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An Intersectional Analysis of Intimate Partner Violence in Canada

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Abstract

Background: Intimate partner violence (IPV) is a recognized public health issue that can lead to poor mental and physical health outcomes. It is critical to take an intersectional approach to understanding the ways that social and interpersonal power impact IPV.

Methods: Random Forest was used to aid in social group selection when forming intersections. Multilevel analysis of individual heterogeneity and discriminatory accuracy (MAIHDA) was used to estimate the prevalence of IPV across intersections. Descriptive statistics were used to explore the context in which IPV occurred.

Results: The prevalence of IPV was greatest for cisgender women, transgender, and non-binary individuals, aged 15-24, with moderate to severe disabilities. Cisgender women, transgender, and non-binary individuals, aged 45+, with disabilities were more likely to report severe psychological consequences of the violence.

Conclusions: Public health efforts should seek to understand and address the complex structural inequities experienced by intersections at highest IPV risk.

Keywords

Intimate partner violence; gender-based violence; Intersectional Framework; health equity; Canada; multilevel analysis; MAIHDA; machine learning

Summary for Lay Audience

Intimate partner violence (IPV) involves behaviours which cause physical, psychological, and/or sexual harm to those within a current or former relationship. Perpetrators will use IPV to gain power and control over their partner. IPV is considered a public health issue, as it can lead to poor mental and physical health outcomes for those experiencing the violence. Certain groups are known to be at higher risk of IPV, including younger women and girls, people with disabilities, sexual minorities, and Indigenous women.

The Intersectionality Framework explains that individuals have many social identities and positions, which intersect with one another to shape one's experiences. Since IPV is rooted in power and control, social power dynamics (e.g., privilege and oppression) influence one's risk of IPV. An intersectional approach is necessary in understanding IPV, as allows us to understand the risk of IPV among intersection groups that have been hidden in prior research.

This study analyzed the Statistics Canada 2018 Survey of Safety in Public and Private Spaces to take an intersectional approach to describe the prevalence of IPV in Canada. We used quantitative methods that have been shown to be well-suited for taking an intersectional approach to studying health inequities. The literature and machine learning methods were applied to aid us in choosing which social groups would be used in forming the intersections for this study. We also described the context in which the violence occurred among those who experienced IPV, including consequences of the violence and help-seeking behaviours.

The social groups chosen to form intersections were sex/gender, age, and disability status. We found cisgender women, transgender, and non-binary individuals, aged 15-24 years old, with moderate to very severe disabilities experienced the greatest prevalence of IPV in the past 12 months preceding the survey. Cisgender women, transgender, and non-binary individuals aged 45 and up, with disabilities experienced the most severe psychological impact from the violence. Our findings demonstrate the importance of taking an intersectional approach to studying IPV. Intersections found to be of greatest IPV risk should be prioritized in public health prevention and intervention efforts.

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Chapter 1

1 Introduction

The following section will outline the rationale for this study along with the overall aim and research objectives.

1.1 Study Rationale

Intimate partner violence (IPV) is a globally recognized public health and human rights issue (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). In Canada, IPV is a prevalent issue with 44% of women and 36% of men who have ever been in an intimate relationship reporting experiencing IPV in their lifetime (Cotter, 2021b). IPV can cause a wide range of serious and long lasting mental and physical health complications for victims (Miller & McCaw, 2019). Recent Canadian studies have identified particular groups that are at greater risk of experiencing IPV, including younger women/girls, sexual minority women, sexual minority men, women with disabilities, and Indigenous women (Cotter, 2021b).

Power plays a major role in how we have come to understand the context of violence, both at an interpersonal and structural level, by working to systematically disempower or oppress particular groups of individuals, making them more vulnerable to experiencing violence (Yllö, 2005). From a structural perspective, Feminist theory explains that the higher risk of IPV observed among particular groups of people can be attributed to the way ones social identity or position interacts with structural power dynamics (e.g., sexism, heterosexism, ableism) to disadvantage particular groups within society (Kelly, 2011). From an interpersonal level, IPV is known to be rooted in a pattern of attempts to gain power and control over one's partner (Johnson & Ferraro, 2000). Therefore, in order to properly understand individuals' experiences regarding the initiation and continuation of IPV, interpersonal and social power must be accounted for in the research process (Yllö, 2005).

Canadians are diverse and belong into multiple social groups which can interact in complex ways to shape their lived experiences. However, prior research has only analyzed limited intersections of identity without fully considering how one's multiple identities can affect the context in which experiences of IPV occur. Previous research has overlooked specific groups (e.g., those at the intersection of disability, age, and sex/gender), who face multiple systemic barriers (e.g., ableism, ageism, sexism), which can intersect to increase their risk of IPV. Further research is needed to get a better understanding of the exposure to IPV among various intersecting groups and the context in which it occurs for those at these intersections.

The Intersectionality Framework, which was first brought into academic literature by Black Feminist legal scholar, Kimberlé Crenshaw, is a theoretical approach that considers the ways that one's multiple identities interact due to intersecting power dynamics (e.g., racism, homophobia, transphobia etc.) (Crenshaw, 1991). Utilizing this approach allows us to explore the experiences of violence for those at multiple intersections of privilege and oppression, while taking social power into account (Bowleg, 2012). Taking an intersectional approach provides the opportunity to gain a better understanding of the contextual experiences of those who are often missed in prior research. Therefore, this thesis took an intersectional approach in its theory and statistical methods, to capture the ways that power influences IPV risk among a wide range of intersections. To do this, novel quantitative intersectional methods were applied that have been shown to be well-suited for studying health inequities.

1.2 Research Objectives

The first overall aim of this study was to take an intersectional approach to explore the prevalence of IPV in order to identify those who may be at high risk of IPV. Individuals were cross-classified across social identities/positions to create intersectional groups. The second aim was to better understand the contextual experiences of those within intersectional groups who were exposed to IPV in the past 12 months. The purpose of this was to get a better understanding of the systemic barriers that those belonging to these intersectional groups face, and how this influences their experiences with IPV. It also

provides us a better understanding of which intersectional groups may be facing more severe forms of IPV. To achieve these goals, the following research objectives were made.

Objective 1: To determine what intersectional groups will be explored using a combination of theory and machine learning methods.

Objective 2: To describe the analytic sample including sample characteristics, intersection groups, and frequency of the outcome.

Objective 3: To describe the prevalence of IPV in the past 12 months among those who have been in an intimate relationship in their lifetime across all intersectional groups, along with their 95% confidence intervals.

Objective 4: To use descriptive statistics to describe the context of IPV across intersectional groups, including factors such as help-seeking, consequences of the violence, and risk factors.

Chapter 2

2 Literature Review

This chapter will discuss what is currently known in the literature on IPV, including its prevalence, risk factors, and health consequences. The chapter will also discuss how patterns of IPV are linked to interpersonal and social power and how this can disproportionally harm specific social groups. The chapter will end by introducing the intersectionality framework and its importance in understanding violence.

