is less than 1% in most countries, and that it takes only 2 seconds for most people to answer them[39]. However, concerns have been expressed regarding single-item measures, such as these measures are more susceptible to measurement error, having lower reliability and validity than the multi-item measures, or that they are unable to fully capture complex constructs[48]. Therefore, with the increasing utilization of single item measures to assess life satisfaction (i.e., "*All things considered, how satisfied are you with your life?")*, future research should aim to assess the psychometric properties (reliability and validity) of these items, and evaluate how they compare with multi-item measures.

Researchers Cheung and Lucas assessed both the criterion and construct validity of single-item life satisfaction measures by comparing them to the gold standard Satisfaction with Life Scale (SWLS) using three large samples. Criterion validity refers to, "the extent to which scores on a particular measure relate to a gold standard", and construct validity refers to, "the extent to which scores on a particular questionnaire relate to other measures in a manner that is consistent with theoretically derived hypotheses concerning the concepts that are being measured"[49]. The researchers mentioned there is already some evidence indicating single-item life satisfaction measures are valid, as a previous study examined the criterion validity of a single-item life satisfaction measure with the SWLS and showed that the two correlated strongly based on a representative US sample (r=.75)[50].

The single-item life satisfaction measure that was used by Cheung and Lucas read, "*In general, how satisfied are you with your life*?" with a 4-point Likert scale from 1 (*Very Satisfied*) to 4 (*Very Dissatisfied*). The researchers found all inferential statistics were significant at p<0.05 using two-tailed tests, and that across both measures of life satisfaction, patterns of statistical significance of the correlations were exactly the same[11]. Both life satisfaction measures were shown to be positively correlated with income, education, subjective health, domain satisfaction, and happiness, and weakly correlated with education and moderately with income (replicating past research on life satisfaction and demographic characteristics). Thus, the researchers conclude they would get identical results regardless of which measure they used if they were focused on null hypothesis significance testing.

Jovanovic and Lazic (2018) sought to examine the validity of single-item life satisfaction measures against the Satisfaction With Life Scale (SWLS). The single-item measure of life satisfaction they used was, "*Thinking about your own life and personal circumstances, how satisfied are you with your life as a whole?*". The item was measured on an 11-point scale (0=no satisfaction at all to 10=completely satisfied). The authors stated that this particular question has often been used in large studies and has shown good convergent validity[47]. They conducted three studies on a total of six samples of Serbian undergraduate students, adults, and elderly (N=2822). Correlations between the single-item measure of life satisfaction and the SWLS were examined, as well as: convergent and criterion-related validity of the two measures, age and gender differences in life satisfaction as measured with the two measures, and test-retest reliability of the two measures. The authors found that the Satisfaction With Life Scale and the single-item measure were strongly correlated across all six samples for all three studies (mean r=0.70). In the first study, they found students reported higher life satisfaction than adults (using both measures), while no substantial differences were found for gender. In the second study, the researchers added an 'elderly' group to the sample, and found no substantial gender differences in life satisfaction across samples of students and adults, but among the elderly sample men reported higher life

satisfaction than women. Researchers also found students reporting higher life satisfaction scores than adults on both the single-item measure and the SWLS, and higher life satisfaction than the elderly on the single-item measure but not on the SWLS.

2.11 Relationship Between Child Maltreatment and Adult Life Satisfaction

To date, few studies have assessed the relationship between experiences of maltreatment in childhood and life satisfaction in adulthood. In 2016, a study was conducted in England[51] assessing the relationship between adverse childhood experiences and adult mental well-being, incorporating a question regarding life satisfaction. The study used a sample of approximately 4000 participants, and an established questionnaire covering demographics, lifestyle behaviors, health status, mental well-being, life satisfaction and exposure to adverse childhood experiences before the age of 18. Life satisfaction was measured on a scale of 1-10 using the standard question, "*All things considered how satisfied are you with your life?*" with 1 being not at all satisfied and 10 very satisfied. As participants reported suffering more adverse childhood experiences, they were more likely to report low life satisfaction (life satisfaction rating of <6); the adjusted OR for 4+ adverse experiences in childhood and reporting low life satisfaction was 3.89 (CI 2.867-5.286; P=0.001), compared to an adjusted OR of 1.636 (CI 1.256-2.132; P=0.05) when participants reported only 1 adverse childhood experience. Mental well-being was measured using the Short Warwick-Edinburgh Mental Wellbeing Scale, a survey of seven questions of which each was scored individually and an overall mental well-being score ranging from 7 (lowest possible mental well-being) to 35 (highest possible mental well-being). Number of adverse childhood experiences was strongly associated with all markers of low mental well-being. The prevalence of low mental wellbeing tripled from 9.5% among those with no experiences of adverse events in childhood to 30.7% among those with 4+ adverse events in childhood and the prevalence of low life satisfaction more than tripled from 7.9% to 26.6% respectively. Low mental wellbeing scores and life satisfaction were significantly associated with

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age, most prevalent in the 50-59 year age group, suggesting a need for age-specific analyses when assessing exposures of adverse childhood experiences and life satisfaction.

In 2015, a cross-sectional self-report survey[52] was used to gather data from approximately 300 students of the University of Ghana to study if childhood maltreatment was a significant predictor of current psychological functioning (i.e., depression, self-efficacy and life satisfaction). The *Childhood Trauma Questionnaire* was used to measure experiences of physical abuse, emotional abuse, sexual abuse, emotional neglect, and physical neglect, while the *Satisfaction with Life Scale* was used to measure individual subjective satisfaction with life. Maltreatment experienced during childhood accounted for 22% of the variance in life satisfaction, with significant predictors being: physical abuse, emotional abuse, sexual abuse, and emotional neglect. This study also noted that living with both biological parents was a protective factor against maltreatment (specifically physical abuse and physical neglect), and that living with an increasing number of siblings increased risk for childhood abuse. In addition, researchers found that males reported more physical abuse and physical neglect than females, regardless of household size, location of home (urban or rural), and who the participants lived with (both parents or 'other'). These findings suggest possible confounding influences based on gender and composition of the household that should be specifically accounted for when assessing the relationship between childhood maltreatment and life satisfaction.

Another study conducted in Ghana in 2014[53] investigated the relationship between childhood maltreatment (psychological, physical, and sexual abuse, and neglect), religiosity and life satisfaction among adults. One hundred and thirty-three adults with a history of childhood maltreatment were sampled. Females reported more childhood maltreatment than males, and childhood maltreatment significantly predicted life satisfaction (childhood maltreatment contributed 11.9% of the variance in life satisfaction). When the author assessed for individual contributions for the measures of maltreatment (i.e., psychological abuse, physical abuse, sexual abuse, neglect) the individual variables did not significantly predict life satisfaction, suggesting

that a cumulative variable assessing all childhood maltreatment experiences should be used. Further, this study found that Perceived Religiosity (Total score for all religious-based Scales) and Personal Religiosity (having a personal, experiential connotation) significantly moderated the relationship between childhood maltreatment and life satisfaction, but Social Religiosity (adherence to the practices and beliefs of an organized church/religious institution) was not found to influence the relationship. Therefore, assessing one's spirituality/religious values as a potential confounding variable is important for my study.

In 2012, a prospective study was initiated in the United States[54] using the Lehigh Longitudinal study and record linkages with child welfare, to assess the relationship between child maltreatment and indicators of adult psychological well-being. The outcomes assessed in the analysis included: adult self-reports of anger proneness, self-esteem, acceptance, autonomy, purpose in life, self-directedness, constraints, and life satisfaction. Experiences of child maltreatment were significant predictors of self-esteem ($\beta = -0.19$; $P = <0.01$), autonomy ($\beta = -0.23$; $P = <0.001$), and life satisfaction ($\beta = -0.23$; $P = <0.001$).

There are no published Canadian studies examining the association between experiences of maltreatment in childhood and adult life satisfaction, and because of demographic, social, and systematic differences between Canada and the United States, generalizing U.S. results to Canada may be problematic[55-61].

2.12 Potential Confounders and Effect Modifiers

The literature reports on several potential confounding variables and effect modifiers that are known to have relationships with both life satisfaction, and childhood maltreatment. Previous studies have presented models showing that global life satisfaction is achieved through five various life satisfaction domains: friends, school, living environment, family and self. Meta-analyses of the existing literature on life satisfaction show that life satisfaction is correlated with many factors existing within these five domains[62]. These factors include: social support, parent-

attachment in early adolescents and peer attachment, family composition, family relations, self-esteem, happiness, loneliness and depression.

Additionally, existing literature has identified associations between health status and life satisfaction, with poor mental and physical health showing associations with lower ratings of life satisfaction[10, 63]. Previous studies have also shown associations between education and life satisfaction, in addition to associations with income, job satisfaction, religious belief, age, marital status, and gender.[10, 51, 53, 64]. The presence of emotional support, satisfaction with one's relationships (both friends and family) and the number of friends one keeps have also been shown to be among the strongest determinants of life satisfaction[65]. Loneliness is often characterized as a feeling of lacking a social relationship network, and the literature reports that loneliness is a strong predictor of life satisfaction[62]. Therefore, accounting for a variable that represents one's social/emotional support (or the lack thereof), while assessing the relationship between childhood maltreatment and adult life satisfaction is important.

Since the dataset for this project will be obtained from the 2012 CCHS-MH, I will only be able to examine variables as potential confounders/ interaction terms if there is an associated survey item for that variable of interest. For example, gender, marital status and family composition have been quoted in the literature as potential confounding/interaction variables affecting the relationship between childhood maltreatment and life satisfaction. It would thus be wise to account for such variables in the data analysis that is aiming to determine the relationship between childhood maltreatment and adult life satisfaction. However, there are no items on the CCHS-MH that inquire about gender of participant, marital status or family composition, therefore these variables cannot be studied.

The variables that are available on the CCHS and will be tested for their confounding/interaction potential include: Age, family mental health, household income, one's perception of their mental, and physical health, job satisfaction, education, social and emotional supports available, and one's perception of the importance of religion/spirituality. These possible

interaction variables could have differing effects on different people and because each is just

associated with the outcome (life satisfaction), should be tested for interaction effects.

Chapter 3

3.1 Methods

This is a secondary analysis of the 2012 Canadian Community Health Survey- Mental Health (CCHS-MH)[66]. Data for the CCHS is collected from individuals aged 15 and over and covers all provinces and territories. Excluded from the sampling frame are individuals who live on Indigenous Reserves, institutional residents, full-time members of the Canadian Forces, and residents of certain remote regions. The CCHS accounts for approximately 98% of the Canadian population that is aged 15 and over. The CCHS used three sampling frames to select the sample of households: an area frame, a list frame of telephone numbers and a Random Digit Dialing sampling frame. Out of the approximately 30,000 households that agreed to participate in the survey, the overall household response rate was 79.8%. After a selected household was contacted and recruited for participation into the study, an individual aged 15 or older was selected according to various age-based selection probabilities. The overall person-level response rate was 86.3%, therefore yielding a combined (household and person) response rate of 68.9%. Owing to the complex survey design, weighting is recommended. Therefore, the master weights provided by Statistics Canada were utilized to ensure that the analysis accounted for the complex survey design used.

3.2 Exposure Variable

The CCHS-MH had six survey items inquiring specifically about childhood maltreatment, framed in terms of event frequency as follows:

> (I) *"Before age 16, how many times did you see or hear any one of your parents, step-parents or guardians hit each other or another adult in your home?"*
>
> (II) *"Before age 16, how many times did an adult slap you on the face, head or ears or hit or spank you with something hard to hurt you?"*

(III) "Before age 16, how many times did an adult push, grab, shove or throw something

at you to hurt you?"

