Evaluating the Intergenerational Effects of Maternal Childhood Threat and Deprivation and the Moderating Impact of Intimate Partner Violence on Infant Birth Outcomes

by

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Dalhousie University is located in Mi'kma'ki, the
ancestral and unceded territory of the Mi'kmaq.
We are all Treaty people.

Dedication

Multiple people deserve credit for the creation of this paper, with me perhaps somewhere near the middle of the list. Most importantly, I would like to thank my supervisors Dr. Jen Khoury and Dr. Tara Perrot. Your guidance and support along this journey has been invaluable, and this paper would have been dead in the water ten times over without the compassion and care you have both shown towards me. Though I'm greatly inspired by your work ethic, consistency, and passion for research, it is the humanity you have both shown towards me that I value most and hope to emulate. I would also like to extend my appreciation for my bonus third supervisor, Dr. Khoury's son Francis Shay McGarry. It has been an honour and a delight watching you grow up over our online meetings, and seeing your smile was often the highlight of some of my darker days. I would also like to thank my thesis committee member, Dr. Ian Weaver, for his insightful suggestions and assistance. A final thank you to Dr. Fisher, who, despite no longer being my supervisor, still ended up talking me off the ledge several times throughout this degree.

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Table of Contents

List of Tables

List of Figures

Abstract

Maternal history of childhood maltreatment (CM) and intimate partner violence (IPV) can affect infant health. Two dimensions of CM, threat (risk to one's person, agency, or integrity) and deprivation (absence of required stimuli), are linked to differential health outcomes for mothers and infants. We hypothesize that distinct maternal CM experiences will result in unique infant health outcomes, with IPV during pregnancy exacerbating these effects. Mother-infant dyads (N = 98) were recruited from the community. Maternal CM was assessed using the Childhood Trauma Questionnaire, IPV was assessed with The Conflicts Tactics Scale – Short Form, and parents reported infant birth outcomes. Results showed no significant effects of maternal threat or deprivation on infant health outcomes, nor did IPV moderate these associations. Maternal race and delivery method were significantly associated with infant birth outcomes. Reasons behind the null results, including biopsychosocial mechanisms and the impact of CM severity and frequency, are discussed.

List of Abbreviations Used

Abbreviations	Definition
ACE	Adverse Childhood Experiences
AIPW	Augmented-Inverse-Probability Weighted
APGAR	Appearance, Pulse, Grimace, Activity, Respiration
CM	Childhood Maltreatment
CTQ	Childhood Trauma Questionnaire
CTS	Conflicts Tactics Scale
DOHaD	Developmental Origins of Health and Disease
HPA	Hypothalamic Pituitary Adrenal
IPV	Intimate Partner Violence
IWK	Izaak Walton Killam
KMO	Kaiser-Meyer-Olkin
MSVU	Mount Saint Vincent University
NICU	Neonatal Intensive Care Unit
SEM	Structural Equation Modeling

Chapter I: Introduction

Evaluating the Intergenerational Effects of Maternal Childhood Threat and Deprivation and the Moderating Impact of Intimate Partner Violence on Infant Birth Outcomes

Child maltreatment (CM), including abuse, neglect, and witnessing intimate partner violence (IPV), can have far-reaching health implications. CM often has profound and lifelong effects on physical and mental health, which can transcend generations – infants of parents who were maltreated during childhood are at increased risk for adverse birth outcomes (Keenan-Devlin et al., 2023). Emerging evidence underscores two dimensions of CM, each of which are affiliated with distinct psychological outcomes for the affected individual (Strathearn et al., 2020) – **threat**, which involves risk to one's person, agency, or integrity, and **deprivation**, which denotes the absence of expected stimuli (McLaughlin & Sheridan, 2014). In addition, women who experienced maltreatment during childhood are at a heightened risk of IPV victimization in adulthood (Shields et al., 2020). Both CM and IPV are individually associated with poor infant health outcomes (Agarwal et al., 2023; Donovan et al., 2016; Flagg et al., 2023; Smith et al., 2016). Experiencing CM and/or IPV can elevate maternal stress during pregnancy (Carpenter et al., 2010; Heim et al., 2000; Parade et al., 2017), which can adversely affect fetal development with implications for later infant health (Babenko et al., 2015). While the combined impact of maternal CM and IPV on infant health remains understudied, this research study aims to fill the literature twofold. Firstly, this study will evaluate maternal experiences of CM via a non-cumulative lens (focusing instead on severity and type of maltreatment, rather than number of forms of maltreatment), by assessing the differential impact of maternal threat and deprivation on infant birth outcomes. Secondly, this study examines maternal instances of IPV as a moderator of the association between maternal CM and infant birth outcomes.

1.1 Child Maltreatment

CM is a global epidemic with adverse impacts that can severely affect personal and public health. Generally, CM refers to a person under the age of eighteen experiencing any form of ill-treatment, abuse, or neglect which may result in actual or potential harm to the child's health, development, or dignity (World Health Organization, 2006). Epidemiological research commonly categorizes CM into four main sub-categories (Christoffersen et al., 2013; Mehta et al., 2023; Moore, et al., 2015), with definitions provided by the World Health Organization (2006): 1) sexual abuse, which is defined as the involvement of a child in a sexual activity that they cannot comprehend or consent to; 2) physical abuse, wherein physical force is deliberately used against a child, often with the intent of punishment; 3) emotional/psychological abuse, wherein the child is exposed to non-physical hostile treatment; and 4) neglect, which constitutes a pattern of failure by the caregiver to provide for a child's well-being or development in one of many possible areas (health, education, security, nutrition, etc.). Recent research also acknowledges witnessing domestic violence as a fifth sub-category of CM (Gardner et al, 2019), separate from emotional abuse or neglect (Manly, 2005), as exposure to domestic violence is associated with similar negative psychopathological outcomes as the other four sub-categories of CM (Choi et al., 2017; Kinyanda et al., 2013).

In Canada, a study of approximately 43,000 people indicated that 6 out 10 individuals retrospectively reported experiencing at least one form of CM before the age of 15 (Statistics Canada, 2023). One-third (32.3%) of individuals polled reported experiencing non-physical CM only, 23.2% reported experiencing a combination of both physical and non-physical maltreatment, 4.1% reported experiencing physical maltreatment alone, and the other 40.4% of people reported no maltreatment (Statistics Canada, 2023). Importantly, the true prevalence of

CM, both national and global, is unknown, as nondisclosure rates of child abuse and maltreatment are high (Statistics Canada, 2023). Furthermore, a study of Israeli children revealed that a higher exposure to CM (one type or multiple) is associated with greater reluctance to disclose the maltreatment, meaning that the most severe cases of maltreatment are also likely the most hidden (Lev-Wiesel et al., 2019). Accordingly, the true prevalence and severity of CM often remains concealed as the abuse occurs.

1.2 Impacts of Child Maltreatment

The adverse impacts of CM are not relegated to childhood, and CM is associated with lifelong trajectories of disadvantageous psychological, biological, and behavioural outcomes (Leeb et al., 2011). As the focus of this study is the intergenerational impact of CM, this will be a truncated review on the impacts of CM for the exposed generation (for full literature reviews, see Leeb et al., 2011; Maniglio, 2009; Norman et al., 2012). Briefly, experiencing CM is associated with an increased likelihood of mental health problems in adulthood, including but not limited to mood disorders (Li et al., 2016), psychosis (Varese et al., 2012), suicidal and non-suicidal self-harm (Angelakis et al., 2019; Liu et al., 2017), and substance abuse (Halpern et al., 2018). Furthermore, the physical health of adults who experienced CM is also affected, with increased risk of experiencing cardiovascular disease (Batten et al., 2004), chronic pain (Chartier et al., 2007), liver disease (Dong et al., 2003), lower self-rated health (Bonomi et al., 2007) and increased mortality (D'arcy-Bewick, 2022). Finally, experiencing CM is associated with increased unhealthy behaviours in adulthood, such as prostitution, delinquency, crime, resulting often in homelessness (Chauhan et al., 2017). See Figure 1 for a diagram summarizing outcomes associated with CM.

1.3 Two Dimensions of Child Maltreatment: Threat and Deprivation

Emerging evidence indicates that differing aspects of maltreatment may be associated with distinct psychological outcomes. Results from a two-decade longitudinal prenatal cohort (Strathearn et al., 2020) found that, while some health outcomes overlapped, other health outcomes were unique to the type of CM experienced. For example, experiencing psychological abuse and/or neglect were broadly associated with all categories and severities of substance use and addiction (alcohol, cigarettes, etc.) in adolescence and early adulthood, whereas experiencing physical abuse was only associated with cannabis dependence, and experiencing sexual abuse was only associated with cigarette use in adulthood (Strathearn et al., 2020). Furthermore, results indicated that psychological abuse and neglect were broadly associated with almost all psychological areas assessed, including internalizing behaviours, mood disorders, post traumatic stress disorder (PTSD), psychosis, delinquency (in males), and decreased quality-of life. Contrastingly, those who experienced physical abuse reported more externalizing behaviours, and, interestingly, neither experiences of physical nor sexual abuse were significantly associated with decreased quality-of-life scores (Strathearn et al., 2020). These results are somewhat similar to earlier literature, in that children who had experienced physical abuse were more likely to develop maladaptive externalizing behaviours, whereas those who experienced neglect were more likely to exhibit internalizing behaviours (Manly et al., 2013). It is relevant to note that the different outcomes of abuse/neglect do not imply that one form of CM is inherently less damaging than the other – more so that the damage is presenting itself differently, though the reasoning and mechanisms as to why remain unclear.

Strathearn's findings support recent research and theory by McLaughlin and Sheridan (2014), who state that childhood experiences of **threat** (wherein one's person, agency, or integrity are at risk), and **deprivation** (the absence of expected/required stimuli) are associated

with differential health outcomes for affected individuals (Greene et al., 2021; Schafer et al., 2023). Children raised in deprived environments (including instances of parental institutionalization, low socio-economic status, and neglect), are more likely to experience deficits in social and cognitive domains, as well as disruptions in relationships with early attachment figures (McLaughlin & Sheridan, 2014). Accordingly, these children reported greater neural-behavioural deficits than their peers, including changes in amygdala and grey matter structure and function, greater susceptibility to anxiety, and decreased language production and comprehension (McLaughlin & Sheridan, 2014). Comparatively, exposure to threatening environments during childhood has been associated with differential neural-behavioural outcomes, including reduced volume of the prefrontal cortex, and atypical emotion processing, specifically with anger (McLaughlin & Sheridan, 2014).