2.1 Intimate Partner Violence

2.1.1 Defining intimate partner violence

IPV is both a global human rights and public health issue, defined by the World Health Organization as behaviours "within an intimate relationship that cause physical, psychological, or sexual harm to those in the relationship" (Krug et al., 2002, p. 89). Intimate partners can include current or former spouses and dating partners, in both heterosexual and same-sex relationships (World Health Organization, 2010). IPV can occur in many different forms, including physical, sexual, and psychological (emotional) abuse, as well as involve other forms of controlling behaviours (Garcia-Moreno, Guedes, & Knerr, 2012). Physical violence includes physical acts of aggression such as slapping, hitting, kicking, and beating (Krug et al., 2002). Sexual abuse includes forced intercourse or other forms of sexual coercion (Krug et al., 2002). Psychological abuse includes intimidating, belittling, humiliating, and threatening (e.g., threatening to harm or threats to take children away) (Garcia-Moreno et al., 2012). Controlling behaviours include social isolation, monitoring movements, and restricting access to resources, information, or assistance including financial, employment, education, or medical related resources (Garcia-Moreno et al., 2012; Krug et al., 2002). These forms of abuse often coexist and IPV victims typically experience a pattern of reoccurring abusive episodes by the perpetrator (Krug et al., 2002). Although not all forms of IPV are considered criminal offences (e.g., psychological abuse), they are still harmful (Cotter & Savage, 2019).

2.1.2 Health consequences of intimate partner violence

IPV can lead to a broad range of severe, acute and/or long lasting physical and mental health consequences, either as a direct result of the violence itself, or through indirect pathways caused by prolonged stress or risky coping behaviours (Bacchus, Ranganathan, Watts, & Devries, 2018; Breiding, Black, & Ryan, 2008; Garcia-Moreno et al., 2012; Greenland, Mansournia, & Altman, 2016; Miller & McCaw, 2019; Public Health Agency of Canada, 2016). These poor health outcomes can continue on even once the violence has ended, such as suffering from chronic pain (Sugg, 2015). Physical injuries from violence can occur, ranging from bruises and scratches to fractures, traumatic brain injury, and even death (Miller & McCaw, 2019; Sugg, 2015). Additionally, IPV has been found to be associated with unintended pregnancy, sexually transmitted infections, and human immunodeficiency virus (HIV) infection due to forced sex, condom refusal, or other forms of sexual coercion (Miller & McCaw, 2019; Sugg, 2015). IPV can initiate or worsen mental illnesses including depression, anxiety, post-traumatic stress disorder (PTSD), suicidal behaviour, and substance abuse (Bacchus et al., 2018; Miller & McCaw, 2019; Sugg, 2015). A large cross-sectional survey in the U.S. found that those who experienced IPV were more likely to report having chronic diseases including stroke, cardiovascular disease, joint disease, asthma, and activity limitations as well as report HIV risk factors, smoke, and engage in binge drinking (Breiding et al., 2008). It is important to note that although many health conditions result from acts of violence, those with pre-existing physical or mental health related disabilities are also at an increased vulnerability to experiencing IPV (Brownridge, 2006; Brownridge et al., 2020; Savage, 2021a). A greater association between IPV and poor health outcomes was found among women, compared to men, reinforcing the knowledge that women will often experience more severe health outcomes from IPV (Breiding et al., 2008).

2.1.3 Sex/gender differences and IPV prevalence

IPV occurs in all countries of the world, regardless of one's gender, sexual orientation, socioeconomic status or other factors (Krug et al., 2002). Globally, IPV is considered gendered, as severe injuries and consequences of IPV disproportionately affect women (World Health Organization & London School of Hygeine and Tropical Medicine, 2010).

Violence against women is often perpetrated by an intimate male partner; whereas, violence against men is often perpetrated by a stranger or acquaintance (Krug et al., 2002). Additionally, women are more likely to suffer from more severe consequences from the violence and are more likely to be murdered by an intimate partner, compared to men (Krug et al., 2002; Public Health Agency of Canada, 2016). Population surveys across the world have found that 10-69% of women have been victims of IPV at some point in their lifetime (Krug et al., 2002). Due to the importance of gender in understanding IPV, the majority of the IPV literature is focused on violence against women. However, it is important to acknowledge that men can also be victims of IPV (often also perpetrated by men), and overlooking this can be detrimental to the men who experience this abuse (Krug et al., 2002; Scott-Storey et al., 2022).

The 2014 Canadian General Social Survey (GSS) found that the prevalence of spousal violence was equal among men and women (4%), within the five years preceding the survey (Burczycka & Conroy, 2018). More recently, data from the 2018 Survey of Safety in Public and Private Spaces (SSPPS) measuring physical, sexual, and psychological violence found that lifetime IPV was higher among women (44%), compared to men (36%) who reported ever having any experience of an intimate relationship (Cotter, 2021b). However, experiences of IPV in the 12 months prior to the survey was almost equal between women (12%) and men (11%). The higher prevalence of IPV among individuals in the SSPPS compared to the GSS is likely attributed to the fact that the GSS mainly focused on acts of physical and sexual violence, rather than also including varied forms of psychological forms of violence included in the SSPPS (Ford-Gilboe et al., 2016). Despite the similarities in 12-month prevalence across men and women in self-report surveys, Canadian police-reported data has found that 79% of victims IPV were women in the year 2017 (Burczycka, Conroy, & Savage, 2018).

These differences in findings across self-reported and police reported data can reflect the findings that women are more likely to experience sexual violence and more severe, controlling, and, chronic forms of violence in their relationship, including being beaten or choked and therefore more likely to require police assistance (Ansara & Hindin, 2010;

Burczycka & Conroy, 2018; Cotter, 2021b; Romans, Forte, Cohen, Du Mont, & Hyman, 2007). Women who reported IPV were also found to be more likely to be victims of reoccurring violence in their relationship, and were more likely than men to report fear, anxiety, and feeling controlled or trapped due to the violence (Cotter, 2021b). Additionally, women have been found to experience more physical injuries and long-term mental health consequences, including PTSD (Burczycka & Conroy, 2018; Romans et al., 2007). Women who did report more severe forms of violence in the survey were also more likely to indicate this violence was from an ex-partner (Ansara & Hindin, 2010). These findings may be due to the violence escalating after the relationship has ended and/or can be an indication that women are less likely to disclose severe abuse when they are currently with their partner (Ansara & Hindin, 2010).

Johnson (2006) also presents reasons for the conflicting findings in IPV prevalence across studies in the United States, in the context of heterosexual couples. He notes that there are different patterns of IPV among couples that are captured when using different sampling frames (Johnson, 2006). The pattern of IPV that is rooted in power in control, called ‘intimate terrorism’, is mainly perpetrated by men towards women, more severe, more frequent, and less likely to be mutual (Johnson, 2006). This is the type of violence that is often captured in studies that sample from agencies, since it is more likely to be reported and these victims often require police intervention or protection (Johnson, 2006). Intimate terrorism is systematically underreported in representative surveys, as victims of this type of violence may be less likely to respond out of fear (Johnson, 2006). The patterns of violence that are overrepresented in larger self-report surveys, called ‘situational couple violence,’ often occurs across both men and women, is less severe, and less likely to be rooted in control (Johnson, 2006). Another reason for differences in findings across studies is also due to how researchers have decided measure IPV (e.g., if they are capturing situational couple violence or intimate terrorism) and whether they have included ex-partners (Romans et al., 2007).