(IV) "Before age 16, how many times did an adult kick, bite, punch, choke, burn you, or

physically attack you in some way?"

(V) "Before age 16, how many times did an adult force you or attempt to force you into

any unwanted sexual activity, by threatening you, holding you down or hurting you in

some way?"

(VI) "Before age 16, how many times did an adult touch you against your will in any

sexual way? By this, I mean anything from unwanted touching or grabbing, to kissing or

fondling."

Responses are scored on a 5-item scale, ranging from 1 (Never) to 5 (More than 10 times). For

the purpose of this analysis, these six variables were transformed into two separate variables:

(I)   A count variable indicating the number of types of maltreatment experienced in

         childhood, ranging from 0 (never abused) to 6 (indicating the respondent experienced

         each type of maltreatment at least once), and

(II)   A binary variable indicating "*Ever Abused*" (coded as 1), and "*Never Abused*" (coded as

   0)

3.3 Outcome Variable

         The CCHS had one single survey item specifically asking about life satisfaction, as

follows:

         (I) *"Using a scale of 0 to 10 where 0 means "Very dissatisfied" and 10 means "Very*

         satisfied", how do you feel about your life as a whole right now?"

According to Statistics Canada coding conventions, a score of 6 or more out of 10 represents

those that are "satisfied" or "very satisfied" with their life, while a score of 4 or less out of 10

represents those that are "dissatisfied" or "very dissatisfied" with their life. A score of 5 indicates

a response of "neither satisfied nor dissatisfied"[6].

As past research has shown the vast majority of respondents report they are satisfied with life, a histogram of the distribution of life satisfaction (below) was examined to determine if this variable could be considered normally distributed and treated as a continuous variable in the analysis. The distribution was neither bell-shaped nor symmetric. The mean was smaller than the median, and the data were left skewed.
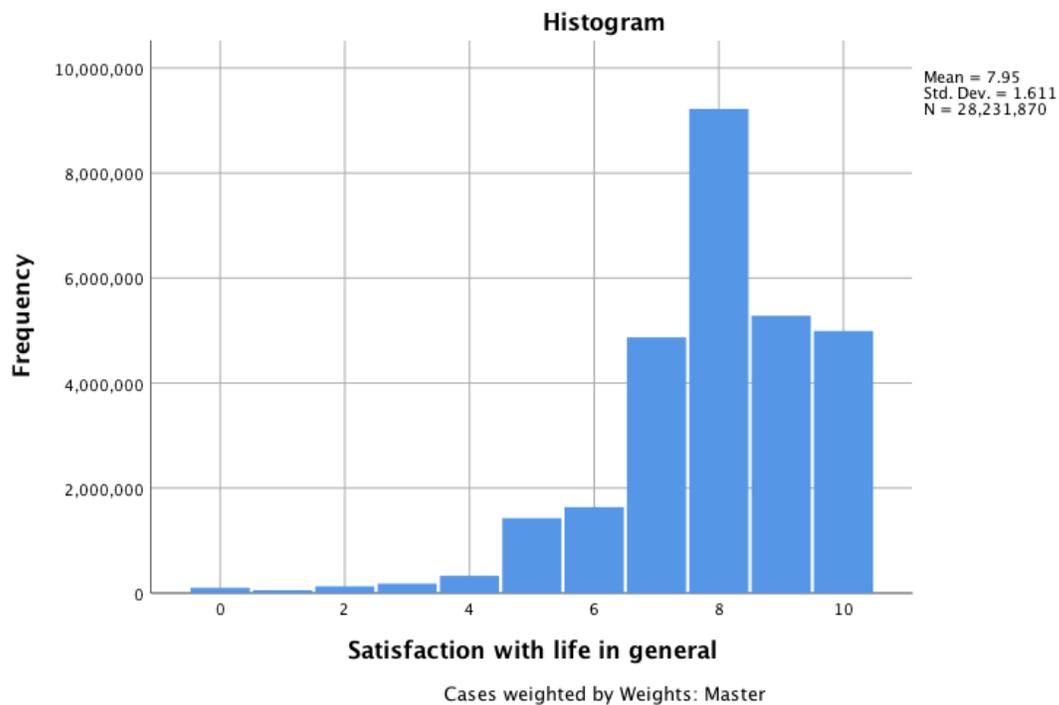
Figure 1: Histogram displaying the distribution of the dependent variable, Life Satisfaction.

The Kolmogorov-Smirnov Test for Normality was also examined to determine if life satisfaction could be treated as a continuous variable. The null hypothesis for the Kolmogorov-Smirnov Test for Normality was that the life satisfaction variable was normally distributed with a p-value <0.05 indicating non-normality. The Kolmogorov-Smirnov test statistic for the life satisfaction variable was 0.203 with a significance of <0.001, indicating a lack of normality for this variable.

The Q-Q plot of life satisfaction plotted the quantiles of the variable's distribution against the quantiles of the normal distribution. For the data to be determined as normally distributed, the data points must be plotted near the diagonal line. As can be seen below in Figure 2, the data points stray from the diagonal line in an obvious non-linear design.

Figure 2: Q-Q plot of the quantiles of Life Satisfaction plotted against the quantiles of the normal distribution

Life satisfaction and life dissatisfaction are often seen as directionally opposite aspects of the same basic phenomenon in affect theory research, as the circumflex model of affect posits two dimensions of affective structure: pleasure/displeasure, and arousal/boredom[67,68]. As satisfaction can be viewed as an interpretation of pleasure, then pleasure (satisfaction), and displeasure (dissatisfaction) can be viewed as polar opposites on the same continuum, and therefore are negatively correlated. Studies have demonstrated that dissatisfaction ratings are similar when using either a unipolar, or a bipolar response scale, and both scales show a reciprocal relationship between satisfaction and dissatisfaction[67].

Therefore, based on these results and using the benchmark scores provided by Statistics Canada, life satisfaction was recoded as a binary variable with scores of 0-4 representing dissatisfaction, and 5-10 representing a lack of dissatisfaction. This variable was coded to predict for dissatisfaction with life because I wanted to look for the presence of a positive relationship (if one existed) between childhood maltreatment and life satisfaction, therefore I assessed for dissatisfaction (as opposed to a negative relationship if I coded for satisfaction).

The hypothesized conceptual model displaying the relationship between the variables cited previously in the literature as potential confounders/effect modifiers in the relationship between childhood maltreatment and life dissatisfaction is presented below. The variables listed with an asterisk (*) are potential confounders/effect modifiers that were unable to be accounted for in my study, as they were not measured for on the Canadian Community Health Survey-Mental Health (2012). Future studies should develop models that adjust for all listed variables.
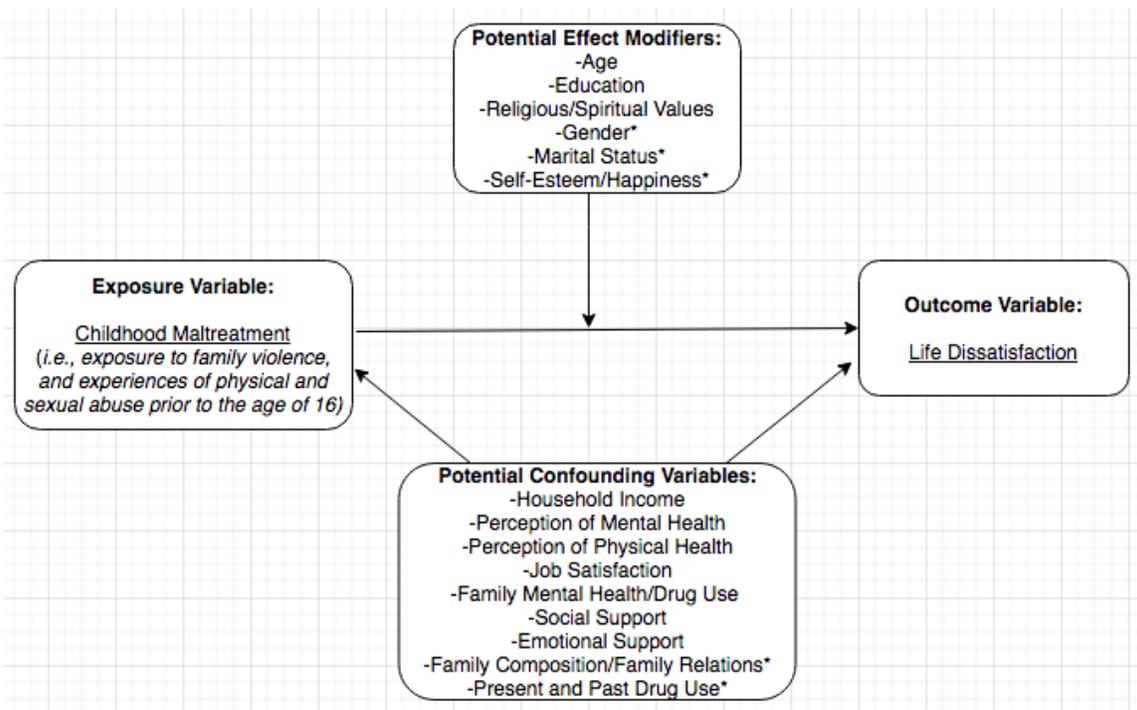

Figure 3: Conceptual model showing the relationship between all variables that have been previously cited as having relationships with childhood maltreatment and adult life dissatisfaction.

3.4 Data Analysis

Multivariate binary logistic regression was used to estimate the odds of being dissatisfied with life, given experiences of maltreatment in childhood as defined above. Using a Poisson regression design was also considered, however ultimately a logistic regression was selected because of its ability to predict binary outcome variables with its most basic form, and it does not make assumptions about the distributions of the independent variables. Poisson regressions use count data and assume the outcome variable has a Poisson distribution with equal mean and variance[59]. This indicates that the Poisson design is not as forgiving a design to adequately model a large number of zero data points, and this is observed with the life satisfaction variable that has a mean of 7.95, and a variance of 2.595. Tolerance and VIF (Variance Inflation Factor) values were also examined to assess multicollinearity. For logistic regression, tolerance values must be greater than 0.1, and VIF values must be less than 10. The largest VIF was 4.8, indicating the data were suitable for logistic regression.

Confounding was assessed using the "change-in-estimate" (CIE) approach, in which variables were considered to be confounding variables in the model based on relative or absolute changes in the unadjusted exposure-outcome effects by a certain percentage[69]. Potential candidate variables were selected *a priori*, and then individually entered into models that contained only the exposure variable (*Total Types of Maltreatment* or *Ever Abused*), and outcome (*Life Dissatisfaction*).

The CIE approach was implemented in two ways: (I) Selection and (II) Deletion. The selection approach entailed entering each candidate variable into the crude model that contained only the exposure and outcome variables, and assessing any changes to the odds ratios. If the change exceeded a certain amount (a 10% change in odds ratio was utilized as this value is commonly cited in the literature), this variable was entered into the model. This process was repeated until all potential covariates had been assessed. The literature cites two slightly different formulas for calculating this percent change. The first method is favoured by biostatisticians, who

consider the crude measure of association as the "starting value"[70]. The formula is as follows:

$$\textit{Magnitude of confounding} = [(OR_{crude} - OR_{adjusted}) / OR_{crude}]$$

The second method is favoured by epidemiologists, who consider the adjusted measure of association to be the starting value because it is less confounded than the crude measure of association[71]. Even though these two methods of calculation differ slightly, they produce similar results and are both appropriate ways of calculating magnitude of confounding. I used both methods to determine the change in estimates, and no contradictory results were obtained.