Interestingly, exposure to threat and deprivation are sometimes linked to the same outcome, though via unique pathways. In a recent study, threat was found to be directly associated with adolescent internalizing and externalizing behaviours, whereas deprivation was *indirectly* associated with internalizing and externalizing behaviours via language ability (Miller et al., 2021). Furthermore, McLaughlin et al. argue that both threat and deprivation are associated with increased future psychopathology, but via differential deficits in cognition (deprivation) and emotional processing (threat) (2021). This assertion was supported by Duprey et al., who found that exposure to threat was associated with increased emotional lability and negativity, while exposure to deprivation was associated with decreased emotion regulation skills (2023). This threat/deprivation model of adversity (McLaughlin & Sheridan, 2016) allows for the identification of differential health outcomes that are associated with unique instances or clustered incidences of CM, something that cannot be done when instances of CM are measured

cumulatively. Notably, the dimensions of CM reported in this section relate only to the affected individuals, while the intergenerational context will be discussed below.

1.4 Impacts of Intimate Partner Violence (IPV)

Experiencing CM can impact the development and maintenance of interpersonal relationships across one's lifespan. For example, enduring CM is associated with an increased likelihood of experiencing IPV later in life (Buffarini et al., 2022; Li et al., 2020; Li et al., 2019). IPV refers to any violence or maltreatment inflicted by a past or current intimate partner, including physical and sexual violence, psychological abuse, and stalking (Centre for Disease Control and Prevention, 2021). In Canada, experiencing IPV is a relatively common occurrence, with 44% of women and 36% of men reporting at least one instance of IPV since the age of 15 (Statistics Canada, 2021). The true prevalence of IPV remains unknown: like CM, many instances of IPV go unreported and true numbers are difficult to gauge. Experiencing IPV is associated with a slew of adverse physical outcomes, including an increased likelihood for sexually transmitted-infections, physical injury, traumatic brain injury, gastrointestinal disorders, chronic pain, and death (Wong & Mellor, 2014). Mental health outcomes are similarly poor for those experiencing IPV, with an increased likelihood of experiencing depression, PTSD, generalized anxiety disorders, substance abuse disorders, and attempted suicide (Wong & Mellor, 2014).

Numerous studies have found positive associations between CM and IPV (see Li et al. 2019 for a meta-analysis). As severity and frequency of CM increase, so too does the likelihood of experiencing IPV (Shields et al., 2020). All types of CM have been identified as risk factors for later-life victimization, including childhood sexual abuse (Jennings et al., 2015), physical abuse (Fiorillo et al., 2013), psychological/emotional abuse (Obasaju et al., 2009), and neglect

(Villodas et al., 2012). Nevertheless, there is evidence that differential subtypes of CM do not consistently predict the likelihood of future IPV victimization. Some studies have found that psychological abuse more highly predicted future victimization than other CM types (Berzenski &Yates, 2010), whereas others have found the same of neglect (Widom et al., 2008) and sexual abuse (Renner & Slack, 2006). The reasoning for these disparities remains unclear. Interestingly, not all individuals who experience CM also experience IPV, and several studies have failed to establish a link between the two (Lavoie et al., 2002; Hotaling & Sugarman, 1990). Evidently, the relationship between CM and IPV is multifaceted, and in need of elucidation.

1.5 Intergenerational Transmission of Adversity: Importance of the Perinatal Period

There is evidence that the impacts of CM and IPV are not limited to one generation, and that the perinatal period is of particular importance for the transmission of stress from mother to infant (Flagg et al., 2023). The Developmental Origins of Health and Disease (DOHaD) hypothesis emphasizes the importance of early life conditions in shaping physical and mental health outcomes across one's lifespan (Gluckman et al., 2007; Haugen et al., 2015; Wang et al., 2018). Severe and/or chronic exposure to stress, including exposure to neglect or abuse, both in early life and adulthood, can have profound effects on the hypothalamic-pituitary-adrenal (HPA) axis. The HPA axis is a central part of the body's stress response system, which regulates the production and release of cortisol, a key stress hormone (Gonzalez, 2013). During pregnancy, maternal stress and health can alter fetal development and fetal stress functioning (Babenko et al., 2015). Studies have shown that women who experience high levels of stress during pregnancy (identified objectively by elevated cortisol levels), were more likely to birth babies with low birthweight (see Matsas et al., 2023, for meta-analysis). Similarly, high levels of maternal cortisol have been associated with complications during pregnancy, including pre-

eclampsia, malformation, preterm delivery, and even miscarriage (see Keenan-Devlin et al., 2023, for review).

Experiencing both CM and/or IPV has been found to adversely impact the mother's HPA activity and their resulting cortisol reactivity (Carpenter et al., 2011; Heim et al., 2000; Parade et al., 2019), thereby potentially impacting the developing child. However, the nature of the impact of CM on cortisol is not always consistent: there is evidence that early life adversity can lead to both hyper- and hypo-activation of the HPA axis (see Khoury et al., 2019, for meta-analysis). This dysregulation can persist long past the act of maltreatment, meaning that any maternal experiences of adversity, either during childhood or by an intimate partner, can impact the uterine environment, thereby influencing the development of the fetus (Epstein et al., 2021; Gonzalez et al., 2012; Parade et al., 2019; Rinne et al., 2023). For instance, Parade et al. (2019) found that mothers who had witnessed IPV in their childhoods, and mothers who experienced familial dysfunction during their pregnancies, were more likely to birth infants with altered cortisol activity during the first months of life. Furthermore, several studies have found that mothers exposed to CM experienced cortisol dysregulation during both pregnancy (Epstein et al., 2021; Rinne et al., 2023) and postpartum (Gonzalez et al., 2012). Given the link between experiencing CM and dysregulated maternal stress during pregnancy, the literature indicates that maternal CM may be indirectly linked to her offspring's health outcomes.

1.6 Impact of Maternal Child Maltreatment on Infant Health

Parental history of CM is associated with adverse infant outcomes both directly and via mediating factors (Flagg et al., 2023). A 2004 retrospective evaluation of over 9000 women who had experienced CM identified an increased likelihood of fetal death (Hillis et al., 2004). Similarly, maternal CM has been directly linked to adverse infant birth outcomes. For example,

mothers who had been maltreated in childhood were more likely to give birth to infants of lower gestational age at delivery and lower birth weight (less than 2500g at birth), compared to mothers who had not experienced CM (Smith et al., 2016). Furthermore, the link between maternal CM and infant birth outcomes has been mediated by additional pregnancy characteristics and behaviours (e.g., substance abuse) (Keenan-Devlin, 2023; Smith et al., 2016). Additional adverse aspects of reproductive health are consistently found to be associated with maternal CM, including but not limited to an increased likelihood of pregnancy loss (Noll et al., 2007), preterm birth (born before 37 weeks of pregnancy) (Christiaens et al., 2015), and low birthweight (Harville et al., 2010). Furthermore, an evaluation of the cumulative impact of CM on birth outcomes found that for each additional instance of adversity, the odds of pregnancy loss increased by 12%, the odds of preterm birth increased by 7%, and the odds of low birth weight increased by 8% (Mersky & Lee, 2019), indicating that both the frequency and severity of CM can impact infant outcomes.

It is relevant to note that many studies evaluating the relation between maternal CM and infant outcomes use the Adverse Childhood Experiences questionnaire (ACE questionnaire; Felitti et al., 1998) as a measurement of CM (Racine et al., 2018). The ACE questionnaire is a ten-item measure of an individual's experiences of childhood abuse, neglect, and household dysfunction. Using dichotomous yes/no questions, the resulting measurement is a cumulative index of an individual's number of ACEs experienced. Generally, an increased ACE score is associated with an increased likelihood of adverse health and behavioural outcomes in the affected individual and their offspring (e.g., Chang et al., 2019; Felitti et al., 1998; Racine et al., 2018). Despite the utility of the ACE, a recent evaluation of its psychometric qualities highlighted several methodological concerns, and recommended that future research employ

lengthier, more in-depth instruments to assess experiences of CM (Holden et al., 2020). Furthermore, a drawback of using total ACEs as an index of CM, is that it fails to account for the unique experiences of maternal **threat** and maternal **deprivation** in studies of intergenerational transmission (McLaughlin & Sheridan, 2016).

A recent study applied McLaughlin and Sheridan's model of threat and deprivation within the intergenerational context, by assessing the unique impact of maternal childhood threat and deprivation on infant brain development (Lyons-Ruth et al., 2023). Maternal experiences of childhood deprivation (neglect) were associated with lower infant grey matter volume, whereas maternal experiences of threat (abuse) were associated with smaller infant amygdala volumes (Lyons-Ruth et al., 2023). This evidence further exemplifies the need for research evaluating the intergenerational effects of CM on infant health outcomes, using the threat/deprivation framework.

1.7 Impact of Maternal Intimate Partner Violence on Infant Health

As with CM, the adverse effects of IPV can transcend generations. When IPV occurs during the perinatal period, the risk of adverse health outcomes increases for both the mother and the developing fetus (see Agarwal et al., 2023 for review). A systematic review comparing birth outcomes for women who experienced IPV and women who did not, found that experiencing IPV was associated with preterm birth (Odds Ratio [OR] = 1.84), low birth weight (OR = 2.73), and stillbirth (OR = 1.74) (Guo et al., 2023). Similarly, a meta-analysis of 50 IPV studies reported similar results, in that IPV was significantly associated with preterm birth (OR = 1.91) and low birth weight (OR = 2.11) (Donovan et al., 2016). Furthermore, experiencing physical IPV during pregnancy is directly associated with an increased likelihood of miscarriage, fetal injury, premature delivery, low-birth weight, low gestational age, and longer stays in the

neonatal intensive care unit (NICU) (Agarwal et al., 2023; Chen et al., 2017; Donovan et al., 2016; Wong & Mellor, 2014). In addition, mothers exposed to IPV during pregnancy are more likely to delay or avoid seeking antenatal care (Dietz et al., 1997), less likely to gain sufficient weight during pregnancy (Moraes et al., 2006), and less likely to breastfeed (Lau & Chan, 2007), all of which can adversely impact the infant.

1.8 Independent or Interactive Impact of Maternal CM and IPV on Infant Health

To my knowledge, very few studies have evaluated the combined impact of maternal CM and instances of IPV on infant health outcomes. Phuc Do et al. (2022) evaluated a prospective birth cohort of 150 Vietnamese women, recruited in their third trimester of pregnancy and re-evaluated 3 months postpartum. Approximately 11% of this cohort reported experiencing both CM and IPV during pregnancy. Researchers found that the combination of CM and IPV during pregnancy effectively doubled the risk of both poor maternal mental health outcomes (measured by decreased scores of mental wellbeing and increased scores of perceived stress) and adverse infant outcomes (measured by low-birth weight, preterm birth, and admission to NICU). Although this study is highly relevant on account of its contribution to the literature of intergenerational impacts of CM and IPV, it is limited in its evaluation of CM in that it uses the ACE-IQ (Adverse Childhood Experiences International Questionnaire). Accordingly, instances of maternal CM were evaluated cumulatively, and any differential infant health outcomes associated with unique instances or clustered incidences of maternal childhood threat and deprivation were not considered.