2.2 Specific Risk Factors

It is well-known that gender plays a major role in determining one's risk of experiencing IPV. However, there are many other additional risk factors that can interact in complex ways to increase an individual's likelihood of experiencing IPV (World Health Organization & London School of Hygeine and Tropical Medicine, 2010). The factors that can influence an individual's risk of IPV can be understood through the ecological model, which categorizes risk factors at various levels including individual, relationship, community, and societal levels (Krug et al., 2002). These factors can impact both the perpetrators risk of becoming abusive as well as the victim's risk of experiencing abuse (Krug et al., 2002). Examples of individual-level factors include adverse childhood experiences (ACE's), age, substance/alcohol use, and mental health (Krug et al., 2002). Relationship-level factors can include relationship conflict and poor family functioning (Krug et al., 2002). Community-level factors include socioeconomic status, community norms or sanctions on partner violence, and social capital (Krug et al., 2002). Societal factors include systems of social power, structural social inequalities, and gender norms (Krug et al., 2002). The rest of this section will highlight some important risk factors and situations discussed heavily in the literature that put individuals at greater risk for experiencing IPV and its consequences. Most of the literature has focused on IPV risk factors among heterosexual couples, cisgender men perpetrators, and cisgender women victims, highlighting the need to focus on contextual factors of IPV among those who are gender diverse or in same-sex relationships.

2.2.1 Adverse childhood experiences

Studies have found living with children increases the risk of IPV, which could be explained by the increased stressors and conflict due to having children (Graham et al., 2021). Exposing children to IPV between adults is considered by some to be a form of child maltreatment, and puts the child at greater risk of psychological, social, emotional, and behavioural problems later in life (Wathen & MacMillan, 2013). Adverse experiences, such as abuse, in childhood can also increase an individual's risk of experiencing violence later in their life (Cotter, 2021b). When children witness or

experience abusive behaviours early in life, it can create an intergenerational cycle of violence, by making this individual more likely to become a perpetrator or victim of abuse later in life (Cotter, 2021b; Miller, 2006; Montalvo-Liendo et al., 2015; Wathen & MacMillan, 2013). Children may learn this abusive behaviour and expect or model it in their future relationships (Cotter, 2021b). A review found that across several studies, women who experienced sexual or physical abuse in their childhood were at greater risk of experiencing IPV later in their life (Montalvo-Liendo et al., 2015). In Canada, those who were physically or sexually abused by an adult in their childhood, or were harshly parented (e.g., being slapped, spanked, made to feel unwanted, unloved, or neglected) were more likely to report experiencing IPV (Cotter, 2021b). Those who have experienced both ACE's as well as IPV have been found to have worse mental and physical health outcomes, compared to those who have only experienced IPV (Montalvo-Liendo et al., 2015).

2.2.2 Younger age

In Canada, 15-24 year olds have the highest prevalence of IPV (29% women/girls and 26% men/boys) in the past 12 months, compared to those belonging to all other age categories (Cotter, 2021b). Younger women, in particular, have been consistently found to be at greater risk of IPV and to report being sexually assaulted by their partner (Policastro & Finn, 2021; Romans et al., 2007; Savage, 2021b). When further breaking down age categories, Savage (2021b) found adolescent girls aged 15-19 years old reported the most IPV across all types, compared to women 20-24 years old and women aged 25 and older. Researchers have suggested some explanations for these findings. We now know that IPV is used as a way to exert control over one's partner (Policastro & Finn, 2021). Since younger individuals are more likely to be in dating relationships and have wider social networks, this can be a reason for their partner to want to have more control over them, putting them at greater risk of IPV (Policastro & Finn, 2021). Younger women under 25 have been found to be less likely to seek formal support for the violence; however, they were more likely to end the abusive relationship (Savage, 2021b). Savage (2021b) points out that this is likely because younger women have fewer ties to their partner, including children and property.

2.2.3 Substance and alcohol abuse

Alcohol use among perpetrators and victims has been found to be associated with IPV across several studies (Graham et al., 2021; Stewart, MacMillan, & Wathen, 2012). In an analysis of the 2004 Canadian GSS women who were experiencing more severe and chronic forms of IPV were also more likely to report that their partner was drinking when the violence occurred (Ansara & Hindin, 2010). A study on IPV among heterosexual couples found that women experienced more severe violence when their husband was drinking, compared to when they were not (Testa, Quigley, & Leonard, 2003). Additionally, those who abuse alcohol or substances are more likely to be a victim of IPV (Sugg, 2015). This may be because they are using substances to cope with the trauma they have experienced from the violence (Sugg, 2015). It could also be because those who abuse alcohol/substances may be more likely to have a partner who also abuses alcohol/substances, a known risk factor for perpetrators to abuse their partners (Sugg, 2015). Alcohol and substance use is an important contextual factor of violence as it may hinder the victims ability to protect themselves or escape from the violent situation (Stewart et al., 2012).

2.2.4 Pregnancy

When an individual in the relationship becomes pregnant, this can either initiate, worsen, or cease the violence in the relationship (Stewart et al., 2012; Sugg, 2015). In Canada, pregnancy has usually been found to stop or prevent violence; however, **t**here is a higher risk of violence when the pregnancy is unplanned (Daoud et al., 2012; Public Health Agency of Canada, 2016; Stewart et al., 2012; Sugg, 2015; Yakubovich et al., 2018). Additionally, women who experience IPV are at greater risk of having an unintended pregnancy (Sugg, 2015). Reasons for unintended pregnancy among IPV victims includes rape or other forms of sexual coercion, or the abusive partner trying gain reproductive control by forcing and threatening their partner to become pregnant, or refusing or sabotaging forms of birth control (Sugg, 2015).

In a large Canadian population-based study, it was found that most women who were abused prior to pregnancy were no longer abused once the pregnancy had started (Daoud et al., 2012). Among mothers who were abused during pregnancy, half of the mothers reported the abuse initiated once the pregnancy began while the other half reported the abuse had started prior to the pregnancy (Daoud et al., 2012). These findings indicate that there is not a single pattern of violence during pregnancy; rather, women's exposure to violence during pregnancy varies. Violence during pregnancy can have health implications to the pregnant individual and fetus such as increased mental health problems, low birth weight, and developmental and behavioural issues (Chisholm, Bullock, & Ferguson II, 2017).

2.2.5 Relationship status

An individual's risk of experiencing IPV can be influenced by their relationship to their partner. In 2017, *police-reported* violence in Canada was greater between dating partners than spouses, and more common among current partners than former partners (Burczycka et al., 2018). However, violence can still occur when the couple is no longer together (Stewart et al., 2012). A Canadian study by Brownridge et al., (2008) found separated and divorced women were at greater risk of IPV by a current or former partner, compared to married women, with separated women reporting the highest prevalence of IPV. The majority of female victims of homicides by an intimate partner occurred by a current or former spouse or common-law husband (75%) (Burczycka et al., 2018). Additionally, a U.S. study found a greater prevalence of IPV is observed among cohabitating couples compared to married couples (Kenney & McLanahan, 2006). However, they argue these findings can be attributed to selection bias, since the majority of non-violent cohabitating couples will eventually become married, and most violent married couples will become divorced (Kenney & McLanahan, 2006).