The deletion approach was used to double-check the selection approach, and confirm the chosen confounding variables. All potential candidate variables were entered into the crude regression model, and after each analysis the variable contributing the least change to the estimate exposure effects (i.e., the variable was associated with a significance value of $p>0.20$) was removed from the model.

Possible effect modification was assessed by using a backwards elimination regression approach; once the variables identified as confounding variables were added to the final regression model, each potential interaction term was added at once, and after each analysis, the variable with the largest p-value was removed. The regression analysis was repeated until all remaining variables in the model had significance levels of $p<0.05$. All interaction terms that were assessed returned with non-significant p-values, therefore all were removed from the final model.

The statistical software used to analyze the data was version 26 of the SPSS Statistics Premium Campus Edition for macOS.

Chapter 4

4.1 Results

Table 1 describes the characteristics of the 25,113 respondents that were sampled in the CCHS-MH 2012 survey. A minority of the sample (2.8%) indicated they were dissatisfied with life in general. Ages of participants ranged from 15 to over 80, and were relatively evenly distributed across age groups; the exceptions were the 65-80+ age groups that had slightly smaller proportions. The education levels of the sample ranged from having achieved less than a secondary school degree, to being a post-secondary graduate, with more than half of the sample (59.0%) indicating they were post-secondary graduates, and a third of the sample having finished secondary school or less than secondary school (33.9%). Total household income ranged from $20,000 to over $80,000, with more than half of the sample (64.9%) having a total household income of over $60,000 per year. More than three quarters of the sample (85.6%) described their physical health as good to excellent, and over 90% (92.2%) described their mental health as good to excellent. Less than half of the sample (38.6%) reported having family members with problems related to emotions, mental health or use of alcohol or drugs. More than 95% of the sample agreed or strongly agreed to feeling like they have people to depend on (97.7%), and having close relationships (96.9%). Approximately two-thirds (62.0%) of the sample reported that having religious and spiritual beliefs in daily life was very important or somewhat important.

4.2 Distribution of Maltreatment

The first question inquiring about childhood maltreatment pertained to the number of times the individual witnessed abuse in the household towards another adult. More than four-fifths of the sample (84.8%) reported 'never' experiencing this type of abuse, while less than 5 percent of the sample (4.4%) reported experiencing it 'more than 10 times'. The next three questions asked about various experiences of physical maltreatment. Approximately two-thirds of

the sample (61.2%) reported 'never' experiencing any instances of being slapped, hit, or spanked by an adult prior to the age of 16, while just over ten percent of the sample (11.0%) reported 'more than 10' experiences. This was the most frequently occurring type of abuse in the sample.

The second physical maltreatment question inquired about experiences of being pushed, grabbed, shoved, or thrown by an adult, and more than three quarters of the sample (79.6%) reported 'never' experiencing this type of abuse. Just over five percent (5.3%) of the sample reported experiencing this type 'more than 10 times'.

The final question pertaining to experiences of physical maltreatment asked about physical attacks (such as being bitten, kicked, punched, or choked), and 90.0% of the sample reported zero experiences. Just under three percent (2.8%) reported 'more than 10' experiences of this type. Of the three variables pertaining to experiences of physical maltreatment in childhood, this variable inquiring about experiences of physical attacks was the least frequently occurring type of abuse among the sample.

The final two maltreatment questions on the survey asked about experiences of sexual abuse occurring prior to the age of sixteen. Just under ninety-five percent of the sample (94.0%) reported 'never' experiencing forced or attempted forced sexual activities by an adult prior to the age of 16, and only 1.3% of the sample reported 'more than 10' experiences of this type. Out of all six of the variables inquiring about experiences of maltreatment in childhood, this variable reporting on experiences of forced or attempted forced sexual activities was the least frequently occurring type of maltreatment among the sample. Similar distributions were observed for the final maltreatment variable that inquired about experiences of sexual touching; just over ninety-percent (90.3%) of the sample 'never' experienced this type of maltreatment, and a modest 1.6% experienced it 'more than 10 times'.

As can be seen in Table 1, approximately half of the sample reported experiencing at least one of the six types of maltreatment in childhood. The distribution of the binary 'ever abused' variable was approximately equal, with 52.4% of the sample experiencing no abuse in

childhood, compared to 47.6% experiencing some form of abuse. For the variable representing the number of types of maltreatment experienced in childhood, more than half the sample (52.4%) reported experiencing 0 types, 40.2% reported experiencing 1-3 types, and 3.0% reported experiencing 5-6 types.

4.3 Coefficients of Variation (CV)

According to Statistics Canada, acceptable values for the coefficients of variation range from 0.0 to 0.165 (0.0% to 16.5%)[72]. Of the variables to be used for this study, none of their respective CV values were greater than 0.165 (16.5%), therefore are considered to be reliable for general use and do not require a warning cautioning users about possible high levels of error. These are presented in Table 1.

Table 1: Descriptive Information of all Variables Pertinent to the Data Analysis (N=25,113); Weighted to represent the Canadian population of N=28,231,870

Variables	Weighted Percent (n Total)	Coefficient of Variation (CV)
Life Dissatisfaction (Derived)		
• 0-4 (Dissatisfied)	2.8% (890)	5.0%
• 5-10 (Not Dissatisfied)	97.2% (24,116)	0.1%
Age Group (Recoded for Analysis)		
• 15-24	15.7% (4013)	2.2%
• 25-34	15.9% (3486)	2.6%
• 35-44	16.9% (3420)	2.7%
• 45-54	18.4% (3626)	2.8%
• 55-64	15.8% (4451)	2.3%
• 65-74	10.4% (3350)	2.7%
• 75-80+	6.9% (2767)	2.8%
Highest Level of Education Attained		
• Less Than Secondary	18.1% (5338)	2.2%
• Secondary School Graduate	15.8% (4022)	2.5%
• Some Post-Secondary	7.1% (1655)	4.1%
• Post-Secondary Graduate	59.0% (13987)	0.9%
Total Household Income		
• No Income or Less than $20,000	4.6% (1736)	4.3%
• $20,000 - $39,999	12.4% (4410)	2.6%
• $40,000 - $59,999	18.2% (5289)	2.3%
• $60,000 - $79,999	17.6% (4176)	2.4%
• $80,000 or more	47.3% (9488)	1.2%
Self-Perceived Physical Health (Recoded for Analysis)		
• Excellent/ Very Good	51.6% (12184)	1.1%
• Good	34.0% (8618)	1.5%
• Fair/ Poor	14.4% (4305)	2.6%
Self-Perceived Mental Health (Recoded for Analysis)		
• Excellent/ Very Good	65.1% (15652)	0.8%
• Good	27.1% (7089)	1.8%
• Fair/ Poor	7.8% (2347)	3.4%
Family Mental Health/Drug Use		
• Yes	38.6% (9863)	1.4%
• No	61.4% (14657)	0.9%
Has People to Depend on (Recoded for Analysis)		
• Agree	97.8% (24487)	0.2%
• Disagree	2.2% (533)	9.4%
Has Close Relationships (Recoded for Analysis)		
• Agree	96.9% (24023)	0.2%
• Disagree	3.1% (921)	5.3%
Importance of Religious/Spiritual Values		
• Very Important	31.9% (8259)	1.6%
• Somewhat Important	30.1% (7529)	1.7%
• Not Very Important	19.3% (4740)	2.3%
• Not At All Important	18.7% (4463)	2.2%
Number of Times Witnessing Abuse in the Household Towards Another Adult Before Age 16		
• Never	84.8% (19321)	0.5%
• 1 or 2 Times	7.1% (1587)	4.1%

• 3 to 5 Times	2.6% (583)	6.5%
• 6 to 10 Times	1.1% (272)	9.5%
• More than 10 Times	4.4% (1012)	6.2%
Number of Times Being Slapped, Hit, Spanked by an Adult Before Age 16		
• Never	61.2% (14023)	1.0%
• 1 or 2 Times	16.2% (3671)	2.8%
• 3 to 5 Times	7.4% (1607)	4.2%
• 6 to 10 Times	4.0% (918)	5.5%
• More than 10 Times	11.0% (2469)	3.5%
Number of Times Being Pushed, Grabbed, Shoved, Thrown by an Adult Before Age 16		
• Never	79.6% (17919)	0.6%
• 1 or 2 Times	9.8% (2279)	3.4%
• 3 to 5 Times	3.7% (840)	5.7%
• 6 to 10 Times	1.7% (437)	7.1%
• More than 10 Times	5.3% (1226)	5.2%
Number of Times Experiencing a Physical Attack (Kicked, Bitten, Punched, Choked) by an Adult Before Age 16		
• Never	90.0% (20324)	0.4%
• 1 or 2 Times	4.8% (1145)	4.8%
• 3 to 5 Times	1.6% (405)	6.9%
• 6 to 10 Times	0.8% (211)	10.3%
• More than 10 Times	2.8% (647)	8.0%
Number of Times Experiencing Forced or Attempted Forced Sexual Activities by an Adult Before Age 16		
• Never	94.0% (21080)	0.3%
• 1 or 2 Times	3.3% (898)	5.2%
• 3 to 5 Times	1.1% (249)	12.6%
• 6 to 10 Times	0.4% (115)	12.7%
• More than 10 Times	1.3% (355)	11.0%
Number of Times Experiencing Sexual Touching by an Adult Before Age 16		
• Never	90.3% (20135)	0.3%
• 1 or 2 Times	5.9% (1538)	3.9%
• 3 to 5 Times	1.5% (375)	9.2%
• 6 to 10 Times	0.7% (184)	12.8%
• More than 10 Times	1.6% (457)	8.9%
Number of Types of Childhood Maltreatment Experienced (Derived)		
• 0	52.4% (11835)	1.1%
• 1	22.1% (4751)	2.4%
• 2	10.9% (2483)	3.2%
• 3	7.2% (1675)	4.0%
• 4	4.4% (1006)	5.8%
• 5	1.3% (387)	8.1%
• 6	1.7% (425)	8.4%
Ever Abused (Derived)		
• No	52.4% (11835)	1.1%
• Yes	47.6% (10726)	1.2%

4.4 Results of Bivariate Analyses

Table 2 contains the results of the bivariate analyses. Odds ratios, and 95% confidence intervals were used to estimate the odds between each of the independent variables and life dissatisfaction.

The reference category for age was set as 15-24 years. There was no clear relationship with age and life dissatisfaction, as some older age groups had lower/higher odds of dissatisfaction than some younger age groups, and vice versa. The two age groups found to have the highest odds of dissatisfaction compared to the reference group were the 55-64 years group (OR= 1.657; CI 1.167- 2.353), and the 45-54 years group (OR=1.521; CI 1.037- 2.229). The lowest odds were seen in the 25-34 years group (OR=0.859; CI 0.564- 1.308), followed by the 65-74 years group (OR=0.925; CI 0.616- 1.389). The only age categories showing statistical significance were the 35-44 years group and the 75-80+ years group.

'*Post-secondary graduate*' was defined as the reference category for Education, with the three remaining categories as: less than secondary, secondary graduate, and some post-secondary. There was no relationship observed between education level attained and life dissatisfaction.

The bivariate analysis with '*Total Household Income*' determined that as household income increased, the odds of being dissatisfied with life decreased. The reference category was set to $80k+. The odds of dissatisfaction increased modestly as the income bracket decreased (from 1.5 to 2.2 when going from the $60k-$79,999 category to the $40k-$59,999 category), but there was a dramatic increase in odds for the '*no income/less than $20k*' group. If an individual reported belonging to the '*no income or less than $20k*' group, the odds of being dissatisfied with life were 5.79 times (OR=5.792; CI 4.310- 8.276) that of the $80k+ group. All findings were statistically significant.