Another study by Kita et al., evaluated the impact of maternal CM and IPV on the mother's perpetration of maltreatment on her own infant (2020). Exposure to both CM and IPV was strongly associated with infant maltreatment at one month (Adjusted odds ratio [AOR] =

5.17, as was experiencing only IPV (AOR = 3.43) and experiencing only CM (AOR = 1.75)). Although the results of this study are relevant in demonstrating the combined and individual impacts of CM and IPV, the outcome is focused on maternal likelihood to perpetrate maltreatment, as opposed to infant health outcomes.

1.9 The Present Study

Given the increased risk for adversity and stress in women who were maltreated either in childhood or by a partner, it is of the utmost importance to evaluate the health outcomes of infants born to this population. Specifically, infant health outcomes should be considered throughout the perinatal window, wherein the potential intergenerational effects of maternal stress can increase the likelihood of adverse outcomes for the infant. Within this context, there are several gaps in the CM literature which we aim to address. Firstly, there is limited research evaluating the potentially distinct impact of different types of maternal maltreatment on infant outcomes, as many studies chart instances of CM based on a cumulative index, using iterations of the ACE scale. Although some studies have evaluated the unique aspects of maltreatment on infant outcomes (see Souch et al., 2022, for review), fewer have done so using the threat/deprivation index (Lyons-Ruth, 2023). Secondly, the combined experiences of CM and experiences of IPV remains ambiguous, and the impact of maternal CM (as measured using the threat/deprivation model) and IPV on infant birth outcomes has not been examined simultaneously, or in a moderating model.

The objectives of the present study are twofold. Firstly, I aim to evaluate maternal experiences of CM via a non-cumulative lens, by assessing the differential impact of maternal threat and deprivation on infant birth outcomes using the model proposed by McLaughlin and Sheridan (2016). I do not hypothesize specific differences between dimensions threat vs.

deprivation, given minimal research on the differential intergenerational effects of maternal threat/deprivation. Secondly, I aim to evaluate maternal experiences of IPV as a moderator of the association between maternal CM and infant birth outcomes. I hypothesize that infants whose mothers experienced high levels of CM coupled with high levels of IPV during pregnancy will experience more adverse birth outcomes relative to CM alone. Given the adverse impact of maternal CM and IPV, and the critical nature of the perinatal period, it is essential to understand the specific and potentially differential effects of maternal threat and deprivation on infant birth outcomes and the moderating role of IPV on this association.

Chapter II: Methodology

2.1 Participants

Participants were recruited via brochures posted to social media and placed in community organizations catering to pregnant people, including the IWK hospital, located in Halifax, Nova Scotia, Canada. Study eligibility criteria included singleton pregnancy under 36 weeks gestation at the onset of the study, mothers to be over the age of 19, literate in English and living in Nova Scotia. Eligible participants were stratified based on their responses to the Adverse Childhood Experiences Questionnaire (Felitti et al., 1998), so that at least 50% of the final total sample endorsed experiencing childhood maltreatment. Study procedures were consistent with the Declaration of Helsinki and cleared by the Mount Saint Vincent University Research Ethics Board prior to study onset.

This sample is part of an ongoing longitudinal study aimed at recruiting 125 mother-infant dyads. Data collection for this thesis occurred across two sessions: during the third trimester of pregnancy (T1) and at two weeks post-birth (T2). At the time of writing, 98 dyads participated in both T1 and T2, and were included in the final analysis. Despite efforts to recruit from high-risk communities, this is a demographically low-risk sample. Mothers in this sample were aged 25-43 years (M = 32.12, SD = 3.98), and were primarily Caucasian (92.9%). The sample was highly educated, with 82.6% achieving a bachelor's degree or higher, and 77.4% of the sample reported their family income between $90,000 - $109,999 per year (see Table 1 for additional demographic information). Regarding infants in the sample, mean age at T2 was 14.91 days, and 48.8% were male (see Table 2 for additional demographic information).

Procedure

The first session (T1) occurred when participants were in the third trimester of their pregnancy. This session took place at Mount Saint Vincent University (MSVU) and consisted of questionnaires regarding childhood experiences, background information, pregnancy health, mental health and wellbeing, and social relationships. Questionnaires were filled out on lab-provided iPads. The second session (T2) occurred within two weeks of the infant's birth and took place either at MSVU or at the participant's home (per their preference). T2 consisted of questionnaires regarding background information, pregnancy health, birth outcomes, mental health and wellbeing, and social relationships. Parent-reported delivery experiences and birth outcomes included mode/method of delivery, birth weight, length at birth, gestational age at birth, head circumference, APGAR (Appearance, Pulse, Grimace, Activity, and Respiration) scores, complications with delivery, and NICU stay duration.

2.3 Measures

2.3.1 Background questionnaire

This 23-item questionnaire was developed by the research team to evaluate demographic information, and includes questions regarding geographic location, race, ethnicity, education, relationship-status, gender identity, and sexual orientation.

2.3.2 Prenatal questionnaire

This 25-item questionnaire was developed by the research team and is a measure of perinatal health. Participants are asked about their pregnancies, including length, number of previous pregnancies, type of prenatal care accessed, and health during pregnancy.

2.3.3 Birth Outcomes

A 34-item questionnaire was developed by the research team to assess parent-reported labour/delivery and birth outcomes. General infant information was collected, including the

gestational age at birth, infant sex, weight, and length, head circumference, APGAR scores, and method of delivery. Complications during and post-birth were tracked, including jaundice, malformation, NICU stay, etc. The number of reported complications was summed, with higher scores representing greater difficulties post-birth and higher numbers of adverse infant outcomes. A dichotomous 'infant birth problems' variable was created, indicating whether infants had experienced any health issues post-birth or if they had not.

2.3.4 Maternal Childhood Maltreatment

The 28-item Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994) was used to evaluate maternal instances of childhood maltreatment. The CTQ is a retrospective self-report measure that assesses experiences of abuse and neglect across five domains: physical abuse, emotional abuse, sexual abuse, emotional neglect, and physical neglect. Each of these domains are represented by individual subscales consisting of specific items. Responses are coded on a five-point Likert scale, with 1 = "never true", and 5 = "very often true". Scores are summed for each subscale, with final scores ranging from 5 to 25. Higher scores indicate a higher level of trauma in that domain. Prior to summing the scores for each subscale, reverse coding was conducted when applicable. Final scores for each abuse/neglect subtype were compared with the recommended low-severity abuse cutoff scores presented by Bernstein and Fink (1998). These cutoff scores were created to identify the maximum number of low-severity cases within a sample and are as follows: emotional abuse: ≥ 9; Physical abuse: ≥ 8; sexual abuse: ≥ 6; emotional neglect: ≥ 10; physical neglect: ≥ 8. Based on theory by McLaughlan & Sheridan (2016), two additional subscales – maternal threat and maternal deprivation – were created using the final summed scores from all five domains. Maternal threat was computed by combining the final scores for emotional, physical, and sexual abuse, whereas maternal deprivation was

computed by combining the final scores for emotional and physical neglect. The CTQ is a psychometrically valid and reliable measure of childhood maltreatment (Saini et al., 2019) and has previously been used in a sample of pregnant women and in the postpartum period, with strong internal consistency (α = .82) (Garon-Bissonette et al., 2022). Internal consistency for the present study was good, with the CTQ total score Cronbach's alpha coefficient α = .839 (subscales α = .602 - .963), suggesting strong reliability amongst the items.

2.3.5 Intimate Partner Violence

The Conflicts Tactics Scale – Short Form (CTS) (Straus & Douglas, 2004) was used to identify maternal instances of threat and/or violence by an intimate partner during pregnancy. These instances of conflict can be categorized into four subscales – physical assault (4 items), psychological aggression (4 items), injury (4 items), and sexual coercion (4 items). Participants are asked to rate the frequency of each behaviour, as committed both by themselves and their partner. Responses are coded on an 8-point Likert scale: 0 = "this behaviour has never happened", 1 = "this behaviour occurred once in the past year", 2 = "this behaviour occurred twice in the past year", 3 = "3 – 5 times in past year", 4 = "6 – 10 times in past year," 5 = "11 – 20 times in past year", 6 = "more than 20 times in past year", and 7 = "not in the past year, but it did happen before". The midpoints of each of these response categories were summed for each participant (for example: category 4 = the behaviour occurred 6 – 10 times in the past year, meaning that the midpoint score is 8). Two new variables, evaluating **prevalence** and **chronicity** of IPV, were created from the physical assault, psychological aggression, injury, and sexual coercion scales. The chronicity variable is made up of the summed mid-point scores, thereby evaluating frequency of IPV, with higher scores indicating more experiences of IPV during pregnancy. The prevalence variable is a 0-1 dichotomy, with a score of 0 assigned for no

experiences of IPV, and a score of 1 assigned for any experiences of IPV. The CTS is a psychometrically valid and reliable measure of intimate partner conflict: in an evaluation of 14 studies that had used the CTS, investigators found a median reliability estimate of .86 (Straus and Mickey, 2012). Internal consistency for this study was moderate, with a Cronbach's alpha coefficient $\alpha = .662$ (subscales $\alpha = .310$ - $.669$), suggesting reasonable reliability amongst the items.

2.4 Statistical Analyses

Data analyses were conducted using the Statistical Package for the Social Sciences (SPSS; SPSS Inc., Chicago, IL). Data was initially evaluated by computing means, standard deviations, and frequencies of all variables of interest. Histograms, along with skew and kurtosis values, were used to visualise and evaluate the normality of each subscale of the CTQ, CTS, and birth outcomes.

CTS mid-point responses were summed to create chronicity variables for each of the four subtypes of IPV (psychological aggression, physical assault, injury, and sexual coercion). Higher scores were indicative of more frequent instances of IPV while pregnant. An IPV total variable was computed by summing the scores of the four IPV subtypes. Prevalence variables were also created for each of the four subscales, representing whether any instance of IPV had occurred in the past year. In terms of maternal childhood maltreatment, two additional subscales – maternal threat and maternal deprivation – were created using the final summed scores from all five CTQ domains. Maternal threat ($\alpha = .877$) was computed by combining the final scores for emotional, physical, and sexual abuse, whereas maternal deprivation ($\alpha = .875$) was computed by combining the final scores for emotional and physical neglect.

Multiple types of infant health outcomes were recorded individually, including APGAR scores, head circumference, infant weight at birth, malformation, etc. It was found that several

outcome variables (head circumference, APGAR 1, 5, and 10) were insufficiently powered, and thus they were removed from future analysis. Thereafter, a new variable representing a total score of infant health outcomes was created by summing scores of intercorrelated post-natal health issues including, jaundice, low glucose, malformation, breathing problems, metabolic disorder, prolonged hospital stay, and blue baby syndrome. A dichotomous 'infant birth problems' variable was created, indicating whether infants had experienced any health issues post-birth or if they had not.