2.2.6 Living in rural areas

Police-reported IPV was found to be greater in rural areas of Canada compared to urban areas, in 2017 (Burczycka et al., 2018); while a more recent analysis found the

prevalence of IPV in past 12 months was equal across urban and rural areas (12%) (Cotter, 2021b). However, those living in rural areas have been found to be more likely to be murdered by an intimate partner, compared to those living in urban areas (Gallup-Black, 2005). This may be explained by the fact that Canadians living in rural areas are more likely to possess firearms (Gallup-Black, 2005). Social isolation is another factor that has been used to explain the higher prevalence of homicides by an intimate partner in rural areas (Gallup-Black, 2005; Lanier & Maume, 2009).

Victims of IPV living in rural areas face unique challenges, as the remote location causes more barriers to leaving their communities, and there may be a lack of resources or fewer formal services available to them (Moffitt, Fikowski, Mauricio, & Mackenzie, 2013). In communities with a very low population, community members may have tighter relationships that may make it more difficult for victims to report the abuse if their abuser is well-known in the community (Moffitt et al., 2013). A large proportion of those living in rural areas, such as the Canadian territories, also identify as Indigenous (Moffitt et al., 2013). Indigenous victims living in rural areas may be required to leave their ties to their family and culture in order to receive more formal services or shelters in other communities that they must travel to (Moffitt et al., 2013).

2.3 Barriers to Help-Seeking and Reporting IPV

People may assume that individuals who are victims of IPV choose to stay in their abusive relationship (Canadian Women's Foundation, 2013). However, studies have shown that women in fact do adopt strategies and plans to leave their abusive relationship, and often eventually do (Garcia-Moreno et al., 2012). Data from the 2018 SSPPS found 68% of women and 42% of men reported speaking to someone about the violence and 13% of women and 4% of men reported using a victims service in the past 12 months (Cotter, 2021b). It is more likely that victims will seek informal help rather than formal support services (Barrett & Pierre, 2011). Women are likely to seek informal or formal support if they fear that their life is in danger (Barrett & Pierre, 2011).

Although victims will usually attempt to seek help, there are many barriers in Canada to help-seeking and reporting the abuse. Victims may fear that reporting will increase their risk abuse by their partner, affecting the safety of themselves or their children (Canadian Women's Foundation, 2013; Lelaurain, Graziani, & Monaco, 2017). More general factors include shame or stigma associated with reporting IPV, fear of losing custody of their children, economic reasons, lack of housing or financial support, and experiencing health challenges as a consequence of the abuse (Garcia-Moreno et al., 2012; Satyen, Rogic, & Supol, 2019). Men who are victims of abuse may have a harder time seeking help, due to fewer services available to them and gender norms (Douglas & Hines, 2011). Additionally, those living in areas where they are unable to access formal support or those who are not educated on what constitutes abuse may not know where or how to receive help (Satyen et al., 2019). Canadians also face barriers specific to their identity or social position, such as fear of racism or discrimination, lack of culturally appropriate services, or cultural and religious barriers (Barrett & Pierre, 2011). These barriers may interact in complex ways for those situated at multiple intersections of oppression (Barrett & Pierre, 2011).

2.4 Power and Intimate Partner Violence

It is known in IPV literature that power must be considered in order to understand violence within relationships (Yllö, 2005). According to Yllö (2005), "domestic violence cannot be adequately understood unless gender and power are taken into account." When there is an imbalance of power between a couple, one of the partners may try to gain interpersonal power and control in their relationship through emotional, physical, and sexual violence. Domestic violence programs often refer to the Power and Control Wheel, originally developed by The Domestic Abuse Intervention Project in Minnesota, U.S.A., to understand the patterned behaviours that male perpetrators use against their female partners to gain and maintain power and control (Figure 2; See Appendix H for permission to use wheel). The segments of the wheel include: coercion and threats to harm them, themselves, or their children; intimidation; emotional abuse; social isolation; minimizing, denying, and blaming; using children as a threat or to guilt them; economic abuse; and male privilege (Domestic Abuse Intervention Programs, 2017). These

segments are connected to physical and sexual violence in the wheel (Domestic Abuse Intervention Programs, 2017).

Figure 1. Power and Control Wheel developed by The Domestic Abuse Intervention Project to illustrate the ways in which male abusive partners will maintain power and control over their female partners (Domestic Abuse Intervention Programs, 2017).

It is important to note the Power and Control Wheel was designed to explain violence against women in heterosexual relationships, and may not fully capture the tactics of violence experienced by those at particular intersections of identity or social positions (Gilson, DePoy, & Cramer, 2001). This is because an individual's risk of experiencing IPV is not only influenced by one's interpersonal relationship, but also fueled by larger systems of power at the structural level. Feminist theory describes how societal structures

can disempower certain groups through contextual factors (e.g., racism, sexism, classism, ableism etc.) which can increase their risk of experiencing IPV.

An example of this is the way that IPV is gendered, as women may experience more violence in their relationships when living in societies that are more patriarchal. It has been found that patriarchal dominance increased the odds a female partner will experience IPV in Canada (Brownridge, 2006). In patriarchal societies, men are taught and reinforced that it is their right to be in a position of power over women (Yllö, 2005). When they perceive this power dynamic to be threatened, they may resort to violence in order to gain control in their relationship (Coston, 2021). Societal norms that reinforce this patriarchal dominance allow this violence to be perpetuated. This may resort to men trying to re-gain power by exerting violence in their relationship (Kasturirangan, Krishnan, & Riger, 2004).

Social power may also come from other social inequalities other than gender. When an individual faces social marginalization or oppression at the societal level, via racism, sexism, ableism etc., abusive partners can utilize their privilege and the disadvantage of their partner's social positioning to exert their power and control within their relationship. Some researchers have begun to adapt the original Power and Control Wheel to be applicable in the context of other social positions. For example, Anthony Lekas at the Thorne Harbour Health LGBTI Family Violence Program adapted the Power and Control Wheel to be applicable to gay men (Lekkas & Speirs, 2019). The adapted version of the wheel is situated in the context of heterosexism, homophobia, biphobia, and transphobia, as displayed by an outer ring around the wheel (Lekkas & Speirs, 2019). Additionally, they have added in an additional power and control tactics relevant to gay men, such as ways that partners can mobilize structural stigma and state power against their partner (e.g., threatening to out them so that authorities or ex-partners will take their children away) (Lekkas & Speirs, 2019). Understanding the way that social power influences gay men specifically is critical, as Scott-Storey et al., (2022) discuss how majority of IPV research assumes that all men are cisgender and heterosexual.

Social power does not just initiate the violence; but it can also influence the continuation of violence in relationships. Social power can influence a victims response to violence by acting as a barrier to being able to leave the abusive relationship through larger systems which are set out to disempower certain groups (Kelly, 2011). For example, transgender and non-binary individuals may have difficulty accessing shelters due to transphobia and experiencing discrimination when interacting with the legal system (Grant et al., 2011). For these reasons, social context must be taken into account to understand the experiences of violence among those at particular intersections (Yllö, 2005).

2.5 Social Groups

This section will discuss the experiences of IPV among specific social groups discussed in the literature, in the context of social and interpersonal power dynamics.