As participants' reported physical health status decreased (i.e., ratings of '*Fair*' or '*Poor*' as opposed to *'Very Good'* and *'Good'*), the odds of dissatisfaction increased. Participants who reported '*Fair/Poor*' as their response to self-perceived physical health were approximately 15

times (0R= 14.510; CI 11.119- 18.934) more likely to be dissatisfied with life compared to the reference group '*Excellent'*, however small cell sizes resulted in large confidence intervals and an imprecise estimate.

Similarly, reporting '*Fair/Poor'* as the response to self-perceived mental health was associated with odds of life dissatisfaction that were approximately 40 times that of the reference group, '*Excellent'* (OR=38.562; CI 29.366- 50.638), but, again, confidence intervals were wide.

People who reported mental health or drug use problems in their family had 60% greater odds of reporting life dissatisfaction than those who did not report any mental health or drug use problems in their family. This finding was statistically significant (OR= 1.613; CI 1.312- 1.983).

Participants who reported '*Disagree'* to feeling like they have people they can depend on in their life were found to be associated with odds of life dissatisfaction that were 8.5 times (OR=8.538; CI 5.917- 12.321) that of the reference group, '*Agree'.*

Similarly, participants reporting '*Disagree'* to feeling like they have close relationships in life were found to be almost 13 times (OR=12.988; CI 9.923- 16.998) more likely to report dissatisfaction with life compared to the reference group, '*Agree'.*

Religion/spirituality in daily life had a protective effect on life dissatisfaction, as a lack of belief in religious importance ('*Not at all Important'*) in daily life was associated with odds of life dissatisfaction that were 1.4 times that of the reference group (which was set to '*Very Important'*). Only the '*Not at all Important'* category was statistically significant.

4.5 Results of Bivariate Analyses with Maltreatment Variables

The odds of being dissatisfied with life was 2.23 times greater for those that experienced some form of maltreatment as children, compared to those that did not (95%CI= 1.790 – 2.782). This finding was statistically significant.

By examining the six individual exposure variables that are assessing the frequency of various maltreatments experienced in childhood, no clear dose-response relationship occurred

with the frequency of times abused. The response '*Never'* was assigned as the reference category for all six variables, and odds of life dissatisfaction ranged from ~1.8 to 4.8 times that of the reference group, depending on the frequency reported.

However, a dose-response relationship was observed for the variable representing total types of maltreatment experienced in childhood. A score of 0 was assigned the reference category and odds ratios ranged from 1.3 to 8.5, with increasing odds associated with increasing types of maltreatment experienced.

Based on the results obtained from the bivariate analyses listed in Table 2, the variables that are possible contenders as confounding variables are: Self-perceived mental health, Self-perceived physical health, Family mental health/drug use, Importance of religious/spiritual values, Has People to Depend on, Has Close Relationships, Total household income, and Education.

Table 2: Bivariate Analyses of Risk Factors and Life Dissatisfaction; Weighted to represent the Canadian population of N=28,231,870

Variables	Crude OR (95% CI)
Age Group (Recoded for Analysis)	
• 15-24	Ref
• 25-34	0.859 (0.564 – 1.308)
• 35-44	1.244 (0.845 – 1.831)
• 45-54	1.521 (1.037 – 2.229)
• 55-64	1.657 (1.167 – 2.353)
• 65-74	0.925 (0.616 – 1.389)
• 75-80+	1.386 (0.920 – 2.089)
Highest Level of Education Attained	
• Post-Secondary Graduate	Ref
• Some Post-Secondary	1.062 (0.729 – 1.547)
• Secondary School Graduate	1.177 (0.890 – 1.557)
• Less Than Secondary	1.192 (0.923 – 1.539)
Total Household Income	
• $80,000 or more	Ref
• $60,000 - $79,999	1.500 (1.053 – 2.136)
• $40,000 - $59,999	2.221 (1.653 – 2.985)
• $20,000 - $39,999	2.931 (2.161 – 3.977)
• No Income or Less than $20,000	5.792 (4.310 – 8.276)
Self-Perceived Physical Health (Recoded for Analysis)	
• Excellent / Very Good	Ref
• Good	2.551 (1.895 – 3.433)
• Fair/ Poor	14.510 (11.119 – 18.934)
Self-Perceived Mental Health (Recoded for Analysis)	
• Excellent / Very Good	Ref
• Good	3.415 (2.554 – 4.567)
• Fair/ Poor	38.562 (29.366 – 50.638)
Family Mental Health/Drug Use	
• No	Ref
• Yes	1.613 (1.312 – 1.983)
Has People to Depend on (Recoded for Analysis)	
• Agree	Ref
• Disagree	8.538 (5.917 – 12.321)
Has Close Relationships (Recoded for Analysis)	
• Agree	Ref
• Disagree	12.988 (9.923 – 16.998)
Importance of Religious/Spiritual Values	
• Very Important	Ref
• Somewhat Important	0.895 (0.680 – 1.177)
• Not Very Important	0.826 (0.615 – 1.111)
• Not At All Important	1.406 (1.067 – 1.853)
Number of Times Witnessing Abuse in the Household Towards Another Adult Before Age 16	
• Never	Ref
• 1 or 2 Times	1.866 (1.337 – 2.604)

• 3 to 5 Times • 6 to 10 Times • More than 10 Times	2.113 (1.241 – 3.597) 2.785 (1.599 – 4.851) 3.883 (2.601 – 5.798)
Number of Times Being Slapped, Hit, Spanked by an Adult Before Age 16 • Never • 1 or 2 Times • 3 to 5 Times • 6 to 10 Times • More than 10 Times	 Ref 1.856 (1.416 – 2.433) 1.961 (1.235 – 3.115) 1.758 (1.156 – 2.672) 2.692 (2.059 – 3.519)
Number of Times Being Pushed, Grabbed, Shoved, Thrown by an Adult Before Age 16 • Never • 1 or 2 Times • 3 to 5 Times • 6 to 10 Times • More than 10 Times	 Ref 2.160 (1.614 – 2.891) 3.758 (2.314 – 6.103) 1.451 (0.865 – 2.433) 3.587 (2.660 – 4.837)
Number of Times Experiencing a Physical Attack (Kicked, Bitten, Punched, Choked) by an Adult Before Age 16 • Never • 1 or 2 Times • 3 to 5 Times • 6 to 10 Times • More than 10 Times	 Ref 3.432 (2.262 – 5.208) 3.292 (1.819 – 5.957) 1.912 (0.798 – 4.582) 4.778 (3.313 – 6.890)
Number of Times Experiencing Forced or Attempted Forced Sexual Activities by an Adult Before Age 16 • Never • 1 or 2 Times • 3 to 5 Times • 6 to 10 Times • More than 10 Times	 Ref 3.595 (2.498 – 5.175) 4.188 (1.493 – 11.747) 2.023 (0.892 – 4.590) 3.658 (2.263 – 5.913)
Number of Times Experiencing Sexual Touching by an Adult Before Age 16 • Never • 1 or 2 Times • 3 to 5 Times • 6 to 10 Times • More than 10 Times	 Ref 2.555 (1.866 – 3.498) 3.796 (1.598 – 9.020) 3.787 (1.910 – 7.507) 4.255 (2.678 – 6.761)
Number of Types of Childhood Maltreatment Experienced (Derived) • 0 • 1 • 2 • 3 • 4 • 5 • 6	 Ref 1.297 (0.973 – 1.730) 1.812 (1.304 – 2.519) 2.641 (1.897 – 3.676) 4.667 (3.289 – 6.622) 4.668 (2.662 – 8.312) 8.527 (4.733 – 15.361)
Ever Abused (Derived) • No • Yes	 Ref 2.231 (1.790 – 2.782)

4.6 Multivariate Logistic Regression Model 1

Regression model 1 utilized '*Number of Types of Childhood Maltreatment Experienced'* as the exposure variable. The following variables produced changes in odds ratio estimates for the exposure variable greater than 10%, and were thus included in the model as confounders: *Total Household Income*, *Self-Perceived Mental Health*, *Self-Perceived Physical Health, Has People to Depend On,* and *Has Close Relationships*. The variables removed from analysis included: *Age*, *Importance of Religion*, *Family Mental Health,* and *Education*.

The Nagelkerke R^2 value for this adjusted model with *Total Household Income*, *Self-Perceived Physical Health*, *Self-Perceived Physical Health, Has People to Depend On,* and *Has Close Relationships* as independent variables included was 0.323, which means the variables in this regression model are able to predict 32.3% of the variation in life dissatisfaction. Several variables (such as '*Age'*, '*Education*, '*Importance of Religious/Spiritual Values'*) were tested as effect modifiers but the results were non-significant, therefore were not included in the model and results are not reported here.

In the multivariable analyses, it was determined that there was a modest increase in odds of life dissatisfaction as the experiences of types of childhood maltreatment experienced. The largest odds ratio was observed amongst those that experienced 4 types of maltreatment in childhood (AOR= 2.356; CI 1.595- 3.481), followed by those that experienced 6 types (AOR= 2.041; CI 0.989- 4.210). There was no indication of a dose-response relationship of increasing odds with increasing types of abuse. Results of the multivariate regression model 1 are in Table 3.

Table 3: Multivariate Regression (N=25,113) with 'Number of Types of Childhood Maltreatment Experienced' as the Exposure Variable, predicting for Life Dissatisfaction (Regression Model 1). Weighted to represent the Canadian population of N=28,231,870

Variables	Adjusted OR (95% CI)
Total Household Income • $80,000 or more • $60,000 - $79,999 • $40,000 - $59,999 • $20,000 - $39,999 • No Income or Less than $20,000	Ref 1.318 (0.892 – 1.948) 1.460 (1.019 – 2.094) 1.315 (0.923 – 1.874) 1.929 (1.326 – 2.807)
Self-Perceived Physical Health • Excellent/Very Good • Good • Fair/ Poor	Ref 1.150 (0.816 – 1.621) 3.407 (2.442 – 4.754)
Self-Perceived Mental Health • Excellent/Very Good • Good • Fair/Poor	Ref 2.563 (1.849 – 3.553) 15.052 (10.678 – 21.218)
Has People to Depend On • Agree • Disagree	Ref 1.571 (0.999 – 2.471)
Has Close Relationships • Agree • Disagree	Ref 3.747 (2.566 – 5.470)
Number of Types of Childhood Maltreatment Experienced (Derived) • 0 • 1 • 2 • 3 • 4 • 5 • 6	Ref 1.144 (0.822 – 1.593) 1.213 (0.846 – 1.739) 1.382 (0.968 – 1.974) 2.356 (1.595 – 3.481) 1.647 (0.882 – 3.075) 2.041 (0.989 – 4.210)

4.7 Multivariate Logistic Regression Model 2

Regression model 2 utilized the binary variable '*Ever Abused*' as the exposure variable. The following variables produced changes in odds ratio estimates for the exposure variable that were larger than 10%, so were considered to be confounders: *Self-perceived Mental Health*, and *Self-Perceived Physical Health*. However, the variables representing '*Has Close Relationships*', '*Has People to Depend On*', and '*Total Household Income*' had changes-in-estimates that were close to the threshold cut-off of 10%, therefore were still included in the regression analysis to test their significance in the full model and identify if they added to explaining the variation in the

model. The variables excluded from analysis included: *Age*, *Family Mental Health*, *Importance of Religion*, and *Education*. The Nagelkerke R^2 value for this model with the aforementioned confounding variables included was 0.319, which means the variables in this regression model were able to explain 31.9% of the variability in life dissatisfaction.

After adjusting for relevant confounding variables, it was determined that experiencing any form of abuse in childhood was associated with 40% greater odds (AOR= 1.424; CI 1.119-1.813) of reporting life dissatisfaction than those who did not experience any abuse in childhood. This finding was statistically significant. Results are in Table 4.