After computing necessary subscales, an exploratory factor analysis was conducted to evaluate underlying factors represented by infant gestational age, weight, length, NICU stay, and total infant health outcomes. Kaiser-Meyer-Olkin (KMO) and Bartlett tests were conducted, and missing values were replaced via mean substitution.

To identify potential covariates for regression analyses, a correlational analysis was conducted to assess associations between infant birth outcomes, both individually and with factor scores, and sociodemographic variables, including infant sex, delivery method, and maternal demographics (race, ethnicity, age, education level, marriage status).

Finally, four separate stepwise regression analyses were conducted to evaluate the independent and interactive impacts of maternal CM (threat and deprivation, consecutively) and IPV on infant birth outcomes (factor scores).

Chapter III: Results

3.1 Descriptive Statistics

CTQ scores were relatively low, indicating that despite our efforts to stratify the sample, many of our mothers had experienced limited or low-severity childhood maltreatment. The response range for all CTQ subscales was 5 – 25, making interpretability difficult (see Table 4). See Figure 2 for percentages of the sample reporting CM subscales above established CTQ cut off scores. Emotional abuse was the most experienced maltreatment, with scores ranging from 5-22 (M = 9.97, SD = 4.76), and approximately half (N = 47, 48%) of mothers exceeding the severity index of emotional abuse scores ≥ 9 (Bernstein & Fink, 1998). Both physical and sexual abuse was experienced less regularly by our sample. Physical abuse scores ranged from 5 – 17 (M = 6.06, SD = 1.88), and only 18.4% (N = 18) of mothers exceeded the severity index ≥ 8. A similar number (N = 19, 19.4%) of mothers reported sexual abuse above the severity index ≥ 6, with scores ranging from 5 – 25 (M = 6.35, SD = 3.93). Scores of emotional neglect ranged from 5 – 24 (M = 8.47, SD = 4.60), with 30% (N = 31) of participants reporting scores above the severity index ≥ 10. Lastly, scores of physical neglect ranged from 5 – 21 (M = 6.85, SD = 3.01), with 25.5% (N = 25) reporting scores above the severity index ≥ 8 . To reduce skewness and improve interpretability, all CTQ data was log-transformed (see Table 5). Log-transformations minimized skewness.

CTS scores were considered both on a chronic (see Table 6) and dichotomous scale (see Table 7), and both indicated low instances of IPV across our sample. CTS psychological aggression scores ranged from 0 – 55, (M = 5.58, SD = 9.56), with the majority of mothers (N = 51, 52%) reporting experiencing at least one instance of psychological aggression from their partners during pregnancy. All other forms of IPV were reportedly less widespread. Sexual

coercion scores ranged from 0 – 4 (*M* = .15, *SD* = .67), with only 3.1% (*N* = 3) of participants having experienced sexual coercion from a partner while pregnant. Similarly, 4.1% (*N* = 4) of mothers reported experiencing physical assault from a partner while pregnant, with scores ranging from 0 – 5 (*M* = 1.36, *SD* = .65.). The least reported instance of IPV was injury, with only 1 participant (1%) reporting experiencing injury from a partner while pregnant. These scores ranged from 0 – 4 (*M* = .045, *SD* = .47). See Figure 3 for frequency of participants endorsing different IPV experiences in the past year.

Infant anthropometric measurements were comparable to other healthy neonatal populations (Shakya et al., 2022; Tesfa et al., 2023). Birth outcomes included birth weight (*M* = 3.49 kg, *SD* = 0.46 kg), length at birth (*M* = 51.61 cm, *SD* = 1.33 cm), and head circumference (*M* = 34.82 cm, *SD* = 1.33 cm). Mean gestational age at birth was 39.59 weeks (*SD* = 1.11 weeks). Of the 76 people who divulged their infants' health issues, 21 (27.6%) reported that their baby had experienced 1 or more health issue(s) post-birth (jaundice, low glucose, etc.) (see Table 2). Summed scores of infant health outcomes ranged from 0 – 4, with 56% of participants reporting no infant health issues, 11% reporting 1 health issue, 6.2% reporting 2 health issues, 3.1% reporting 3 health issues, and only one reporting 4 health issues (*M* = .47, *SD* = .90) (see Table 2 for all illnesses and frequencies). Only 5% (*N* = 5) of infants spent time in the NICU post-birth.

3.2 Main Analyses

3.2.1 Factor Analysis

The factor analysis explored the underlying structure of variables related to infant health outcomes. Based on eigenvalues greater than 1, two factors were extracted, cumulatively explaining 60.03% of the total variance (see Table 8). In this 2-factor solution for infant

outcomes, gestational age, birth weight, and length at birth loaded together onto Factor 1 (Infant Health Indices), and infant problems summed and NICU stay loading onto Factor 2 (Infant Health Conditions). This model was supported via a confirmatory factor analysis using pairwise comparisons. The KMO measure of sampling adequacy was found to be 0.501. Additionally, Bartlett's test of sphericity was statistically significant ($\chi^2 = 30.51$, $df = 10$, $p < .001$), supporting the factorability of the correlation matrix. Both factors were mean imputed to account for missing data.

3.2.2 Identifying Covariates

Correlation analyses were conducted to explore potential covariates associated with infant health outcomes, both individually and from the two-factor model. Potential covariates included maternal race, ethnicity, minority status, education, marital status, number of children, age, work hours, infant sex, birth location, and method of delivery (see Table 9). As the sample was primarily White ($N = 91$, 93%), the maternal race variable was coded categorically, 0 = White, and 1 = Other. Of these variables, only maternal race and method of delivery (specifically, experiencing both labour and a caesarean birth) were significantly correlated with factored and individual infant outcomes (see Table 9). Specifically, maternal race was negatively correlated with infant birth weight ($r = -.342$, $p = .002$), infant gestational age ($r = -.323$, $p = .004$), and Factor 1: Infant Health Indices ($r = -282$, $p = .005$). Overall, being non-white was correlated with giving birth to an infant of lower birth weight and infant gestational age. Method of delivery was only found to be significantly correlated with infant birth outcomes when the mother underwent initial labour, and then also experienced a caesarean section. In these instances, undergoing labour and caesarean was positively correlated with baby problems summed ($r = .255$, $p = .026$), baby problems dichotomous ($r = .275$, $p = .012$) low glucose ($r =$

.425, p = .043), and Factor 2: Infant Health Conditions (r = .244, p = .027). Overall, delivering a baby via caesarean after attempting labour was correlated to an increased likelihood of infant health issues.

3.2.3 Regression Analyses

Four stepwise linear regression models were conducted to assess the main effects of maternal CM (threat and deprivation) and maternal IPV, as well as their potential interactive effect on infant birth outcomes (Factor 1: Infant Health Indices, and Factor 2: Infant Health Conditions) (see Tables 10-13). Each model evaluated a unique combination of maternal adversity factors and their interactions with IPV, with a focus on factored infant birth outcomes. Significant covariates (maternal race and delivery method) were included in the stepwise regression.

3.2.3.1 Model 1: Maternal Threat, Maternal IPV, and Threat x IPV Interaction on Factor 1: Infant Health Indices. The first stepwise regression model examined the predictors of infant health indices, including maternal threat, maternal IPV, and their interaction. The results indicated that although race and delivery were significant covariates, none of the main predictors of interest significantly contributed to the variance in Factor 1 infant birth outcomes (Table 10).

3.2.3.2 Model 2: Maternal Threat, Maternal IPV, and Threat x IPV Interaction on Factor 2: Infant Health Conditions. In the second stepwise regression model, maternal threat, maternal IPV, and their interaction were entered as predictors of infant health conditions. Like Model 1, none of the main predictors significantly predicted infant birth outcomes (Table 11). Race and delivery method were significant covariates.

3.2.3.3 Model 3: Maternal Deprivation, Maternal IPV, and Deprivation x IPV Interaction on Factor 1: Infant Health Indices. The third stepwise regression model assessed

predictors maternal deprivation, maternal IPV, and their interaction on infant health indices. Once again, apart from race and delivery method, none of the predictors emerged as significant predictors of infant birth outcomes (Table 12).

3.2.3.4 Model 4: Maternal Deprivation, Maternal IPV, and Deprivation x IPV Interaction on Factor 2: Infant Health Conditions. The final stepwise regression model investigated the impacts of maternal deprivation, maternal IPV, and their interaction, infant health conditions. None of the predictors were statistically significant (Table 13). Race and delivery method were significant covariates.

Chapter IV: Discussion

The intergenerational effects of maternal CM on infant birth outcomes were investigated in this study. In addition, I evaluated how experiences of IPV during pregnancy can exacerbate the association between maternal CM and infant birth outcomes. Although prior research demonstrates that both CM and IPV can adversely affect infant birth outcomes (Agarwal et al., 2023; Flagg et al., 2023), the existing literature is limited in the examination of global/cumulative indices of maternal CM on infant outcomes (Holden et al., 2020), and there is limited understanding of how maternal CM and IPV interact during pregnancy to influence infant health (Phuc do et al., 2021). This study uniquely contributes to the literature by separately evaluating the differential impacts of maternal childhood threat and deprivation on infant birth outcomes, utilizing McLaughlin and Sheridan's (2014) model, and by being among the first to investigate how IPV moderates the relation between maternal CM and infant birth outcomes.

4.1 Impact of Race on Infant Outcomes

In our present sample, maternal race was found to have a significant impact on infant birth outcomes. Specifically, when mothers were non-White, their infants had an increased likelihood of lower birth weight and decreased gestational age at birth. The races comprising the non-white category of our sample included 5 participants who identified as Asian, and 2 participants who identified as Arab. The significant impact of race on infant outcomes aligns with existing literature, which suggests that racial disparities can influence health outcomes due to a variety of systemic factors.

Racial disparities persist in income and employment, often leading to economic disadvantages for families of certain racial and ethnic backgrounds. Lower income levels can result in inadequate access to essential resources such as nutritious food, safe housing, and

quality healthcare, critical for healthy pregnancy and infant development (Adler & Newman, 2002; Braveman & Barclay, 2009). Similarly, educational disparities contribute to differences in health literacy and the ability to navigate healthcare systems (Cutler & Lleras-Muney, 2006). However, it's worth noting that our sample, consisting predominantly of highly educated and higher-income participants, may not reflect these socioeconomic challenges. In fact, race, income, and education were not significantly associated in our sample, and there were very few non-white participants, limiting the generalizability of our findings to other marginalized populations. In addition, while certain environmental factors associated with minority status - such as living in disadvantaged neighborhoods and exposure to environmental toxins - can also impact infant health outcomes (Diez Roux & Mair, 2010), these were not directly assessed in our study, so can not be evaluated as playing a role. Nonetheless, understanding the complex interplay of socioeconomic status, neighborhood conditions, access to quality healthcare, and experiences of discrimination is crucial in comprehensively examining the impact of race on infant outcomes, warranting further research in diverse populations.