2.5.1 Transgender and non-binary identities

Majority of IPV research has focused on the prevalence of IPV among female victims with male perpetrators; therefore, there is limited representative Canadian research estimating the risk of IPV among transgender (trans) and non-binary people (Stewart et al., 2012; Yerke & DeFeo, 2016). This is an critical gap in the literature, as trans and non-binary individuals have been found to experience a higher prevalence of IPV compared to cisgender people and sexual minorities (Wathen, MacGregor, Tanaka, & MacQuarrie, 2018). The 2015 U.S. Transgender Survey (USTS) found that out of the 27,715 participants, 54% experienced some form of IPV in their lifetime (King, Restar, & Operario, 2019). Psychological abuse was the most reported among participants in this national U.S. sample at 42.0% (King et al., 2019). Other forms of violence reported included physical IPV (39.9%), trans-related IPV (30.4%), stalking (18.0%) and forced sex (21.5%) (King et al., 2019).

There are forms of trans-specific abuse tactics that trans partners experience, on top of the general abuse tactics that cisgender people also experience (Yerke & DeFeo, 2016). These tactics involve taking advantage of societal power dynamics, such as cissexism, which partners may use against their trans partner in order to gain power and control in

the relationship (King et al., 2019; Yerke & DeFeo, 2016). Some of these tactics include threatening to out their partner's gender or sex assigned at birth to individuals or employers that could react negatively to this information, forms of emotional abuse that seek to worsen their partners gender dysphoria by targeting their appearance, and restricting or controlling their partner's access to gender-affirming resources or transition-related medical care (Cook-Daniels, 2015; King et al., 2019; Yerke & DeFeo, 2016). Perpetrators might also take advantage of their trans partners fear of others not being accepting of their trans or non-binary identity to keep their partner in their relationship (Cook-Daniels, 2015).

On top of the barriers that the general population faces to seeking help, trans and non-binary individuals face additional trans-specific barriers to leaving an abusive relationship. Barriers include fear of social isolation from having to out oneself or their partner by seeking help, fear of experiencing transphobia or anticipating lack of sensitivity among courts and law enforcement, and lack of knowledge on trans-specific or trans-friendly resources (Brown & Herman, 2015; Yerke & DeFeo, 2016). Trans people may have lack of confidence in their health care providers ability to help them due to a lack of competency on trans issues (Brown & Herman, 2015; Yerke & DeFeo, 2016). These barriers stem from a history of trans people experiencing high levels of discrimination and prejudice in society regarding their gender identity or expression (Grant et al., 2011). Trans and non-binary people also face greater economic marginalization and under or unemployment due to discrimination (Grant et al., 2011). This may lead trans people to rely on their partner for financial support, making it more challenging for them to break ties with their abusive partner.

Trans people may fear being further victimized when attempting to seek help (Yerke & DeFeo, 2016). Discrimination has been reported at domestic violence shelters, including denying trans people equal treatment, denying access to the shelter, and experiencing verbal or physical harassment at shelters (Grant et al., 2011). Additionally, trans people report police officers, health care providers, and other support services being insensitive and uninformed on trans-specific IPV issues (Yerke & DeFeo, 2016). Many trans folks

are faced with the difficult decision of having to stay in their abusive relationship or put themselves at risk of being discriminated against or further victimized by professionals or other IPV services (King et al., 2019; Yerke & DeFeo, 2016).

2.5.2 Sexual minorities

Sexual minorities, including those identifying as gay, lesbian and bisexual (LGB), have had less of a focus in Canadian IPV research compared to heterosexual individuals. This partly stems from false societal beliefs that abuse in relationships only occur by men towards their female partners, difficulty finding proper sample sizes, and discrimination towards LGB people (Coston, 2021; Whitehead, Dawson, & Hotton, 2020). However, research has found sexual minority men and women face greater amounts of IPV, compared to heterosexual individuals, with those identifying as bisexual experiencing the highest prevalence of IPV (Coston, 2021; Jaffray, 2021b, 2021a). Additionally, sexual minority women were found to be more likely to experience more severe forms of IPV including physical and sexual assault, and report symptoms of PTSD (Jaffray, 2021b). Sexual minority men are five times more likely to experience sexual assault and two times more likely to be physically assaulted by their intimate partner, compared to heterosexual men (Jaffray, 2021a). These men have also reported experiencing greater levels of fear and anxiety, and feeling controlled and trapped by their partner, compared to heterosexual men (Jaffray, 2021a). It is important to acknowledge that a limitation of these findings is that there is no information on the sex/gender of the perpetrators.

Feminist theories used to explain IPV often emphasize patriarchy and how it enables men to gain power over women, which does not provide an explanation to why same-sex partners also experience a greater prevalence of IPV. However, there are other ways in which social context (e.g., heteronormativity) can influence and maintain power dynamics within relationships other than patriarchal dominance (Whitehead et al., 2020). Similarly to violence experienced by trans and non-binary people, sexual minorities may experience types of violence directed toward their sexual orientation, such as threats to out their sexual orientation to people who may react negatively, or use homophobia or biphobia as a tool to gain control over the relationship (Coston, 2021). Scholars have

noted that LGBT racial and ethnic minorities, such as Black gay and bisexual men (BGBM), can be put at an even greater risk of IPV due to experiencing intersecting systems of oppression (e.g., racism, heteronormativity, and homophobia) (Brooks et al., 2021; Russell, 2020). Abusive partners may take advantage of both systemic racism and homophobia as tactics to threaten or silence their BGBM partner (Brooks et al., 2021). The greater IPV among bisexual women may be due in part to the greater levels of stigma they face (Coston, 2021). Bisexual women are not only stigmatized in heteronormative environments, but also by the lesbian and gay communities as being more promiscuous, hypersexual, or having their sexuality treated as illegitimate (Coston, 2021). These stereotypes can lead bisexual women's partners to become jealous or insecure, which may lead their partner to become violent as a way to regain control (Coston, 2021). Additionally, the hyper-sexualization of bisexual women can also lead to an increased risk of sexual abuse and rape (Coston, 2021).

2.5.3 Socioeconomic status

Those of low socioeconomic status (SES), especially those living in poverty, have been found to experience greater levels of IPV (Cotter, 2021b; Daoud, Smylie, Urquia, Allan, & O'Campo, 2013). Researchers discuss the higher stress experienced by those living in poverty as a possible risk factor of IPV (Stewart et al., 2012). The 2018 SSPPS showed Canadians with a household income below $20,000 experienced a significantly greater prevalence of IPV in their lifetime compared to those in other income categories (Cotter, 2021b). However, they found there were not significant differences between income categories and IPV in the past 12 months, which may indicate that the higher prevalence of IPV is not a result of being low income, but rather experiencing IPV may affect ones income later in life (Cotter, 2021b).