Table 4: Multivariate Regression (N=25,113) with 'Ever Abused' as the Exposure Variable, predicting for Life Dissatisfaction (Regression Model 2); Weighted to represent the Canadian population of N=28,231,870

Variables	Adjusted OR (95% CI)
Total Household Income • $80,000 or more • $60,000 - $79,999 • $40,000 - $59,999 • $20,000 - $39,999 • No Income or Less than $20,000	Ref 1.368 (0.930 – 2.013) 1.481 (1.030 – 2.127) 1.358 (0.961 – 1.920) 1.995 (1.370 – 2.903)
Self-Perceived Physical Health • Excellent/ Very Good • Good • Fair/ Poor	Ref 1.149 (0.816 – 1.618) 3.404 (2.430 – 4.768)
Self-Perceived Mental Health • Excellent/ Very Good • Good • Fair/ Poor	Ref 2.626 (1.898 – 3.634) 15.844 (11.266 – 22.282)
Has People to Depend On • Agree • Disagree	Ref 1.652 (1.051 – 2.596)
Has Close Relationships • Agree • Disagree	Ref 3.747 (2.537 – 5.535)
Ever Abused (Derived) • No • Yes	Ref 1.424 (1.119– 1.813)

In summary, two regression models were used to assess the relationship between childhood maltreatment and life dissatisfaction. The six variables taken from the CCHS-MH that represent different types of childhood maltreatment were transformed into two distinct exposure variables: a count variable with scores ranging from 0-6, assessing '*Number of Types of Childhood Maltreatment* Experienced', and a binary variable assessing '*Ever Abused'*. Each of these variables were used in their own regression models as the sole exposure variable. The variables determined as confounders did not change from Regression model 1 to Regression model 2, indicating the same variables reported statistical significance regardless which exposure variable was utilized.

Regression model 1 found no evidence of a dose-response relationship of increasing odds with increasing types of maltreatment experienced in childhood. The only significant result found was for experiencing 4 types of maltreatment (AOR=2.356; CI 1.595-3.481), which translates to those that experienced 4 of the different types of maltreatment in childhood have 2.4 times the odds of reporting life dissatisfaction compared to those that did not experience any types of maltreatment in childhood. This model was adjusted for the following covariates: *Total Household Income*, *Self-Perceived Physical Health*, *Self-Perceived Mental Health*, *Has People to Depend on*, and *Has Close Relationships*. These results highlight the importance of considering all types of abuse when studying child maltreatment.

Regression model 2 found that experiencing any form of maltreatment in childhood was associated with 40% greater odds of reporting life dissatisfaction than those who did not experience any maltreatment in childhood (AOR=1.424; CI 1.119-1.813). This model was adjusted for the following covariates (which happen to be the same confounders that were statistically significant from Regression model 1): *Total Household Income*, *Self-Perceived Physical Health*, *Self-Perceived Mental Health*, *Has People to Depend on*, and *Has Close Relationships*.

Chapter 5

Discussion

5.1 Summary of Findings

This study examined the relationship between experiences of maltreatment in childhood (exposure to family violence, physical and sexual abuse) and subsequent life satisfaction/dissatisfaction in adulthood using data from the Canadian Community Health Survey-Mental Health (2012). Two models were developed. Model 1 measured exposure to maltreatment using a count variable with scores ranging from 0-6 assessing '*Number of Types of Childhood Maltreatment Experienced'*. Model 2 measured exposure to maltreatment using a binary variable representing '*Ever Abused'* and '*Never Abused'*.

Results for model 1 did not support a dose-response pattern. Experiencing four types of maltreatment was the only statistically significant result (AOR= 2.356; CI 1.595-3.481). This model was adjusted for household income, self-perceived physical and mental health, and measures of emotional and social support (*has people to depend on*, and *has close relationships*). As expected, results for model 2 showed that *any* type of maltreatment in childhood was associated with a greater odds of life dissatisfaction (AOR= 1.424; CI 1.119- 1.813). This model was adjusted for the same variables as in model 1. These results corroborate findings from the literature that show there is a relationship between experiencing maltreatment in childhood and later dissatisfaction with life, as described below. Based on the results obtained for this study, the conceptual model displaying the relationship among the variables investigated in this study was revised. The revised model is presented in the Appendix.

5.2 Comparison of Findings with the Literature

As discussed, the results of this study support findings from previous studies that show how experiences of maltreatment in childhood negatively impact adult life satisfaction. Results

for both models showed that for individuals who were exposed to family violence, and/or experienced physical and/or mental abuse in childhood, their odds of life dissatisfaction increased compared to individuals who did not experience maltreatment in childhood.

A study conducted in England (2016)[51] that was discussed previously found that the adjusted odds of reporting low life satisfaction increased from 1.64 when participants reported experiencing 1 adverse childhood experience, to 3.89 for those reporting 4+ adverse events. The authors used ACE scores ranging from 0-9, but fitted these scores into only four categories: 0 (the reference category), 1, 2-3, and 4+. This study included age, and residential deprivation as confounding variables in the regression analysis, and the results obtained were of statistical significance. These adjusted odds ratios obtained in this English study are more pronounced than the AOR's computed in model 1 of my study, but this could be due to the collapsing of the 9 maltreatment scores into 4 categories which would have increased the number of observations in each category, thus allowing for increased reliability of results and increased ease of comprehension. Both regression models in my study found that age was not significantly related to explaining life dissatisfaction, even though previous studies[9, 42; 47] have cited that age may interact with maltreatment to explain some of the variance in life satisfaction.

The confounding variables that were determined statistically significant in my models were all variables previously cited in the literature for influencing the relationship between child maltreatment and life satisfaction/dissatisfaction. As discussed in the literature review, previous studies[6-11, 14, 63] have shown that higher household income is positively associated with life satisfaction, while low subjective mental health and poor physical health is negatively associated with life satisfaction. In addition, the previously discussed literature[62; 65] shows how having social and emotional support systems are associated with an increase in odds of life satisfaction, and this was also seen in my study as the two variables '*Has people to depend on*' and '*Has close relationships*' were statistically significant variables observed confounding the relationship between childhood maltreatment and life dissatisfaction. Interestingly, importance of

religious/spiritual values did not return statistically significant in either adjusted model, despite previous studies[53, 64] showing that perceived and personal religiosity significantly moderates the relationship between childhood maltreatment and life satisfaction. Unlike previous research,[11, 42, 64] educational attainment of participant and presence of poor family mental health were not significant in either model.

Cumulative risk models are often cited in the literature to measure the extent of maltreatment experienced in childhood. Previous studies have shown that different types of maltreatment rarely occur in isolation and are highly interrelated, with one study in particular using a community sample and a clinical sample to compare the prevalence rates of maltreatment co-occurrence[73]. The authors determined that the community sample had 13.5% - 43.4% of its participants experiencing multiple forms of maltreatment, while the clinical sample had even higher co-occurrence rates of maltreatment at 33% - 95%.

A commonly cited study that was the first of its kind to assess the cumulative impact of maltreatment experienced in childhood (as opposed to individual impacts of each type of maltreatment) is the CDC-Kaiser Permanente Adverse Childhood Experiences Study[14] (discussed earlier). The researchers measured for seven different adverse experiences in childhood and developed a variable representing '*The number of categories of exposure*' by summing each of the seven individual categories that were assessed for in the study. This methodology is commonly seen in literature studying childhood maltreatment, with the main findings from these studies consisting of [14; 53, 74]: (I) adverse childhood experiences are strongly interrelated and occur together, rather than occurring independently; (II) the presence of one adverse experience in childhood increases the prevalence of having additional adverse experiences; and (III) there is a graded relationship observed between experiencing more types of maltreatment in childhood and health and social outcomes. Therefore, with extensive documentation in the literature showing how experiences of maltreatment in childhood should be examined and measured together, all

analyses for my study were conducted using cumulative risk models, and the independent effects of each individual maltreatment variable were not assessed for.

One major difference between my study methodology and these studies that also studied the cumulative impact of childhood maltreatment is that these studies utilized adverse childhood experiences (ACEs) as their measure of childhood maltreatment, so the authors included not only personal measures of abuse (such as experiences of physical or sexual abuse), but also included measures related to other family members (such as divorce/separation of parents, and living with family members who are substance abusers, mentally ill or suicidal, or ever imprisoned), in their cumulative assessment of childhood maltreatment. My cumulative maltreatment variable encompassed personal experiences of physical and sexual abuse, and only one variable pertaining to the individual's family (i.e., witnessing violence within the household). I adjusted for family mental health/drug use as a confounding variable in my analysis, however the variable was not included as an exposure in the assessment of childhood maltreatment. Therefore, this difference may be a contributing factor in explaining why these authors found larger magnitudes of effect, and statistically significant results, compared to my results.

Another difference between my study methodology and these studies that also studied the cumulative impact of childhood maltreatment is that I did not group categories of maltreatment together for model 1, as these studies did. The authors of the Adverse Childhood Experiences (ACEs) Study developed a count variable with ACE scores ranging from 0-7 to measure the cumulative impact of childhood maltreatment, yet they grouped scores 4-7 as one category ($\geq$4). Similarly, the studies cited above used ACE scores ranging from 0-8[74,75] and 0-10[76] yet still grouped their categories of child maltreatment as 0,1,2,3, and $\geq$4. This facet provides a basis for future studies that aim to examine the cumulative impact of childhood maltreatment on health outcomes, as this is the first study to separate and study each score representing the number of types of childhood maltreatment experienced independently, instead of grouping the larger scores together. This may explain why experiencing four types of maltreatment was the only statistically

significant result obtained in model 1, and why it was associated with the largest odds for life dissatisfaction. The authors may have noticed patterns among those participants who reported experiencing at least 4 maltreatment events in childhood, and so decided to group those larger scores, as some studies suggest that experiencing four or more ACEs is a threshold above which there is a particularly higher risk of negative physical and mental health outcomes[14, 77] or this decision may have simply been due to inadequate sample sizes for the larger scores.

A recent study conducted in the United States (2019) has shown that collapsing categories actually has impacts on scale information (reliability) and can reduce the power of the study, which may result in a decrease in overall information obtained from the models (leading to incorrect inferences) and a decrease in precision[78]. However, justifications can be made for collapsing categorical variables as an approach to managing small cell counts and the potential convergence issues of the estimation procedure that can follow. Therefore, it is advised to validate any results obtained from such analyses using larger sample sizes when they become available. It is not known the exact reasoning for why these authors collapsed their ACE categories in their models, but this provides a basis for future studies to compare results of models that group larger ACE scores together, to models that list each score independently using the same dataset.

Model 2 utilized a dichotomous exposure variable measuring '*Ever Abuse*d' and *'Never Abused'*, and this was a novel approach not seen in the literature. The current body of literature on child maltreatment and life satisfaction use categorical count variables to determine if dose-response relationships are present. Model 2 aimed to determine if *any* experience of physical or emotional abuse, or exposure to family violence, was associated with dissatisfaction with life compared to those who experienced no abuse in childhood, and a statistically significant result was found suggesting there is a 40% increase in odds of life dissatisfaction when there has been any maltreatment event in childhood.

5.3 Strengths and Limitations

One of the main strengths of this study is in relation to its novel contribution in the field of child maltreatment and life satisfaction. This study is the first to use Canadian data to assess the relationship between experiencing maltreatment in childhood and dissatisfaction with later life, and is the first study using a binary '*Ever Abused*' vs. '*Never Abused*' exposure variable as a means of measuring child maltreatment. This study adds merit to the significance of childhood experiences as determinants of adult life satisfaction.