4.2 Impact of Delivery Method on Infant Outcomes

In addition to race, the only other maternal characteristic found to have a significant impact on birth outcomes was method of delivery. Specifically, when mothers experienced labour followed by a caesarean section, their infants experienced an increased likelihood of higher summed scores of infant health issues (i.e., the combined scores of jaundice, malformation, breathing problems, metabolic disorder, prolonged hospital stay, and blue baby syndrome). Prolonged labor, often associated with fetal distress, can lead to complications such as hypoxia (Myers et al., 2020), which poses risks to the infant's immediate and long-term well-being. Similarly, emergency C-sections, prompted by urgent conditions such as maternal or fetal

distress, introduce added stress and urgency, potentially increasing the likelihood of complications.

Interestingly, a study evaluating the impact of maternal experiences of CM on caesarean section likelihood reported a significant association between experiencing any maltreatment during childhood, and an increased likelihood for caesarean sections during labour (Lukasse et al., 2010). However, no distinct categories of CM were specifically associated with caesarean during labour, meaning that there was only a significant association when experiences of CM overall were considered. Although our total scores of threat and deprivation were not correlated with delivery via labour and caesarean, the relation between instances of CM and delivery method should be further evaluated. Nevertheless, the association between delivery method and infant health outcomes highlights the importance of labour and delivery in shaping the health trajectories of newborns.

4.3 CM: The Role of Frequency and Severity

Despite the significant impact of maternal race and delivery method, we failed to find significant effects of maternal CM on infant birth outcomes. Our results align with very little of the existing literature evaluating the impact of CM on infant birth outcomes. Prior studies have reported significant associations between maternal CM and adverse birth outcomes, such as low birth weight, gestational diabetes, gestational age, and preterm birth (Smith et al., 2016; Kern et al., 2022). One key factor that might explain these discrepancies is the severity of maltreatment reported in our sample. Previous studies have shown that the severity and chronicity of maltreatment are critical in significantly impacting birth outcomes (Mersky & Lee, 2019; Smith et al., 2016). For example, Keenan-Devlin et al. (2023) found that the more domains of childhood abuse/neglect endorsed by participants, the more likely their infants would be born

small for gestational age. However, this was only true when the CM was rated as moderate or severe. Specifically, for each domain of moderate or severe CM endorsed, the likelihood of delivering a small for gestational age infant increased by 27%. Notably, this was in comparison to subjects who reported instances of CM, but whose experiences were classified as minor. This is an important distinction, particularly given the low severity of maltreatment endorsed by the current sample. Similarly, Shamblaw et al. (2021), found that participants with a history of both childhood sexual abuse and childhood emotional abuse had double the likelihood of experiencing perinatal and obstetric complications when compared to a non-abused population. However, after adjusting for lifetime psychiatric disorders, only childhood sexual abuse was found to be significant, further indicating that the type/severity of maltreatment may influence infant outcomes via differential means. Finally, a recent meta-analysis by Brunton (2024), reported that child physical abuse and child sexual abuse specifically were the most endorsed forms of CM associated with birth complications, adverse health outcomes, and NICU stay.

These findings bode poorly for this study, considering that our most prevalent reported form of CM was emotional abuse (48%), loosely followed by sexual (19%) and physical (18%) abuse. Although childhood emotional abuse has been associated with infant health outcomes, it has rarely been found to have an independent intergenerational impact: rather, when combined with other forms of CM, childhood emotional abuse has been found to impact infant outcomes (e.g., Ciciolla et al., 2021; Keenan-Devlin et al., 2023). I do not mean to dismiss the distinct impact of experiencing childhood emotional abuse, which can be devastating and debilitating. However, it is possible that the intergenerational impacts of childhood emotional abuse occur via differential avenues than other forms of CM (sexual, physical). For example, a meta-analysis by Greene et al. (2020) found that those with a history of child emotional abuse were more likely to engage in

abusive or neglectful parenting behaviours when compared to those without a history of emotional CM. Furthermore, Dye (2019) argues that experiencing emotional abuse can be detrimental to a child's perception of self, others, and the world at large – essentially, arguing that the most damaging aspect of emotional abuse is the abnormal social and cognitive development that occurs from having emotionally unreliable, or rejecting, parents. Should this be the case, it would make logical sense to not see intergenerational impacts on infant health outcomes in a cohort primarily reporting maternal history of emotional maltreatment.

Another contributor to our null findings could be the use of McLaughlin and Sheridan's (2016) threat/deprivation model, without sufficient variation of abuse/neglect subtypes. Specifically, considering our low physical and sexual abuse prevalences, our threat variable was realistically mostly reflective of emotional abuse. In comparison, Schäfer et al. (2023) successfully used the threat/deprivation model to identify distinct aspects of cognition and psychopathy within the exposed generation. Despite creating our threat/deprivation scales relatively similarly (with threat incorporating instances of sexual, physical, and emotional CM, and deprivation encompassing instances of emotional or physical neglect), Schäfer et al.'s analysis of early life adversity was far more robust. For example, where I only evaluated maternal adversity using one scale (CTQ), Schäfer et al. considered many more sources of possible threat experiences, such as a PTSD assessment, and both child and parental reports of lifetime exposure to abuse or attack, witnessing domestic violence, instances of bullying, and more (2023). Similarly, Schäfer et al. created their deprivation measure by assessing maternal level of education, familial income, paternal presence, and both child and parent reports of instances of physical neglect (2023).

Given the dimensional nature of the threat/deprivation model, it is possible that the amount of information included equates to the success of the model. The sample evaluated by Schäfer et al. was a subset (N = 2,511) from a very large (N = 9,937) school-based community cohort, in which a wide range of data were collected. Accordingly, the measures of threat and deprivation were far more substantial and reflective of the sample, as they included more specific information. The low-risk makeup of our sample, combined with the inclusion of only domains of CM within the threat and deprivation measures, may have contributed to our lack of significant findings. Future research should explore how more comprehensive/ robust measures of maternal threat and deprivation (i.e., the inclusion of maternal education, income, and paternal presence in the deprivation measure) relate to infant health outcomes.

4.4 IPV: The Role of Frequency and Severity

I did not find that experiences of IPV moderated the relation between maternal CM and infant birth outcomes. Our sample disclosed low instances of IPV overall, except for psychological aggression, which was reported by 54% of participants. This is consistent with other research which identifies psychological aggression as the most common form of IPV during pregnancy (Silverman et al., 2006; Taillieu et al., 2016). However, the lower prevalence rates of physical (4.1%) and sexual (3.1%) IPV in our study diverge from other research reporting higher rates (Coker, 2006; Chambliss, 2008). Numerous studies have found significant associations between IPV severity and adverse infant birth outcomes. Silverman et al. (2006) and Gavin et al. (2012) reported that sexual IPV was significantly associated with preterm birth and low birth weight, with prevalence rates of 7.7% and 9%, respectively. In contrast, our study's lower prevalence of sexual coercion (3.1%) was not significantly related to birth outcomes. This could indicate that more severe or frequent sexual IPV has a more pronounced impact on

maternal and infant health. Our lower rates of physical and sexual IPV may contribute to the lack of significant findings in our study.

It is possible that the most frequent type of IPV reported by our sample is incongruent with an increased likelihood of adverse infant outcomes. Specifically, it seems possible that the most reported form of IPV in this sample (psychological aggression, reported by 54% of participants), is not as strongly associated with infant outcomes, compared to other types of IPV. This concept is supported by Alhusen et al. (2015) whose literature review evaluated the impact of IPV during pregnancy on neonatal outcomes (low birth weight, preterm birth, and preterm death). They found that instances of physical assault and injury were most strongly associated with adverse infant outcomes. Specifically, when participants delivered their infants during a hospitalization due to a previous assault by their partner, their infants were three times as likely to be born with low birth weight when compared to unharmed women (Alhusen et al., 2015). If the delivery occurred later, after mothers had already been discharged, infants still had a greater likelihood of low birth weight and preterm birth, in addition to a greater likelihood of hemorrhage and placental abruption during delivery. In one study evaluated by Alhusen et al. (2015), it was found in a low-income sample from Texas, that experiencing physical IPV during pregnancy was associated with an increased likelihood of neonatal death in comparison to the non-maltreated group (1.5% versus 0.2%) (Yost et al., 2005). Finally, Alhusen et al. (2015) found that those who had experienced more frequent instances of IPV during pregnancy (10+) were more likely to deliver a low-birth-weight infant, than those who had experienced fewer instances of violence during pregnancy, results that further support the essentialness of maltreatment frequency on significant intergenerational impacts. Considering that the only forms of IPV found to significantly impact birth outcomes in Alhusen et al.'s meta-analysis (2015)

were physical abuse and injury, it is perhaps understandable why we did not find significant associations between IPV and birth outcomes in the present sample. The reported prevalence of physical assault within our sample was 4.3%, whereas injury was only reported by 1% of the sample. Other research also indicates that IPV is not significantly associated with infant birth outcomes in small samples or samples with low prevalence of IPV (Berenson et al., 1994; Bullock & McFarlane, 1989; Grimstad et al., 1997).

4.5 Intergenerational Adversity: The Role of Frequency and Severity

The concept that high severity of maternal adversity is requisite to impact infant birth outcomes is supported by Ciciolla et al., 2021, who evaluated the relation between maternal adversity (measured using the ACE scale) and adverse infant outcomes, using a sample of 164 pregnant women. The partitioning of maternal CM experiences in this study was as follows: low maltreatment (0-2 ACEs), moderate maltreatment (3-5 ACEs), and high maltreatment (6+ ACEs). Ciciolla et al. (2021) found that women who had experienced high maltreatment had 4 times greater odds of birthing an infant with adverse health outcomes (coded dichotomously as having experienced at least one instance of premature birth or low birthweight), when compared to women who had experienced low or moderate ACEs. Similarly, women who had experienced high scores of CM had 9 times the odds of reporting a NICU hospitalization, and 4 times greater odds of reporting any pregnancy or birth complications at all, when compared to those from the low and moderate maltreatment categories. These findings are relevant, as they support the hypothesis that experiencing any form of CM is insufficient to significantly impact infant outcomes. Rather, the maltreatment experienced must reach a certain threshold of severity and frequency to have an intergenerational impact. The findings by Ciciolla et al. (2021) support previous literature which has found links between maltreatment severity and infant outcomes

(Christiaens et al., 2015; Mersky & Lee, 2019; Smith et al., 2016). Notably, Smith et al. (2016) found that for each additional ACE, birth weight decreased by 13.79 g, while the total decrease in gestational weeks was 0.063 weeks per unit increase of ACE. These findings were similarly supported by Mersky and Lee (2019), who found that for each additional instance of adversity, the odds of pregnancy loss, preterm birth, and low birth weight increased. These findings, in combination with our nonsignificant results, further demonstrate the nuanced nature of the intergenerational transmission of trauma, suggesting that the extent and severity of maternal maltreatment likely plays a crucial role in influencing infant health outcomes.