Women and other marginalized populations including people with disabilities, sexual and gender minorities, racial/ethnic minorities, and Indigenous populations face socioeconomic disadvantages in Canada due to a history of institutional racism and employment discrimination (Daoud et al., 2013; Nangia & Arora, 2021; Shier, Graham, & Jones, 2009). Less social power and resource deprivation may hinder the ability for people of low SES

to access help or be able to escape the abuse (Stewart et al., 2012). Partners that are less educated or rely on their partner for income may have difficulty leaving relationship due to lack of financial independence. Women with higher incomes who are financially independent have been found to be more likely to seek help, including seeking legal services (Barrett & Pierre, 2011). In Canada, the Legal Aid Program helps to provide legal services to low-income individuals who are victims of IPV (Government of Canada, 2021). One example of services provided by the Canadian Legal Aid Program is Legal Aid Ontario, which provides IPV victims living in Ontario with two hours of free legal advice provided by a lawyer with experience working in IPV issues (Legal Aid Ontario, 2022). Although these services are available, there is still an inadequate amount of support for most women of low SES. For example, the federal Divorce Act in Canada and the Children's Law Reform Act in Ontario complicate the legal process, by allowing children to have maximum contact with both parents, despite family court judges being made aware of historical IPV (Ellis, Lewis, & Nepon, 2021). This is likely to create even greater inequities among low SES women, who are unable to afford longer-term legal counsel.

2.5.4 Disability

There is limited research on IPV risk among people with disabilities (Brownridge, 2006). This invisibility of people with disabilities in IPV research can be detrimental, as studies have shown that individuals with a disability have been found to be at greater risk of IPV, compared to those who do not have a disability (Brownridge, 2006; Du Mont & Forte, 2014; Hahn, McCormick, Silverman, Robinson, & Koenen, 2014; Savage, 2021a; Son et al., 2020). Those with disabilities are also at greater risk of severe physical violence and sexual violence (Brownridge, 2006; Savage, 2021a). People with disabilities are very heterogenous group, as there is a wide range of disabilities that people may have (sensory, cognitive, physical, mental health related), with varying levels of severity. A large percentage of the Canadian population (22%) age 15 and over have reported having at least one disability (Morris, Fawcett, Brisebois, & Hughes, 2018). Those with more severe disabilities, such as those with severe activity limitations, or those who require a caregiver due to their disability, are more vulnerable to IPV if their primary caregiver is their partner (Savage, 2021a). When stratifying by disability severity, women with mild

disability had a higher prevalence of lifetime IPV (53%) compared to women without disabilities (37%) (Savage, 2021a). Risk of IPV increased for women with moderate (57%), and severe/very severe disabilities (60%), however no statistically significant differences were found between these severity categories (Savage, 2021a).

People with disabilities may experience unique forms of IPV which may not be as harmful if experienced by someone without a disability (Gilson et al., 2001). Gilson et al., (2001) indicate some of these forms of disability-specific abuse tactics including: removing/sabotaging accessibility devices, withholding food, medications, or personal care, refusing to communicate using sign language or other communication devices (Gilson et al., 2001). Emotional abuse can also take forms such as threats to institutionalize their partner if they do not comply, or restricting contact to family and friends (Gilson et al., 2001; Savage, 2021a). Since these forms of abuse are not as common among those without disabilities, it may be difficult for health care providers to recognize these forms of abuse, which can perpetuate the violence (Gilson et al., 2001). Those with disabilities were more likely to feel trapped, controlled, and fearful of their abusive partner, compared to those without disabilities (Savage, 2021a). Women with disabilities have reported worse health consequences as a result of the violence, compared to women without disabilities, including lower self-esteem and symptoms of PTSD (Savage, 2021a).

There are many individual and social factors that have put those with disabilities at increased risk of IPV. People with disabilities are more likely to experience known IPV risk factors, including being physically or sexually abused by an adult in childhood, having a low income, and low educational attainment (Savage, 2021a). People with disabilities face individual (e.g., activity limitations) and social barriers (e.g., employment discrimination) to finding employment (Brownridge, 2006; Shier et al., 2009). They also may rely on their partner for arranging transportation and completing other daily activities (Savage, 2021a). These factors will lead the victim to become more dependent on their abusive partner, creating an imbalance of power in the relationship (Brownridge, 2006). Ableism can also contribute to abusers perceiving their partner with

a disability as less able to protect themselves from the violence and abusers may believe it will be easier to exert control (Son et al., 2020). These factors can not only lead to the initiation of the violence, but also act as barriers to ending the violence. It may be more difficult for those with severe disabilities to access information on how to report the violence, or it may be harder to leave a partner if they rely on them to help them with their daily activities and finances.

2.5.5 Indigenous identity

Indigenous identity refers to those who identify as First Nations, Métis or Inuit living in Canada, irrespective of whether they are registered under the Indian Act of Canada. Indigenous men and women have reported greater amounts of IPV compared to non-Indigenous people in their lifetime (Cotter, 2021b). Indigenous women in particular, have been found to be at greater risk of IPV compared to non-Indigenous women across several studies (Boyce, 2016; Brownridge, 2008; Cotter, 2021b; Heidinger, 2021; Romans et al., 2007). Data from the 2018 SSPPS showed that 61% of Indigenous women experienced some form of IPV in their lifetime, compared to 44% of non-Indigenous women (Heidinger, 2021). Additionally, Indigenous women were twice as likely to be victims of sexual violence in their relationship, compared to non-Indigenous women in their lifetime (Heidinger, 2021).

The higher prevalence of IPV experienced by Indigenous women can be directly linked to the historical context of colonialism and residential school trauma that Indigenous people had and continue to endure to this day (Bopp, Bopp, & Lane, 2003; Brownridge, 2008; Native Women's Association of Canada, 2015; Smye et al., 2020). Indigenous peoples' emotional trauma and marginalization from society, stemming from a history of colonialism and racism, have increased their risk factors for violence including policy-induced poverty, lack of housing, adverse childhood experiences, alcohol and substance abuse, higher unemployment, lower educational attainment, loss of cultural values and way of life, and poor physical and mental health (Boyce, 2016; Heidinger, 2021; Native Women's Association of Canada, 2015; Smye et al., 2020). The historical violence experienced by Indigenous peoples in the residential schools has led to violence

becoming intergenerational, as the trauma experienced by previous generations have created a cycle of violence in their communities (Native Women's Association of Canada, 2015; Truth and Reconciliation Comission of Canada, 2015). Those who experienced or witnessed violence at the residential schools have an increased risk of perpetrating IPV or becoming victims of IPV in their future relationships, and these behaviours and trauma ultimately get passed on to their children (Moffitt et al., 2013; Smye et al., 2020; Truth and Reconciliation Comission of Canada, 2015).

Indigenous women living on reserves face barriers to leaving their violent relationship both within and outside of their communities. Within their communities, they are often forced to leave behind their families, traditional lands, and cultural connections in order to escape the abuse (Smye et al., 2020). Having to leave their community and land means they would have to give up their social and financial support, housing, and spiritual ties (Smye et al., 2020). For those living off the reserves, it can be challenging to find culturally appropriate IPV resources, as 36% of Indigenous adults in Toronto (O'Brien et al., 2018) and 40% in London Ontario (Xavier et al., 2015) have reported that family violence resources supporting Indigenous peoples are inadequate.