This study utilized a large sample size of 25,113 participants, which represented approximately 98% of the Canadian population aged 15 and over. The data were also weighted to more accurately reflect the population, and all coefficients of variation associated with each of the variables used in this study fell within the acceptable ranges (from 0.0% to 0.165%), indicating reliability for general use, minimal possibilities for error, and overall generalizability of results (external validity) to the Canadian population. Cross-sectional studies typically cannot establish causality (but instead help with the generation of causal hypotheses), due to their design that samples the population at one moment in time. An important criteria of causality is the establishment of temporality for the association, so because a 'cross-section' of the population is sampled, a temporal relationship often cannot be determined. However, the exposure variable (childhood maltreatment) was assessed retrospectively, and so by default occurred prior to the outcome (life dissatisfaction). Therefore, even though this study used a cross-sectional design, the fact the exposure did occur prior to the outcome strengthens causal interpretations. However, longitudinal studies on life satisfaction/dissatisfaction should still be conducted to provide insight and hopefully corroborate the findings of this study.

This study is not devoid of limitations, and so these need to be addressed. Firstly, due to the cross-sectional cohort design of the Canadian Community Health Survey, associations found between childhood maltreatment and life dissatisfaction may have been biased due to internal/psychological characteristics of the respondent at the time of survey completion.

Research has shown that a respondent's temporary mood state may influence the evaluations they make in surveys, such that a positive mood tends to result in more favourable evaluations, while a negative mood may result in less favourable evaluations[79]. Thus, if participants were having a particularly good/bad day when they were responding to the CCHS-MH, certain responses may have been biased by their perceived transient emotional state at that time (such as, "*On a scale of 0 to 10, how do you feel about your life as a whole right now*?").

Potential recall bias and recall error are also sources of limitations for this study, as the data on experiences of maltreatment in childhood were collected retrospectively on the CCHS-MH. This means that the quality of the exposure data is largely determined by the participants' abilities to accurately recall past experiences, and with increasing age the risk of incorrectly remembering events from childhood increases. In addition, respondent error may be an error that was introduced into the study due to potential misinterpretations of the child maltreatment questions by respondents. For example, experiences of corporal punishment in childhood may be recognized as instances of physical abuse, based on the interpretation of the following survey item, "*Before age 16, how many times did an adult spank you with something hard to hurt you?*". These types of limitations would have impacts on the reliability of the measures, as well as can lead to underestimations or overestimations of the true effect/association.

Social desirability bias is also a possible limitation of this study, due to the sensitive nature of this study subject area (i.e, child maltreatment), which may have influenced participant responses and ultimately lead to additive or correlational systematic errors in this study. Researchers Tourangeau and Yan distinguished between three distinct dimensions of sensitivity: (I) *Intrusiveness* (which refers to the fact that certain questions may violate the norm of privacy), (II) *Threat of Disclosure* (which refers to the respondents' worries about potential risks and negative repercussions that may occur if the disclosed responses become public information), and (III) *Social Desirability* (which refers to the respondents' need for social approval and making oneself look good through the perceived adherence of social norms)[80]. Participants tend to

exaggerate socially desirable characteristics (i.e., over-reporting), and deny socially undesirable characteristics (i.e., under-reporting). Inquiring about experiences of childhood maltreatment is a sensitive topic and would require the participant to revisit these potential traumatic moments from their life (that they may have worked hard to forget, or avoid). This in turn would increase the potential for negative emotional states to arise, such as feelings of anxiety associated with the recalling of traumatic memories from their childhood, or a resurgence of feelings like guilt or shame if the individual internalized their abuse experiences or never previously disclosed them. The participants might feel their privacy is being intruded on by being asked these types of personal questions, and/or may worry about the repercussions of disclosing such information (especially when there is an interviewer present). This all would increase the likelihood that the participant does not provide truthful responses for such sensitive questions, which would negatively influence data quality and ultimately the internal validity of this study. In the Canadian Community Health Survey, 87% of interviews were conducted in person using computer-assisted personal interviews (CAPI)[66], which, when compared to paper-based forms or telephone interviews, is a quicker and simpler method of survey data collection that increases confidentiality, trust and security for the participant. However, the literature shows that self-administered surveys still yield more valid survey estimates of sensitive characteristics compared to interviewer-administered forms of data collection[80], as the social presence of the interviewer may influence the respondents' reflection of the social consequences associated with providing information to a relative stranger. Therefore, the use of CAPI in the Canadian Community Health Survey thus subjects this present study to the possibility of bias as a result of social desirability.

Another limitation of this study is due to missing data. Data on job satisfaction was missing in 59.54% of participants, which called for the removal of the variable from any data analyses. Job satisfaction is reported in the literature as a potential confounding variable influencing the relationship between child maltreatment and life satisfaction, therefore adjusting for such a variable would have been important in my analysis. However, missing data can reduce

the statistical power of a study as well as produce biased estimates that lead to invalid findings, and missing rates of more than 20% becomes problematic, therefore the variable needed to be removed[81].

A final limitation of this study is due to the availability of the variables provided on the CCHS-MH. Potential confounding and interaction variables that could influence the relationship between child maltreatment and life dissatisfaction were determined *a priori* based on a review of the existing literature, and these variables should have all been accounted for in the data analysis. However, certain variables were not included on the CCHS, therefore had to be excluded from consideration in the regression analysis between child maltreatment and life dissatisfaction. Some examples of the variables that should have been accounted for in the data analyses are: gender, marital status, family composition, and present and past drug use. The lack of data on these variables may mean that the regression models were forced to attribute effects of these omitted variables to other confounding variables included in the analysis, which would thus result in biased coefficient estimates. Future studies should be conducted using data that represents these omitted variables. Additionally, childhood maltreatment was assessed using several survey items that inquired about experiences of various types of physical and sexual abuse, as well as exposure to family violence. However, it is known that abuse encompasses experiences of neglect, as well as emotional abuse as well; therefore, this study was limited to measuring only three main types of child maltreatment. Future research should thus focus on the development of typological exposure variables that consider all types of abuse in childhood in order to measure, with a more comprehensive scope, all experiences of maltreatment in childhood.

5.4 Future Research and Public Health Implications

This study is important for its contribution to the existing body of literature examining the relationship between childhood maltreatment and life satisfaction/dissatisfaction in later life, and it is the first study to examine this relationship using Canadian data. This allows for

comparisons of findings internationally, and discussions about investments that have been made in upstream child abuse prevention approaches across the world that aim to mitigate the effects of, and prevention of child maltreatment. For example, utilizing screening techniques to aid in the early identification of maltreatment in childhood, and promoting approaches that encourage healthy family relationships (such as educating parents on child development, parenting skills, managing family/parenting stress) would be beneficial for mitigating, and preventing the negative effects of child abuse.

Much knowledge now exists regarding the importance of being satisfied with life. In addition to being generally happy and enjoying life, feeling satisfied with life has been shown to: decrease risks of disease and the presence of chronic health conditions in later life, lower the risk of mortality, improve social relationships including marital satisfaction, increase academic self-efficacy and act as a facilitator of academic success, as well as increase job satisfaction and occupational success, compared to those who are dissatisfied with life.

However, one study has shown how children who experienced maltreatment (poverty, domestic distress, and parental drug abuse) can demonstrate resilience in later life, and rebound from their difficult childhoods. The authors found that by the time the children in the sample turned 40, only one in six had substance abuse, mental health problems or criminal records, and most had maintained goals for the future with furthering their education and employment. These are interesting findings, as there is evidence that children who experienced abuse or neglect have more than a 40% increased risks for arrests and violent crimes, as well as have more than 7 times the odds of problematic drug use compared to non-abused children.[15; 82] However, this study demonstrates that rebounding from experiences of maltreatment in childhood is possible, and so future research should aim to understand how and why children who experience comparable maltreatment types at similar ages are impacted differently by similar events, as well as studying why children who experience maltreatment can have differing life satisfaction ratings in later life. The strongest influences of positive change in this study were: continuing education at

community colleges, marriage to a stable partner, and having strong religious beliefs that require active participation in a 'community of faith'.[83] The results of my study did not support the findings of religious belief acting as a buffer for the effects of child maltreatment; however, future studies should still include religious value in their analyses of maltreatment and life satisfaction, as the literature shows protective effects as a result of having strong religious beliefs.

Future research would also benefit from focusing on teasing apart the number of types of maltreatment experienced in childhood, to determine which combination of maltreatment types is associated with the largest odds of life dissatisfaction. Utilizing a typological approach in the research of maltreatment would propose taking the number (accounting for the co-occurrence of maltreatment types) as well as severity (frequency) of the maltreatment types into consideration, which would allow for the identification of specific patterns of maltreatment that possibly act in synergistic manners, amplifying the effects of maltreatment and influencing life satisfaction. The consideration of a more systematic approach for addressing and identifying a possible hierarchy of maltreatment types (for single maltreatment types and for the co-occurrence of types) would also be beneficial for future research. The literature suggests there may be a hierarchy of maltreatment types constructed by severity of maltreatment, where one type of maltreatment is more harmful to children and more associated with risk-taking behaviours, compared to other types of maltreatment, therefore such a hierarchy should be acknowledged in child maltreatment research[84]. For example, sexual abuse is considered to be the most detrimental form of child maltreatment for both males and females because it violates the most strongly held social norms, followed by physical abuse, and finally neglect[84]. Sexual abuse is most strongly associated with the internalization and externalization of problems among children/adolescents and has the strongest relationship with risky behavioral outcomes (such as unsafe sexual practices and substance abuse), when compared with physical abuse and neglect. When comparing physical abuse to neglect, studies show that physical abuse is associated with stronger risks for violent outcomes and delinquency, therefore an argument can be made that sexual abuse is the most

harmful type of maltreatment, and so should be weighted in the hierarchy as most severe, followed by physical abuse and neglect. Therefore, future research in the field of childhood maltreatment would benefit greatly by using an approach to measuring maltreatment that accounts for the co-occurrences of the types of maltreatment, the frequencies of the maltreatment experienced and the severity of the maltreatment in terms of the hierarchical position it holds on the hierarchy of maltreatment types.

This study will help to inform the Government of Canada and necessary Canadian agencies such as the Public Health Agency of Canada about the importance of investing in upstream child maltreatment prevention to moderate impacts of maltreatment from the earliest stages of life, in addition to offering assistances and programs for families who have experienced child maltreatment or who may be at increased risks for childhood maltreatment (such as families of low income, families with a large number of dependent children or children that have special needs, single-parent homes). The results of model 2 in particular argues for the importance of investing in trauma informed care for children exposed to maltreatment, as it was found that experiencing *any* type of maltreatment in childhood was associated with a 40% greater odds of dissatisfaction with life as an adult, compared to those who did not experience any childhood maltreatment. Having governments emphasizing the importance of childhood experiences for healthy child development is the ideal goal of this research, especially during the critical formative years of ages zero to five. Investing in children's health is essential for growing populations of adults who do not have their life satisfaction affected by negative experiences in their childhood.

5.5 Conclusion

In conclusion, the findings of this study support the existing literature on childhood maltreatment and its long-term effects on adult life satisfaction. Model 1 found that experiencing four types of maltreatment in childhood was associated with statistically significant odds of life

dissatisfaction that were 2.35 times the odds of those experiencing zero types of child maltreatment. Model 2 found a statistically significant relationship between being '*Ever Abused'* in childhood and dissatisfaction with life, with 40% greater odds of life dissatisfaction observed among those who experienced any type of maltreatment in childhood. Both models were adjusted for household income, self-perceived physical health, self-perceived mental health, and measures of emotional and social support (*has people to depend on*, and *has close relationships*).