4.6 The Interactive Impact of CM and IPV

Only one other study to date (Phuc Do et al., 2021) has examined how IPV moderates the impact of CM on infant birth outcomes (dichotomously generated yes/no if the infant had low birth weight, or preterm birth, or NICU admittance). Phuc Do et al., found that infants had twice the risk of experiencing adverse birth outcomes if their mothers had experienced any form of IPV during pregnancy, and that that risk increased if their mothers were exposed to both CM and IPV. It is possible that our differing findings are related to demographic differences, including type/severity of maltreatment reported, differential cultural standards, and/or methodological disparities.

Specifically, Phuc Do et al. reported a comparable proportion of mothers who had experienced some instance of CM - approximately 55% in their sample versus 48% in ours. Similarly, our study samples had comparable levels of emotional abuse (45% vs. 48%). However, disparities revealed themselves in other patterns of victimization. Phuc Do et al.'s sample reported higher instances of childhood physical abuse (33%) compared to our sample (18%). In contrast, our sample reported almost three times the prevalence of childhood sexual

abuse in comparison to Phuc Do (19 % vs. 6%). Interestingly, neglect was the lowest reported form of CM from Phuc Do et al.'s sample, disclosed by a mere 1.33% of participants. Furthermore, their research team evaluated neglect as a singular scale, as opposed to differentiating the specifics of emotional (30%) and physical neglect (25.5%), as we did.

Our sample was mostly comparable to Phuc Do et al. in terms of IPV exposure, psychological aggression notwithstanding. Our sample disclosed low instances of IPV overall, except for psychological aggression which was reported by 54% of participants. In comparison, only 14% of the Vietnamese sample reported experiencing "emotional IPV". Interestingly, physical and sexual IPV frequency were consistent across studies. The prevalence for both sexual and physical IPV was 3.3% from the Vietnamese population, while our sample reported similar numbers (physical assault = 4.1%, sexual coercion = 3.1%). Phuc Do et al. did not report instances of injury. Taken together, there are notable differences in the reported forms of maltreatment between the two studies that may contribute to differing results (see Figure 4).

Another potential explanation for the differing findings lies in cultural norms and attitudes surrounding child discipline and the reporting of abuse. Phuc Do et al. highlights the normalization of corporal punishment in Vietnamese society, which may account for the higher rates of reported physical abuse in their sample. However, this explanation does not account for the lower prevalence of reported sexual abuse and neglect, suggesting that other factors may be at play. Regardless, it is possible that these demographic factors played a role in our differential findings. Alternatively, methodological differences may be at work. Generally, Phuc Do et al. had approximately 50 more participants, which would have influenced statistical power. Additionally, Phuc Do et al. used an augmented-inverse-probability weighted (AIPW) model to handle incomplete data and estimate risk differences for outcomes of interest, which we did not.

Furthermore, they used structural equation modelling (SEM) to analyze the relationships between CM, IPV, and birth outcomes, which may have allowed for greater accuracy within their population.

In addition to lower severity of CM/IPV, the demographic profile of our study population could partly explain the divergence in findings to the larger literature. Our participants were predominantly highly educated, White, and financially well-off, none of which are risk factors for adverse birth outcomes (see Currie, 2011, for a thorough review of the causes/consequences of birth inequality). Furthermore, the impact of IPV on infant birth outcomes is often found to be significant when evaluating diverse and often socioeconomically disadvantaged populations. For example, studies by Bailey (2010) and Coker et al. (2006) included participants from various racial and socioeconomic backgrounds and found that IPV, particularly physical and sexual violence, significantly increased the risk of preterm birth and low birth weight. This theory may be further supported by the fact that within our sample, maternal race was found to significantly impact infant outcomes.

4.7 Possible Indirect Effects of CM and IPV via Biopsychological Factors

It is possible that maternal CM and IPV do not have a direct effect on infant birth outcomes, but rather have an indirect influence via biopsychosocial pathways during the prenatal period. This possibility is supported by the DOHaD framework, which suggests that early life experiences, including maternal biology, can shape fetal development and have long-term health consequences (Lacagnina, 2020). Two plausible prenatal biological factors that could account for indirect effects on infant birth outcomes are the dysregulated HPA axis and compromised immunity (see Bowers & Yehuda, 2016, for full review of intergenerational stress mechanisms and pathways).

High levels of stress can lead to chronic over-activation or under-activation of the HPA axis, resulting in abnormal cortisol levels (see Murphy et al., 2022 for review). Elevated cortisol levels are often observed in individuals who have experienced significant early life stress, leading to a state of hyperarousal (Gonzalez, 2013; Murphy et al., 2022). Conversely, some individuals may exhibit blunted cortisol responses due to prolonged exposure to stress (Murphy et al., 2022). HPA alterations can persist into adulthood, contributing to various psychological and physiological problems, including anxiety, depression, and metabolic disorders (Watson & Mackin, 2006).

Women exposed to CM and/or IPV can show altered HPA axis functioning and elevated cortisol output during pregnancy (Buss et al., 2017; Cicchetti et al., 2011; Heim et al., 2000; Moog et al., 2022). Elevated maternal cortisol can cross the placenta, affecting fetal development and leading to heightened stress reactivity in the child (Jagtap et al., 2023). Concurrently, infants of parents who experienced chronic and/or severe stress throughout their lives may show altered HPA axis functioning, much like the patterns seen in their parents (i.e., heightened or blunted stress response) (Murphy et al., 2022). In turn, altered fetal HPA functioning is associated with compromised fetal development and adverse birth outcomes, including but not limited, to preterm birth (Wadhwa et al., 2011), low birth weight, and low gestational age at birth (Wadhwa et al., 2004).

In addition to the HPA axis, the immune system is also highly responsive to stress. Heightened stress exposure can lead to long-term changes in immune functioning, including chronic inflammation (Liu et al., 2017), and compromised immunity (Glaser & Kiecolt-Glaser, 2005). Specifically, it has been found that experiences of CM and IPV can induce altered stress responses that impact healthy immune functioning (Danese & Lewis, 2017; Gouin & Kiecolt-

Glaser, 2011). This change in immune health is particularly relevant to pregnant populations: the immune system naturally adapts throughout pregnancy by attenuating inflammatory responses (Aguilar-Valles et al., 2007), theoretically to protect the infant from rejection by the maternal immune system. Accordingly, stress-induced immune deficiencies (either via CM or IPV exposure) are uniquely important to evaluate and observe throughout pregnancy, as they can affect infant health (see Christian, 2012, for review). Specifically, infants born to parents with dysregulated immunity can also exhibit similar signs of dysregulation, such as heightened inflammation or compromised immune responses (Chen et al., 2021). This dysregulation, in turn, is associated with an increased likelihood of adverse birth outcomes, including decreased gestational length, decreased birth weight, limited fetal growth, and preterm birth (see Beydoun & Saftlas, 2008, for meta-analysis).

Although cortisol dysregulation and immune responsivity may be indirect mechanisms of the impact of CM/IPV on infant outcomes, I did not process or analyze biological indices of immunity for this thesis, and therefore cannot confirm their role in this study. However, saliva samples were collected as part of the larger research project, meaning that future studies can evaluate the possible relations between CM, IPV, maternal immunity, and infant outcomes. Ideally, this research will further elucidate the potential indirect effects of CM/IPV on infant outcomes.

4.8 Study Limitations

It is important to consider study findings in light of study limitations. First, the present sample is quite homogeneous and low-risk in terms of sociodemographic characteristics (i.e., high income and education, primarily White), which limits the generalizability of our findings, particularly to higher-risk groups. Therefore, future research should aim to include a more

diverse sample to provide insights into the relationships studied here within different demographic contexts. Secondly, despite our efforts to recruit in high-risk communities, the overall nature of the severity of CM and IPV reported in this sample was quite low. Additionally, our reliance on self-reported data poses limitations, especially given the low response rates for infant outcomes. Given that our infant data was collected within two weeks post-birth, there is a potential for recall bias. Participants may have struggled to accurately recall events amidst sleep deprivation and other stressors associated with the early perinatal period. Despite efforts to mitigate these challenges, it was not feasible within our timeline to incorporate objective birth measures (i.e., health records). In the future, I plan to access hospital health records, to determine whether our lack of significant effects was indeed due to the subjectivity of our infant outcomes. Lastly, we were unable to assess indirect effects of maltreatment via biological measures, as it was not feasible to process and analyze this data within the timeframe of this project. Future studies should consider analyzing possible biological mechanisms of action, including indices of cortisol output and immune functioning, to identify indirect effects on infant outcomes.

4.9 Future Directions

Given the study limitations outlined, several future directions are recommended. Firstly, expanding the sample to include a more diverse range of participants, particularly those from higher-risk groups, would allow for a more comprehensive understanding of the relations studied across different demographic contexts. This could involve recruiting participants from varied socioeconomic backgrounds, racial and ethnic groups, and with varying levels of risk factors such as maternal mental health issues or substance use. Although we endeavoured to recruit from lower-socioeconomic and higher-risk communities, such a population was not represented within our sample. Additionally, incorporating objective measures alongside self-reported data could

provide a more nuanced understanding of the associations between maternal CM, IPV, and infant health outcomes. Accessing hospital health records for infant outcomes could mitigate the potential for recall bias and provide more accurate data. Furthermore, as the effects of CM and IPV on birth outcomes appear to be indirect, future studies should consider a multi-method approach evaluating possible biological mechanisms of action (cortisol output, immune functioning, etc.). Longitudinal studies that follow participants over time could elucidate the long-term effects of maternal maltreatment and intimate partner violence on child development and health outcomes. Finally, intervention studies aimed at mitigating the impact of maternal adversity on infant health could provide valuable insights into strategies for improving perinatal care and outcomes for vulnerable populations.

4.10 Conclusion

The present study evaluated the impact of maternal childhood maltreatment and intimate partner violence on infant birth outcomes. In this low-severity CM sample, we found no direct association between maternal adversity and infant outcomes. However, it was found that being non-White, and delivering a baby via labour and caesarean section, is associated with an increased likelihood of poor birth outcomes. Limitations in sample homogeneity and reliance on self-reported data suggest the need for future research with more diverse populations and objective measures to better understand these complex relationships and inform targeted interventions.