The systemic sexism, racialization, stigmatization, and discrimination Indigenous women face within Canadian institutions, such as the healthcare and justice system, can also have implications which initiate and perpetuate the violence (Smye et al., 2020). The social injustice and forced displacement Indigenous peoples have faced in Canada have created a lack of confidence in the justice system to protect them (Bopp et al., 2003; Boyce, 2016; Heidinger, 2021). The justice system has failed to treat Indigenous women, in particular, with the same value as non-Indigenous people, as there has been issues with the justice system not investigating and solving cases of missing and murdered Indigenous women to the same extent as non-Indigenous peoples (Bopp et al., 2003). Additionally, it is known there are disproportionate numbers of Indigenous peoples who have been incarcerated (Truth and Reconciliation Comission of Canada, 2015). This history has led Indigenous women to often avoid contracting the police about the violence due to a lack of confidence in the police and a history of racism they have

experienced by the police services (Bopp et al., 2003; Boyce, 2016). The media has inappropriately portrayed and stigmatized Indigenous peoples as violent, which is a reflection of harmful societal beliefs (Smye et al., 2020). Additionally, many healthcare and social services workers often stigmatize and discriminate against Indigenous people (Smye et al., 2020). Indigenous women are often wrongfully assumed to be unfit to care for their children as seen by the surveillance of Indigenous mothers and the large amount of Indigenous children put into the child welfare system (Smye et al., 2020; Truth and Reconciliation Comission of Canada, 2015).

Indigenous women's intersecting experiences with colonialism and sexism have led to both the greater initiation and continuation of IPV by both allowing abusers to use their power over these women and make it difficult for them to escape the violence. These contextual factors have made Indigenous mother's fear losing their children to foster care, and being incarcerated if they report the abuse (Smye et al., 2020). Indigenous mothers have reported their parenting ability has been unjustly challenged so often that it has been normalized to anticipate losing custody of their children (Smye et al., 2020). Partners may use the knowledge of this stigma to threaten to call child welfare on their partner to have their children separated from them as a means to gain power and control in the relationship. There is also a lack of culturally appropriate services that can allow Indigenous people to heal from the IPV they experience (Bopp et al., 2003). Indigenous women have reported difficulties seeking appropriate assistance, as they often have experienced stigma and discrimination when seeking help regarding IPV (Smye et al., 2020).

2.5.6 Visible minorities

According to the Canadian Employment Equity Act, visible minorities are "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour" (Employment Equity Act, 1995). In 2018, the prevalence of lifetime IPV among visible minority women who have ever been in a relationship was lower, compared to Indigenous and non-Indigenous non-visible minority women (Cotter, 2021a). However, once accounting for immigrant visible minorities, who tend to have a lower prevalence of

IPV, visible minorities experienced approximately the same amount of IPV as non-visible minorities (Cotter, 2021a). Despite this, visible minorities who are victims of IPV face excess barriers reporting abuse and accessing support services which can be attributed to structural inequalities in Canada. Visible minorities may encounter, or fear encountering, discrimination and racism when accessing services due to a history of discrimination, violence, and racism against them (Decker et al., 2019). This is particularly noticeable within the police and legal system, where Black individuals have unjustly faced police brutality and incarceration (Decker et al., 2019). Visible minorities who do choose to separate from their abusive partner may find it more difficult than non-visible minorities to find employment and housing, due to experiences of racism and employment and housing discrimination (Kasturirangan et al., 2004).

Victims may be less likely to report IPV to the police if their partner is also a visible minority, as they may fear it will further reinforce stereotypes or lead to their partner being unjustly harmed or incarcerated by police (Decker et al., 2019; Kasturirangan et al., 2004). The literature has also shown that Black women perceive police lack care and concern for their well-being which may discourage them to call police (Decker et al., 2019). Despite these barriers, Holliday et al. (2020) found that Black women in the U.S. were twice as likely to call the police regarding IPV compared to white women. A stratified analysis found reasons for these findings including that Black and Hispanic women who called police were more likely to face more severe injuries from IPV compared to white women (Holliday et al., 2020). Additionally, a focus group comprised of Black women discussed how Black women are more likely to be shot or be killed by an intimate partner, and this fear may be why they are more likely to call police (Holliday et al., 2020). Since immigrants and those from a diverse range of cultures and religions may also be visible minorities, these barriers often intersect with the other barriers that these groups face when seeking help (e.g., language barriers or lack of culturally appropriate services).

2.5.7 Immigration history

Immigrant women in Canada have been found to have a lower prevalence of IPV compared to non-immigrant women (Cotter, 2021a; Du Mont & Forte, 2012). However, immigrants may face unique forms of IPV and have more barriers to help seeking compared to non-immigrants. Individuals may use their partners vulnerability as an immigrant as a tactic for abuse. Forms of immigration-related emotional abuse include threats to call immigration officials, threats to change their partners immigration status or their children's, and threats directed at their partners immigration status (Couture-Carron, Zaidi, & Ammar, 2021). Immigrants without documentation are even more vulnerable to immigration-related abuse, have greater dependence on their abuser, and have even more difficultly seeking help with legal services which perpetuates the continuation of violence they experience (Adams & Campbell, 2012). Abusers may use tactics to control their immigrant partners by further socially isolating them as they rely more on their abusers after leaving their friends and families from their home country (Adams & Campbell, 2012). These tactics may include limiting their partners contact with their friends and family from home, or telling them that they will not be able to function on their own with limited language skills, work experiences, and acculturation (Adams & Campbell, 2012).

A Canadian study using the 1999 GSS analyzed the differences in IPV risk among immigrants with different lengths of stay in Canada (Hyman, Forte, Du Mont, Romans, & Cohen, 2006). They found the odds of experiencing IPV in the past 5 years was 0.57 times lower (95% CI: 0.38, 0.87) among recent immigrant women compared to non-recent immigrant women (Hyman et al., 2006). Women who were not currently married were 10 times more likely to report IPV compared to women who were currently married (Hyman et al., 2006). They discuss potential behavioural and social reasons for increased odds of IPV among non-recent immigrants including alienation from their previous social supports, increased substance abuse, and postmigration stresses (Hyman et al., 2006). Increased reporting of IPV among non-recent immigrants may also be due to the women gaining more language skills to be able to communicate the abuse, or learning over time what constitutes abuse in Canada (Hyman et al., 2006).

Immigrants may face greater barriers to leaving abusive relationships, compared to non-immigrants. Immigrant women in Canada have been found to experience higher levels of discrimination and have lower levels of trust towards their neighbours, coworkers, and peers, compared to non-immigrants, which may prevent them from reaching out for help (Du Mont & Forte, 2012); however, it is unclear if this would vary by recency of immigration. A Canadian study that surveyed 90 immigrant women found that 57% of participants avoided calling the police to report IPV (Couture-Carron et al., 2021). Reasons for the women not calling the police included fear of abuser or getting in trouble (70%), not thinking it was a police matter (67%), believing police could not help (55%), fearing police (40%), fearing racism or cultural insensitivity (37%), fear of being arrested (34%), and language barriers (20%) (Couture-Carron et al., 2021). Immigrants to Canada come from many different cultures and ethnic backgrounds which can add to the barriers they face when seeking help for IPV, including cultural norms or expectations, as well as discrimination and racism when interacting with support services (Kasturirangan et al., 2004). It may also be difficult for immigrant women to reach out to police or health-care services about abuse due to factors including fear of children being taken away, cultural or family expectations, confidentiality concerns, and fear of deportation (Couture-Carron et al., 2021; Du Mont et al., 2012; Okeke-Ihejirika et al., 2020). Additionally, a large proportion of immigrant women who did not call the police were sponsored by their abuser (Couture-Carron et al., 2021).