This study offers novel information regarding the different approaches one can take when measuring exposures of maltreatment in childhood, which provides a basis for which future studies can elucidate and further expand on. Additionally, the results of this study will contribute valuable knowledge to the minimal body of literature currently available on this particular relationship, in addition to being the first study to date using Canadian data to explicitly assess the relationship between childhood maltreatment and adult life satisfaction. The findings of this study will hopefully offer insight regarding the importance of childhood experiences for the healthy development of children who grow into adults that are satisfied with their lives.

References

1. Sousa, L., & Lyubomirsky, S. (2001). Life satisfaction. In L. Sousa & S. Lyubomirsky (Authors), *Encyclopedia of women and gender: Sex similarities and differences and the impact of society on gender* (Vol. 2, pp. 667-676). University of California: Academic Press

2. Diener, E. (2009). *Culture and well-being: The collected works of Ed Diener*. Springer Netherlands. file:///Users/anamrazovac/Downloads/2009_Book_CultureAndWell-Being.pdf

3. Yetim, U. (2003). The impacts of individualism/collectivism, self-esteem, and feeling of mastery on life satisfaction among the Turkish university students and academicians. *Social Indicators Research*, *61*, 297-317. https://doi.org/10.1023/A:1021911504113

4. Sustainable Development Solutions Network. (2019). *World Happiness Report 2019* (J. F. Helliwell, R. Layard, J. D. Sachs, J.-E. De Neve, H. Huang, S. Wang, & L. B. Aknin, Eds.). https://s3.amazonaws.com/happiness-report/2019/WHR19.pdf

5. Ackerman, C. (2020, January 9). *Life satisfaction theory and 4 contributing factors (Incl. SWLS scale)*. https://positivepsychologyprogram.com/life-satisfaction/

6. Statistics Canada. (2019, March 26). *Life satisfaction, 2017*. https://www150.statcan.gc.ca/n1/pub/82-625-x/2019001/article/00002-eng.htm

7. Fergusson, D. M., Mcleod, G., Horwood, L. J., Swain, N. R., Chapple, S., & Poulton, R. (2015). Life satisfaction and mental health problems (18 to 35 years). *Pubmed*, *45*(11), 1-10. https://doi.org/10.1017/S0033291715000422

8. Strine, T. W., Chapman, D. P., Balluz, L. S., Moriarty, D. G., & Mokdad, A. H. (2008). The associations between life satisfaction and health-related quality of life, chronic illness, and health behaviors among U.S. community-dwelling adults. *Journal of Community Health*, *33*(1), 40-50. https://doi.org/10.1007/s10900-007-9066-4

9. Bowling, A., & Grundy, E. (2008). Differentials in mortality up to 20 years after baseline interview among older people in East London and Essex. *Oxford Academic*, *38*(1), 51-55. https://doi.org/10.1093/ageing/afn220

10. Lombardo, P., Jones, W., Wang, L., Shen, X., & Goldner, E. M. (2018). The fundamental association between mental health and life satisfaction: results from successive waves of a Canadian national survey. *BMC Public Health*, *18*(342). Retrieved from https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-018-5235-x

11. Cheung, F., & Lucas, R. E. (2014). Assessing the validity of single-item life satisfaction measures: Results from three large samples. *Quality of Life Research*, *23*(10), 2809-2818. https://doi.org/10.1007/s11136-014-0726-4

12. Bethell, C., Jones, J., & Gombojav, N. (2019). Positive childhood experiences and adult mental and relational health in a statewide sample. *JAMA Paediatrics*, *173*(11), e193007. https://doi.org/10.1001/jamapediatrics.2019.3007

13. Afifi, T. O., MacMillan, H. L., Boyle, M., Cheung, K., Taillieu, T., Turner, S., & Sareen, J. (2016, March). *Child abuse and physical health in adulthood*. Retrieved from https://www150.statcan.gc.ca/n1/pub/82-003-x/2016003/article/14339-eng.htm

14. Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. *American Journal of Preventive Medicine*, *14*(4), 245-258. https://doi.org/10.1016/S0749-3797(98)00017-8

15. Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L., & Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet*, *2*(8), 356-366. https://doi.org/10.1016/S2468-2667(17)30118-4

16. Afifi, T. O., MacMillan, H. L., Boyle, M., Taillieu, T., Cheung, K., & Sareen, J. (2014). Child abuse and mental disorders in Canada. *Canadian Medical Association Journal*, *186*(9), E324-E332. https://doi.org/10.1503/cmaj.131792

17. Statistics Finland. (2017, March 23). *Victims of crimes committed by persons with foreign background are often also of foreign background*. https://www.stat.fi/til/rpk/2016/13/rpk_2016_13_2017-03-23_tie_001_en.html#:~:text=The%20number%20of%20child%20victims,(35.9%20per%20cent)%20girls.&text=Of%20the%201%2C100%20victims%20of,and%2012.6%20per%20cent%20boys.

18. Save the Children. (2019). *We save the children Afghanistan country annual report 2019*. https://resourcecentre.savethechildren.net/node/17790/pdf/save_the_children_afghanistan_annual_report_2019.pdf

19. Statistics Canada. (2017, February 16). *Family violence in Canada: A statistical profile, 2015*. https://www150.statcan.gc.ca/n1/daily-quotidien/170216/dq170216b-eng.htm

20. School of Graduate Studies. General Forms of Theses. Kingston; 2017

21. World Health Organization. (n.d.). *Early child development*. https://www.who.int/social_determinants/themes/earlychilddevelopment/en/

22. Shonkoff, J. P., & Phillips, D. A. (2000). *From neurons to neighborhoods: The science of early child development*. National Academy Press.

23. Winston, R., & Chicot, R. (2016). The importance of early bonding on the long-term mental health and resilience of children. *London Journal of Primary Care*, *8*(1), 12-14. https://doi.org/10.1080/17571472.2015.1133012

24. Tierney, A. L., & Nelson, C. A. (2009). Brain development and the role of experience in the early years. *Zero to Three*, *30*(2), 9-13.

25. Institute of Medicine and National Research Council., Petersen, A. C., Joseph, J., Feit, M. N., Monica Feit., Joshua Joseph., & Anne Petersen. (2014). *New Directions in Child Abuse and Neglect Research*. National Academies Press.

26. Oberman, L., & Pascual-Leone, A. (2013). Changes in plasticity across the lifespan: Cause of disease and target for intervention. *Progress in Brain Research*, *207*, 91-120. https://doi.org/10.1016/B978-0-444-63327-9.00016-3

27. World Health Organization. (2000). *The implications for training of embracing A life course approach to health* [Brochure]. https://www.who.int/ageing/publications/lifecourse/alc_lifecourse_training_en.pdf

28. Arain, M., Haque, M., Johal, L., Mathur, P., Nel, W., Rais, A., Sandhu, R., & Sharma, S. (2013). Maturation of the adolescent brain. *Neuropsychiatric Disease and Treatment*, *9*, 449-461. https://doi.org/10.2147/NDT.S39776

29. Johnson, S. B., Blum, R. W., & Giedd, J. N. (2009). Adolescent maturity and the brain: The promise and pitfalls of neuroscience research in adolescent health policy. *Journal of Adolescent Health*, *45*(3), 216-221. https://doi.org/10.1016/j.jadohealth.2009.05.016

30. Kim, S., Kim, J. S., Jin, M. J., Im, C. H., & Lee, S. H. (2018). Dysfunctional frontal lobe activity during inhibitory tasks in individuals with childhood trauma: An event-related potential study. *NeuroImage: Clinical*, *17*, 935-942. https://doi.org/10.1016/j.nicl.2017.12.034

31. Lejoyeux, M., Arbaretaz, M., McLoughlin, M., & Ades, J. (2002). Impulse control disorders and depression. *The Journal of Nervous and Mental Disease*, *190*(5), 310-314. https://doi.org/10.1097/00005053-200205000-00007

32. Babakhanlou, R., & Beattie, T. (2019). Child abuse. *InnovAIT*, *12*(4), 180-187. https://doi.org/10.1177/1755738018820872

33. Wathen, C. N., & MacMillan, H. L. (2013). Children's exposure to intimate partner violence: Impacts and interventions. *Paediatrics & Child Health*, *18*(8), 419-422.

34. Child Welfare Information Gateway. (2019). *Long-term consequences of child abuse and neglect.* Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Children's Bureau

35. Franke, H. A. (2014). Toxic stress: Effects, prevention and treatment. *Children*, *1*(3), 390-402. https://doi.org/10.3390/children1030390

36. Blair, C., & Raver, C. C. (2016, April 16). Poverty, stress, and brain development: New directions for prevention and intervention. *Academic Paediatrics*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5765853/

37. Bowlus, A., McKenna, K., Day, T., & Wright, D. (2003, March). *The economic costs and consequences of child abuse in Canada* (Report to the Law Commission of Canada). https://dalspace.library.dal.ca/bitstream/handle/10222/10274/Bowlus_McKenna%20et%20al%20Research%20Child%20Abuse%20EN.pdf?sequ

38. Child Welfare Information Gateway. (2019). *Long-term consequences of child abuse and neglect.* Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Children's Bureau

39. Peterson, C., Florence, C., & Klevens, J. (2018). The economic burden of child maltreatment in the United States, 2015. *Child Abuse & Neglect*, *86*, 178-183. https://doi.org/10.1016/j.chiabu.2018.09.018

40. Hollis, A. (2018). *Economic commentary on raising children: A case for investing in children*. University of Calgary. https://static1.squarespace.com/static/5669d2da9cadb69fb2f8d32e/t/5bf3b1f34d7a9c87e1110 8cc/1542697461156/Raising+Canada+Eco+Report+-+AH+PRF.pdf

41. National Center for Injury Prevention and Control, Division of Violence Protection. (2020, March 5). *Risk and protective factors*. Centers for Disease Control and Prevention. https://www.cdc.gov/violenceprevention/childabuseandneglect/riskprotectivefactors.html

42. Boehm, J. K., Winning, A., Segerstrom, S., & Kubzanksy, L. D. (2015). Variability modifies life satisfaction's association with mortality risk in older adults. *Psychological Science*, *26*(7), 1063-1070. https://doi.org/10.1177/0956797615581491

43. World Health Organization. (2000). *The implications for training of embracing A life course approach to health* [Brochure].

44. Larsen, R. J., Diener, E., & Emmons, R. A. (1985). An evaluation of subjective well-being measures. *Social Indicators Research*, 1-17.

45. Margolis, S., Schwitzgebel, E., Ozer, D. J., & Lyubomirsky, S. (2019). A new measure of life satisfaction: The riverside life satisfaction scale. *Journal of Personality Assessment*, *101*(6), 621-630. https://doi.org/10.1080/00223891.2018.1464457

46. Galanakis, M., Lakioti, A., Pezirkianidis, C., Karakasidou, E., & Stalikas, A. (2017). Reliability and validity of the Satisfaction with Life Scale (SWLS) in a Greek sample. *The International Journal of Humanities and Social Studies*, *5*, 120-127.