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Table 1: Maternal Descriptives

Variable		N (%)	Mean	SD	Min	Max	Range
Age	Total	98	32.12	3.98	25.00	43.00	18.00
Race							
	White/European	91 (92.9%)					
	Asian	4 (4.1%)					
	Indigenous	0 (0.0%)					
	African	0 (0.0%)					
	Latin American	0 (0.0%)					
	Oceanian	0 (0.0%)					
	Other	3 (3.1%)					
	Total	98 (100.0%)					
Ethnicity							
	North American	82 (83.7%)					
	Aboriginal	1 (1.0%)					
	Latin/Central/ South American	2 (2.0%)					
	Other	13 (13.3%)					
	Total	98 (100.0%)					
Education							
	High School diploma	4 (4.1%)					
	Trade Certificate	5 (5.1%)					
	College/CEGEP	5 (5.1%)					
	University certificate	3 (3.1%)					
	Bachelor's degree	39 (39.8%)					
	Master's degree	36 (36.7%)					
	PhD	2 (2.0%)					
	MD	4 (4.1%)					
	Total	98 (100.0%)					
Income							
	Less than $20,000	1 (1.2%)					

	$20,000 - $34,999	1 (1.2%)
	$35,000 - $69,999	9 (10.7%)
	$70,000 - $89,999	8 (9.5%)
	$90,000 - $109,999	22 (26.2%)
	$110,000 - $149,999	20 (23.8%)
	$150,000 - $199,999	17 (20.2%)
	$200,000 +	6 (7.1%)
	Total	84 (100.0%)
Method of Delivery	Spontaneous vaginal	39 (47.6%)
	Assisted vaginal	24 (29.3%)
	Labour and caesarean	14 (17.1%)
	Caesarean only	5 (6.0%)
	Total	82 (100.0%)
Marital Status	Married	60 (71.4%)
	Common-law	20 (23.8%)
	In a relationship but not married or common-law	2 (2.4%)
	Single	1 (1.2%)
	Separated	1 (1.2%)
	Total	84 (100.0%)
Number of Children	0	54 (55.1%)
	1	32 (32.7%)
	2	10 (10.2%)
	3	1 (1.0%)
	4+	1 (1.0%)
	Total	98 (100.0%)

Weekly Work Hours (SAHM included)	0 hours	5 (5.1%)					
	1-29 hours	7 (7.1%)					
	30-48 hours	76 (77.6%)					
	49+ hours	10 (10.2%)					
	Total	98 (100.0%)					
Relationship Duration (years)	Total	80 (100.0%)	7.96	4.18	1.00	20.00	19

Note: SAHM = Stay at home mom

Table 2: Infant Descriptives

Variable		N (%)	M	SD	Min	Max	Range
Gest. age (weeks)		80 (100.0%)	39.59	1.11	37.14	41.86	4.72
Birth weight (kg)		83 (100.0%)	3.49	.46	2.27	5.05	2.78
Birth length (cm)		65 (100.0%)	51.61	1.33	47.00	58.42	11.42
Head circ. (cm)		35 (100.0%)	34.82	1.33	31.75	38.00	6.25
APGAR 1		31 (100.0%)	7.19	2.69	1.00	9.00	8.00
APGAR 5		31 (100.0%)	8.48	1.46	2.00	9.00	7.00
APGAR 10		14 (100.0%)	8.86	.363	8.00	9.00	1.00
Sex							
	Male	41 (48.8%)					
	Female	43 (51.2%)					
	Total	84 (100.0%)					
NICU stay							
	No	79 (94.0%)					
	<1 day	1 (1.2%)					
	1 day	1 (1.2%)					
	2 days	3 (3.6%)					
	Total	84 (100.0%)					
Baby health problems	Jaundice	15 (50.0%)					
	Low glucose	8 (26.7%)					

	Malformation	0 (0.0%)
	BP	7 (23.3%)
	Met. dysfunction	0 (0.0%)
	B.B. syndrome	0 (0.0%)
	Total	30 (100.0%)
Baby problems summed	None	55 (72.4%)
	One	11 (14.5%)
	Two	6 (7.9%)
	Three	3 (3.9%)
	Four +	1 (1.3%)
	Total	76 (100.0%)
Baby problems dichotomous	No problems	55 (72.4%)
	One + problems	21 (27.6%)
	Total	76 (100.0%)

Note: Gest. Age = Gestational Age. Head circ. = Head circumference. APGAR = Appearance, Pulse, Grimace, Activity, Respiration. NICU = Neonatal Intensive Care Unit. BP = Breathing problems. Met. Dysfunction = Metabolic dysfunction. B.B. syndrome = Blue baby syndrome. "Baby problems summed" describes a final summed score of recorded post-natal health issues, while "Baby problems dichotomous" describes whether any post-natal health issues were experienced at all.

Table 3: Infant Outcomes – Correlation Matrix

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Gestational Age	1												
2. Birth Weight	.385**	1											
3. Birth Length	.218	.536**	1										
4. Head Circ.	.410*	.406*	.258	1									
5. Baby probs. sum.	.019	-.164	.033	.105	1								
6. Baby probs dich.	-.084	-.161	.010	.028	.856**	1							
7. NICU Stay	-.005	.046	-.002	-.013	.214	.197	1						
8. Jaundice	.391	-.074	.084	-.225	.520*	.423*	.300	1					
9. Low glucose	.056	.002	.455	.064	.515*	.225	-.025	.150	1				
10.Breathing problems	.263	-.065	-.275	.150	.296	.204	.013	-.311	-.285	1			
11. APGAR 1	.143	.244	.048	.261	.052	-.011	-.516**	-.210	-.184	.401	1		
12. APGAR 5	.220	.305	.264	.160	.079	-.000	-.272	-.208	.091	.272	.645**	1	
13. APGAR 10	.383	.013	.293	.383	-.132	-.426	-.417	-.250	.408		.390	.684**	1

Notes : Head circ. = Head circumference. Sum. = summary. Dich. = dichotomous. NICU = Neonatal Intensive Care Unit. APGAR = Appearance, Pulse, Grimace, Activity, Respiration.

** *p < 0.01,*

* *p <0.05.*

Table 4 : Descriptives – CTQ Original

Variable	N	*M*	*SD*	Min	Max	Range	Skew		Kurtosis	
							Statistic	S.E	Statistic	S.E
Emotional abuse	98	9.97	4.76	5.00	22.00	17.00	.84	.24	-.39	.48
Sexual abuse	97	6.35	3.93	5.00	25.00	20.00	3.55	.25	12.27	.49
Physical abuse	97	6.06	1.88	5.00	17.00	12.00	2.73	.24	11.03	.48
Physical neglect	98	6.85	3.09	5.00	21.00	16.00	2.13	.24	4.97	.48
Emotional neglect	98	8.47	4.60	5.00	24.00	19.00	1.26	.24	.87	.48

Note: CTQ = Childhood Trauma Questionnaire.

Table 5 : Descriptives – CTQ Log-Transformed

Variable	N	*M*	*SD*	Min	Max	Range	Skew		Kurtosis	
							Statistic	S.E	Statistic	S.E
Emotional abuse	98	.95	.20	.70	1.34	.64	.31	.24	-1.18	.48
Sexual abuse	97	.76	.16	.70	1.40	.53	2.83	.25	7.49	.49
Physical abuse	98	.77	.11	.70	1.23	.70	1.65	.24	2.66	.48
Physical neglect	98	.80	.15	.70	1.32	.62	1.39	.24	1.00	.48
Emotional neglect	98	.87	.21	.70	1.38	.68	.71	.24	-.93	.48

Note: CTQ = Childhood Trauma Questionnaire.

Table 6 : Descriptives – CTS Chronicity

Variable	N	*M*	*SD*	Min	Max	Range	Skew		Kurtosis	
							Statistic	S.E	Statistic	S.E
Psych. Agg.	89	5.58	9.56	.00	55.00	55.00	3.34	.255	12.88	.506
Physical Assault	88	1.36	.647	.00	5.00	5.00	5.87	.257	38.93	.508
Injury	88	.045	.426	.00	4.00	4.00	9.38	.257	88.00	.508
Sexual Coercion	88	.148	.670	.00	4.00	4.00	4.98	.257	25.25	.508
IPV Total	88	5.93	.233	.00	58.00	58.00	3.21	.257	11.95	.508

Note: CTS = Conflict Tactics Scale. Psych. Agg. = Psychological Aggression.

Table 7 : Descriptives – CTS Prevalence

Variable	N	*M*	*SD*	Min	Max	Range	Skew		Kurtosis	
							Statistic	S.E	Statistic	S.E
Psych. Agg.	89	.630	.045	.00	1.00	1.00	-.544	.255	-1.74	.506
Physical Assault	88	.057	.233	.00	1.00	1.00	3.90	.257	13.48	.508
Injury	88	.011	.647	.00	1.00	1.00	9.38	.257	88.00	.508
Sexual Coercion	88	.057	.233	.00	1.00	1.00	3.90	.257	13.48	.508

Note: CTS = Conflict Tactics Scale. Psych. Agg. = Psychological Aggression.

Table 8: Factor Analysis

	Factor 1: Infant Birth Indices	Factor 2: Infant Health Conditions
Gestational Age	.645	.037
Birth Weight	.866	-.101
Length at Birth	.776	.044
Baby Problems Summed	-.071	.798
NICU Stay	.068	.756

Note: Factor 1 Eigenvalue = 1.78, variance explained = 35.64%; Factor 2 Eigenvalue = 1.22, variance explained = 24.59%. NICU = Neonatal Intensive Care Unit.

Table 9 : Covariate Correlation

	MR	ME	MM	MEd	MMar	NC	A	MWH	IS	BL	SV	AV	LC	Ces
Gest. Age	-.323**	-.062	.178	.139	-.002	-.033	-.138	.001	-.055	.062	.142	.078	-.128	-.150
Birth Weight	-.342**	.024	.197	-.033	.039	.241*	.071	-.203	-.185	.064	.172	.090	-.080	-.139
Length	-.115	-.020	.045	.006	-.076	-.071	-.182	.025	-.135	-.064	.077	-.027	.084	-.067
BPS	-.032	-.152	-.068	.021	-.074	-.081	.145	.005	-.091	-.059	-.180	.020	.255*	-.022
BPD	.026	-.139	-.187	.018	-.075	-.160	.027	-.032	-.079	-.014	-.201	-.040	.285*	.073
NICU Stay	-.063	-.095	.039	-.152	.102	-.189	-.058	.042	.044	-.055	.074	-.052	.135	-.078
Jaundice	.156	.156	-.156	.171	.111	-.307	.317	.048	.245	.155	-.233	.226	-.042	.225
Low Glucose	-.156	-.156	.156	-.107	.092	.307	.257	.265	-.052	-.155	-.342	.190	.425*	-.225
BP	-.141	-.141	.141	-.171	-.257	.221	-.167	-.549**	.027	-.141	.112	.253	-.285	-.204
Factor 1	-.282**	-.016	.121	.027	-.006	.073	-.093	-.086	-.158	.001	.168	.060	-.059	-.151
Factor 2	-.043	-.132	-.007	-.068	.019	-.187	.031	.042	-.022	.349	-.071	-.022	.244*	-.060