47. Jovanovic, V., & Lazic, M. (2018). Is longer always better? A comparison of the validity of single-item versus multiple-item measures of life satisfaction. *Applied Research Quality Life*. https://doi.org/10.1007/s11482-018-9680-6

48. Bowling, A. (2005). Mode of questionnaire administration can have serious effects on data quality. *Journal of Public Health*, *27*(3), 281-291. https://doi.org/10.1093/pubmed/fdi031

49. Terwee, C. B., Bot, S. D.M., de Boer, M. R., van der Windt, D. A., Knol, D. L., Dekker, J., Bouter, L. M., & de Vet, H. C. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology*, *60*(1), 34-42. https://doi.org/10.1016/j.jclinepi.2006.03.012

50. Kobau, R., Sniezek, J., Zack, M. M., Lucas, R. E., & Burns, A. (2010). Well-being assessment: An evaluation of well-being scales for public health and population estimates of well-being among US adults. *Applied Psychology: Health and Well-Being*, *2*(3). https://doi.org/10.1111/j.1758-0854.2010.01035.x

51. Hughes, K., Lowey, H., Quigg, Z., & Bellis, M. A. (2016). Relationships between adverse childhood experiences and adult mental well-being: Results from an English national household survey. *British Medical Journal Public Health*, *16*(222). https://doi.org/10.1186/s12889-016-2906-3

52. Adjorlolo, S., Adu-Poku, S., Andoh-Arthur, J., Botchway, I., & Mlyakado, B. P. (2015). Demographic factors, childhood maltreatment and psychological functioning among university students' in Ghana: A retrospective study. *Wiley Online Library*, *52*(S1). https://doi-org.proxy.queensu.ca/10.1002/ijop.12248

53. Dodoo, N. (2014). *The relationship between childhood abuse, religiosity and life satisfaction* (Doctoral dissertation). Retrieved from https://pdfs.semanticscholar.org/a3fe/9b3ff203f5468e8cd63c3822ebf32b3762e6.pdf

54. Herrenkohl, T. I., Klika, J. B., Herrenkohl, R. C., Russo, M. J., & Dee, T. (2012). A prospective investigation of the relationship between child maltreatment and indicators of adult psychological well-being. *Violence and Victims*, *27*(5), 764-776.

55. Barrientos, M., & Soria, C. (n.d.). *Canada vs. United States*. https://www.indexmundi.com/factbook/compare/canada.united-states/demographics

56. American Health Care Initiative. (2018, May 16). *American health care: Health spending and the federal budget*. https://www.crfb.org/papers/american-health-care-health-spending-and-federal-budget

57. Canadian Institute for Health Information. (n.d.). *How much does Canada spend on health care?* https://www.cihi.ca/en/health-spending/2018/national-health-expenditure-trends/how-much-does-canada-spend-on-health-care

58. Heymann, J., & Barthold, D. (2018, May 11). Why Canadians outlive Americans, and why we shouldn't be so satisfied. *The Globe and Mail*. https://www.theglobeandmail.com/opinion/why-canadians-outlive-americans-and-why-we-shouldnt-be-so-satisfied/article16147153/

59. Magee, M. (2017, February 28). *Canada vs. U.S. Health- Report card*.

    http://www.healthcommentary.org/2017/02/28/canada-vs-u-s-health-report-card/

60. The Conference Board of Canada. (n.d.). *Racial wage gap*.

    https://www.conferenceboard.ca/hcp/provincial/society/racial-

    gap.aspx?AspxAutoDetectCookieSupport=1

61. Pew Research Center. (2016, June 27). *Demographic trends and economic well-being*.

    https://www.pewsocialtrends.org/2016/06/27/1-demographic-trends-and-economic-well-

    being/

62. Kapikiran, S. (2013). Loneliness and life satisfaction in Turkish early adolescents: The

    mediating role of self esteem and social support. *Social Indicators Research*, *111*, 617-632.

    https://doi.org/10.1007/s11205-012-0024-x

63. Gana, K., Bailly, N., Saada, Y., Joulain, M., Trouillet, R., Herve, C., & Alaphilippe, D.

    (2013). Relationship between life satisfaction and physical health in older adults: A

    longitudinal test of cross-lagged and simultaneous effects. *Health Psychology*, *32*(8).

    https://doi.org/10.1037/a0031656

64. Artes, J., Jimenez, J. S., & del Mar Salinas-Jimenez, M. (2011). Education and satisfaction

    with life: The role of positional concerns. *Social Indicators Research*, *103*(3), 409-426.

65. Kasprzak, E. (2010). Perceived social support and life-satisfaction. *Polish Psychological

    Bulletin*, *41*(4), 144-154. https://doi.org/10.2478/v10059-010-0019-x

66. Statistics Canada. (2013, September 18). *Canadian Community Health Survey- Mental Health

    (CCHS)*. https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5015

67. Mazaheri, M., & Theuns, P. (2009). Effects of Varying Response Formats on Self-ratings of

    Life-Satisfaction. *Social Indicators Research*, *90*(3), 381-395.

68. Oliver, R. L. (1993). Cognitive, Affective, and Attribute Bases of the Satisfaction Response.

    Journal of Consumer Research, *20*(3), 418-430.

69. Greenland, S. (1989). Modeling and variable selection in epidemiologic analysis. *American Journal of Public Health*, *79*, 340-349.

70. Chau, A.M. H., Lo, E.C. M., Wong, M.C. M., & Chu, C. H. (2018). Interpreting poisson regression designs in dental caries studies. *Caries Research*, *52*, 339-345. https://doi.org/10.1159/000486970

71. Sullivan, L., & LaMorte, W. W. (n.d.). Confounding and effect measure modification. In Boston University School of Public Health (Author), *Confounding and effect measure modification*. https://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/BS704-EP713_Confounding-EM/BS704-EP713_Confounding-EM_print.html

72. Statistics Canada. (2009, September 21). *Table 5-1 Quality level guidelines*. https://www150.statcan.gc.ca/n1/pub/13f0026m/2007001/table/tab5p1-eng.htm

73. Schilling, C., Weidner, K., Brahler, E., Glaesmer, H., Hauser, W., & Pohlmann, K. (2016). Patterns of childhood abuse and neglect in a representative German population sample. *PLOS One*, *11*(7), e0159510. https://doi.org/10.1371/journal.pone.0159510

74. Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., Dube, S. R., & Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood. *European Archives of Psychiatry and Clinical Neuroscience*, *256*(3), 174-186. https://doi.org/10.1007/s00406-005-0624-4

75. Dube, S. R., Felitti, V. J., Dong, M., Giles, W. H., & Anda, R. F. (2003). The impact of adverse childhood experiences on health problems: Evidence from four birth cohorts dating back to 1900. *Preventive Medicine*, *37*(3), 268-277. https://doi.org/10.1016/S0091-7435(03)00123-3

76. Dong, M., Anda, R. F., Felitti, V. J., Dube, S. R., Williamson, D. F., Thompson, T. J., Loo, C. M., & Giles, W. H. (2004). The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. *Child Abuse and Neglect*, *28*(7), 771-784. https://doi.org/10.1016/j.chiabu.2004.01.008

77. Ippen, C. G., Harris, W. W., Horn, P. Van, & Lieberman, A. F. (2011). Traumatic and stressful events in early childhood: Can treatment help those at highest risk? *Child Abuse & Neglect*, *35*(7), 504-513. https://doi.org/10.1016/j.chiabu.2011.03.009

78. Rutkowski, L., Svetina, D., & Liaw, Y.-L. (2019). Collapsing categorical variables and measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 1-13. https://doi.org/10.1080/10705511.2018.1547640

79. Heide, M., & Gronhaug, K. (1991). Respondents' moods as a biasing factor in surveys: An experimental study. *Journal of Consumer Psychology*, *Advances in Consumer Research Volume 18*, 566-575.

80. Krumpal, I. (2014). *Encyclopedia of Quality of Life and Well-Being Research*. Springer Netherlands. https://doi.org/10.1007/978-94-007-0753-5_4086

81. Dong, Y., & Peng, C.-Y. J. (2013). Principled missing data methods for researchers. *SpringerPlus*, *2*(222). https://doi.org/10.1186/2193-1801-2-222

82. Currie, J., & Tekin, E. (2012). Understanding the cycle: Child maltreatment and future crime. *Journal of Human Resources*, *47*(2), 509-549.

83. *Journeys From Childhood to Midlife: Risk, Resilience, and Recovery*. (2001). Cornell University Press.

84. Hahm, H. C., Lee, Y., Ozonoff, A., & Wert, M. J. Van. (2009). The impact of multiple types of child maltreatment on subsequent risk behaviors among women during the transition from adolescence to young adulthood. *Journal of Youth and Adolescence*, *39*(5), 528-540. https://doi.org/10.1007/s10964-009-9490-0
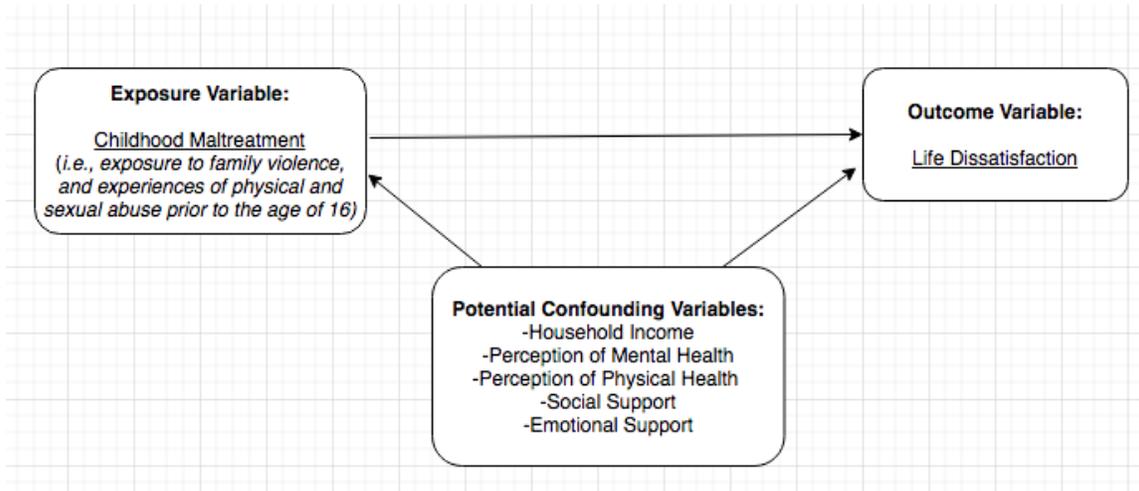
Appendix

Figure 4: Revised conceptual model displaying the relationships observed among the variables investigated in this study

QUEEN'S UNIVERSITY HEALTH SCIENCES & AFFILIATED TEACHING HOSPITALS RESEARCH ETHICS BOARD (HSREB)

HSREB Renewal of Ethics Clearance

October 16, 2020

Miss Ana Mrazovac
Department of Public Health Sciences
Queen's University

TRAQ #: 6027990
Department Code: EPID-690-19
Study Title: "EPID-690-19 Early Childhood Abuse and the Association with Life Satisfaction"
Review Type: Delegated
Date Ethics Clearance Effective: October 16, 2020
Ethics Clearance Expiry Date: October 16, 2021

Dear Miss Mrazovac:

The Queen's University Health Sciences & Affiliated Teaching Hospitals Research Ethics Board (HSREB) has reviewed the application. This study, including all currently approved documentation has been granted ethical clearance until the expiry date noted above.

Prior to the expiration of your ethics clearance, you will be reminded to submit your renewal report through TRAQ. Any lapses in ethical clearance will be documented below.

Lapse in Ethics Clearance: N/A

Regards,

albert F. Clark.

Albert F. Clark, PhD
Chair, Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board

The HSREB operates in compliance with, and is constituted in accordance with, the requirements of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); the international Conference on Harmonisation Good Clinical Practice Consolidated Guideline (ICH GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Product Regulations; Part 3 of the Medical Devices Regulations, and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. The HSREB is qualified through the CTO REB Qualification Program and is registered with the U.S. Department of Health and Human Services (DHHS) Office for Human Research Protection (OHRP). Federalwide Assurance Number: FWA#: 00004184, IRB#: 00001173. HSREB members involved in the research project do not participate in the review, discussion or decision.