Note: Gest. Age = Gestational Age. BPS = Baby problems summed. BPD = Baby problems dichotomous. NICU = Neonatal Intensive Care Unit. BP = Baby problems. MR = Mom Race. ME = Mom ethnicity. MM = Mom minority. Med = Mom education. MMar= Mom marital status. NC = Number of children. A = Age. MWH = Mom work hours. IS = Infant sex. BL = Birth location. SV = Spontaneous vaginal. AV = Assisted vaginal. LC = Labour and cesarean. Ces = Cesarean.
*** p < 0.01 ,*

**. p <0.05 .*

Table 10: The Moderating Role of Maternal Deprivation and Intimate Partner Violence on Factor 1: Infant Health Indices

Model	Independent Variables	Unstandardized *B*	Std. Error	Standardized *B*	*t*	Sig.
1	Race	-1.19	.425	-.321	-2.80	.007
	Delivery Method	.019	.297	.007	.063	.950
2	Race	-1.20	.433	-.323	-2.77	.007
	Delivery Method	.031	.304	.012	.102	.919
	IPV	.001	.027	.004	.034	.973
	Neglect	-.113	.399	-.033	-.283.	.778
3	Race	-1.20	.439	-.323	-2.73	.008
	Delivery Method	.030	.309	.012	.097	.923
	IPV	.007	.208	.029	.032	.974
	Neglect	-.104	.516	-.030	-.201	.841
	IPV x Neglect	-.004	.126	-.025	-.028	.978

Table 11: The Moderating Role of Maternal Threat and Intimate Partner Violence on Factor 1: Infant Health Indices

Model	Independent Variables	Unstandardized *B*	Std. Error	Standardized *B*	*t*	Sig.
1.	Race	-1.19	.425	-.321	-2.80	.007
	Delivery Method	.019	.297	.007	.063	.950
2	Race	-1.24	.438	-.333	-2.82	.006
	Delivery Method	.004	.302	.002	.014	.989
	IPV	.001	.027	.003	.024	.981
	Abuse	.201	.350	.068	.576	.567
3	Race	-1.27	.441	-.341	-2.87	.006
	Delivery Method	.011	.303	.004	.037	.971
	IPV	.228	.312	.978	.731	.467
	Abuse	.365	.416	.123	.877	.383
	IPV x Abuse	-.090	.123	-.982	-.732	.467

Table 12: The Moderating Role of Maternal Deprivation and Intimate Partner Violence on Factor 2: Infant Health Conditions

Model	Independent Variables	Unstandardized *B*	Std. Error	Standardized *B*	*t*	Sig.
1	Race	-.253	.443	-.067	-.570	.570
	Delivery Method	.583	.309	.222	1.89	.064
2	Race	-.261	.451	-.070	-.580	.564
	Delivery Method	.594	.317	.226	1.87	.066
	IPV	.000	.028	.002	.017	.986
	Neglect	-.096	.415	-.028	-.232	.817
3	Race	-.281	.457	-.075	-.616	.540
	Delivery Method	.608	.322	.232	1.89	.063
	IPV	-.081	.216	-.345	-.376	.708
	Neglect	-.225	.537	-.065	-.419	.677
	IPV x Neglect	.050	.131	.351	.382	.704

Table 13: The Moderating Role of Maternal Threat and Intimate Partner Violence on Factor 2: Infant Health Conditions

Model	Independent Variables	Unstandardized *B*	Std. Error	Standardized *B*	*t*	Sig.
1	Race	-.253	.443	-.067	-.570	.570
	Delivery Method	.583	.309	.222	1.89	.064
2	Race	-.278	.457	-.074	-.608	.545
	Delivery Method	.575	.315	.219	1.83	.073
	IPV	.000	.028	.002	.014	.989
	Abuse	.110	.365	.037	.302	.764
3	Race	-.247	.460	-.066	-.538	.593
	Delivery Method	.569	.317	.217	1.80	.077
	IPV	-.226	.325	-.958	-.694	.490
	Abuse	-.053	.434	-.018	-.122	.903
	IPV x Abuse	.090	.129	.966	.698	.487

Figure 1: Health and Behavioural Outcomes Associated with Child Maltreatment

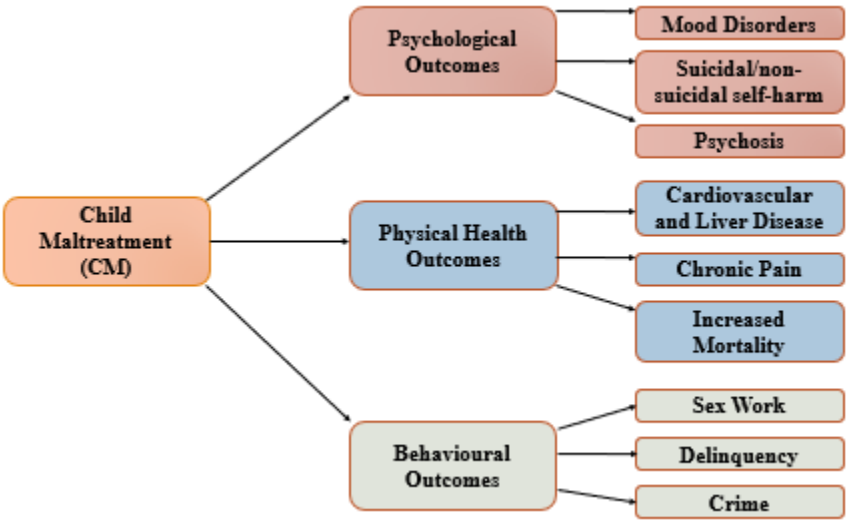
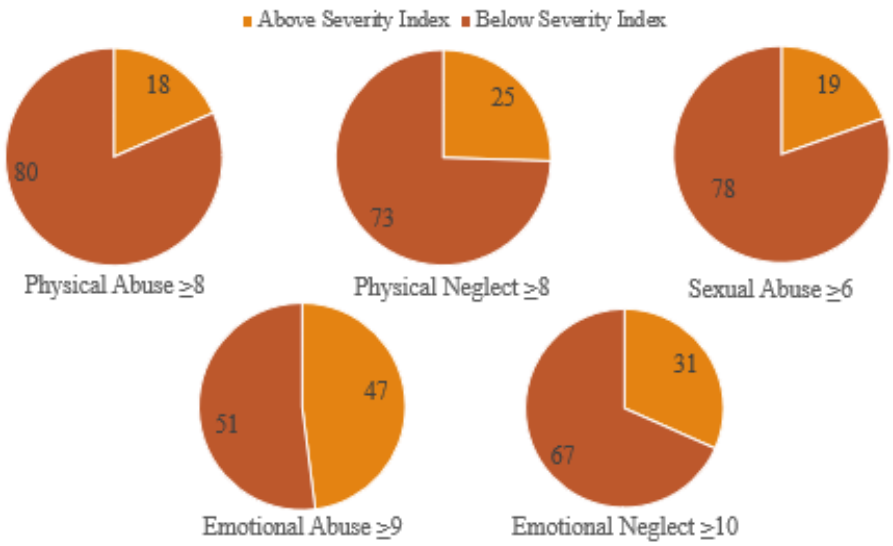
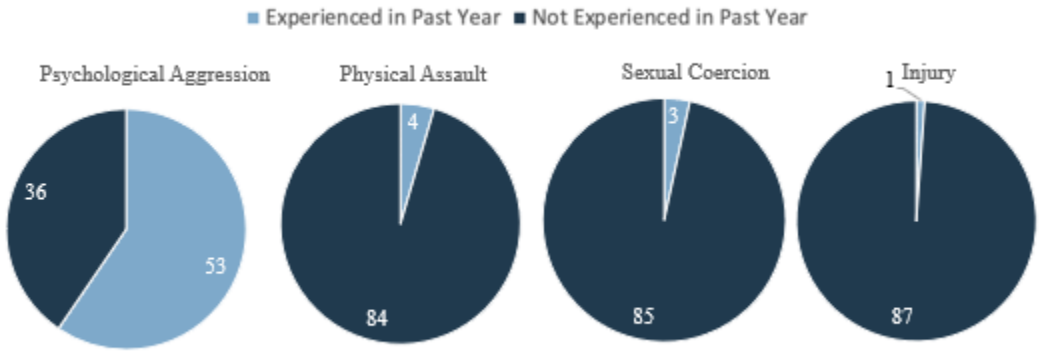


Figure 2: Maternal Childhood Maltreatment Severity Index



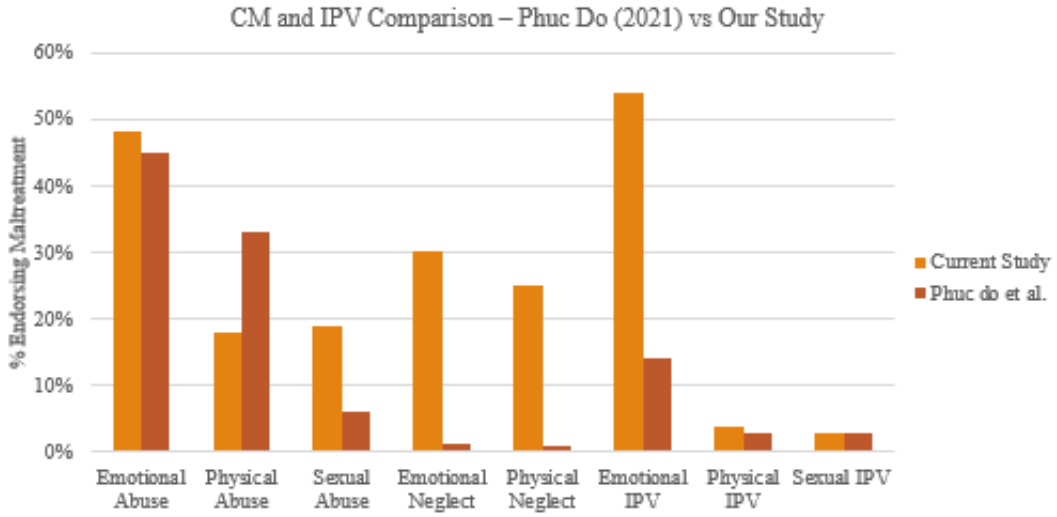
Note: Figure depicts the frequency of individuals endorsing different types of child maltreatment, above the severity index of the Childhood Trauma Questionnaire (CTQ)

Figure 3: Intimate Partner Violence Experienced in the Past Year (Yes/No)



Note: Figure depicts the frequency of individuals endorsing different types of intimate partner violence within the past year.

Figure 4: Sample Comparison Across Studies – Phuc Do et al. (2021).



Note: Instances of Intimate Partner Violence (IPV) have been labelled per Phuc Do et al. In this comparison, our scores of "emotional IPV" represent psychological aggression, "physical IPV" represent physical aggression, and "sexual IPV" represent sexual coercion. There is no comparison for injury.