Newer immigrants, specifically, often face language barriers, and their education credentials may not be recognized in Canada or have had no prior work experience in Canada, hindering their ability to find employment (Kasturirangan et al., 2004; Okeke-Ihejirika et al., 2020). Immigrant women exposed to IPV may be less likely to have access to financial resources as a form of power and control (Alaggia, Regehr, & Rishchynski, 2009). For these reasons, immigrants may often rely on their partner for financial stability (Couture-Carron et al., 2021). Additionally, new immigrants may have left behind their close friends and family and rely on their partner for social support and ties to their culture, and may lack knowledge on IPV services within their communities (Adams & Campbell, 2012; Kasturirangan et al., 2004; Okeke-Ihejirika et al., 2020).

2.5.8 Religion and culture

Individuals who come from certain racial/ethnic groups or immigrated to Canada may have cultural or religious expectations which impact their experiences with IPV. Some victims of IPV may have difficulty leaving abusive relationships or do not want to end their relationship due to religious norms and beliefs regarding marriage and divorce (Barrett & Pierre, 2011). To seek help, it is common for victims to reach out to informal support networks (e.g., friends, neighbours etc.) (Savage, 2021b). For religious women, a religious authority or leader can be a strong source of strength and support (Gezinski, Gonzalez-Pons, & Rogers, 2019). It is important to recognize that being religious is not a risk factor for IPV in itself. Rather, religion as an institution can be a risk factor for IPV if it reinforces traditional gender roles and/or acceptance of male control and authority. These norms can perpetuate IPV for women who do reach out for help from these religious support systems (Gezinski et al., 2019).

Some communities focus on collectivism over individualism, meaning they put more value society on rather than on their own autonomy (Stewart et al., 2012). Collectivist cultures often support more patriarchal norms that reinforce men's power and control over women, which can lead to expectations that women must stay in their abusive relationships (Barrett & Pierre, 2011; Stewart et al., 2012). Women from collectivist cultures may not want to report the violence they are experiencing because it could bring shame to their community or family (Kasturirangan et al., 2004). Some cultures may socially isolate women when they report violence in their relationship, since they believe it will break apart their community by bringing in outsiders (Kasturirangan et al., 2004). Women who do choose to seek formal support may face barriers due to lack of culturally appropriate services (Du Mont & Forte, 2012).

2.6 Intersectionality

Intersectionality is a theoretical framework first brought into academic literature by Black Feminist legal scholar, Kimberlé Crenshaw, and sociologist, Patricia Hill Collins. However, the ideas behind intersectionality has been a part of activist discourse long

before its introduction into academia, such as in activist Sojourner Truth's "Ain't I a woman?" speech in 1851 (Crenshaw, 1989) and the Combahee River Collective Statement (The Combahee River Collective, 1978). Crenshaw used the term 'intersectionality' to explain how the experiences of Black women could not be understood through feminist or antiracism perspectives, since the feminist perspective failed to acknowledge Black experiences and antiracism failed to acknowledge women (Crenshaw, 1989). The intersectionality framework acknowledges that individuals have multiple social positions (e.g., race, gender, sexual orientation) and that these positions intersect through structural-level systems of power (e.g., racism, sexism, heterosexism) to shape experiences (Bowleg, 2012). The Combahee River Collective explain their experiences of intersecting systems of oppression in their statement, "We also often find it difficult to separate race from class from sex oppression because in our lives they are most often experienced simultaneously" (The Combahee River Collective, 1978). Therefore, these social positions must be considered as a whole when trying to understand the experiences of those at the intersection of multiple social positions (Crenshaw, 1991). This is because the systems of power that disadvantage those at particular social positions intersect with one another in complex ways, so the health outcomes and experiences of those at particular intersections cannot be understood by adding together the effect of each social position (Bowleg, 2008, 2012). For this reason, an intersectional approach is considered complex in its methods and interpretation, and must always acknowledge social power (Collins, 2019). Other core tenants of intersectionality include relationality, social inequality, social context, and social justice (Collins, 2019).

Leslie McCall's work has outlined three methodological approaches to studying intersectionality (McCall, 2005). The first approach is the intracategorical approach, which studies the heterogeneity within a particular social position to get a better understanding of intersections that have been underrepresented in research. The majority of intracategorical studies are qualitative. The second approach is the intercategorical approach, which compares health outcomes across a broad range of intersections in the population. Quantitative intersectional methods that have been developed mainly focus

on the intercategorical approach. Lastly, the anticategorical approach rejects categorization of individuals due to the complexity and fluidity of one's intersectional position (McCall, 2005).

Previous Canadian quantitative studies on IPV that have taken an intersectional approach have only considered limited intersections (Heidinger, 2021; Jaffray, 2021a, 2021b). To get a deeper understanding of how systems of power intersect to impact IPV across very heterogeneous populations, a quantitative intercategorical intersectional analysis is needed. Intersectionality scholars have begun to develop and test new quantitative intersectional methods to study health inequalities; however, there are still many theoretical and methodological challenges that scholars are working to address (Bauer, 2014; Bauer et al., 2021; Guan et al., 2021; Lizotte, Mahendran, Churchill, & Bauer, 2020).

2.7 Need for an Intersectional Approach

Patricia Hill Collins describes violence as a "saturated site of intersecting power relations" (Collins, 2019, p. 237). She discusses how violence and power are "intertwined" and that violence has been used historically to establish power dynamics and create social inequalities. Therefore, considering intersecting social power relations is a necessary component to understanding gender-based violence. Since violence is considered a more visible "saturated site" (Collins, 2019), studying violence is a way we can better understand how intersecting social power dynamics influence other health inequalities across populations.

Recently, Statistics Canada released a series of reports on IPV in their Juristat Catalogue using data from the 2018 SSPPS (Cotter, 2021b, 2021a; Heidinger, 2021; Jaffray, 2021b, 2021a; Savage, 2021b, 2021a). These reports focused on experiences of specific groups that have either faced societal, political, and historical challenges or are known to have experienced a greater prevalence of IPV as seen in the literature. These groups include sexual minority men, sexual minority women, Indigenous women, younger women, visible minority women, and women with disabilities. These reports have been able to capture the experiences of those within specific intersections; however, since they have

analyzed only limited intersections, it hides those who are at multiple intersections of identity. It is important to study higher dimensional intersections within IPV research, as Canadians have many intersecting social identities and positions that make up who they are, and these identities can interact to shape one's experiences and risk of being exposed violence. To understand how IPV impacts *all* Canadians, across social intersections, an intersectional approach must be taken.

Chapter 3

3 Methodology

This chapter will discuss the methodology of the study including the study design, the target and sample population, measurement of variables, summaries of statistical methods used, data considerations and statistical analysis.

3.1 Study Design

3.1.1 Data Source

The 2018 Survey of Safety in Public and Private Spaces (SSPPS) is a cross-sectional survey conducted by Statistics Canada over the period of April to December 2018 (Statistics Canada, 2018). The 2018 SSPPS was the first cycle of the survey, which was created to understand the experiences of safety among Canadians in public and private spaces, including at home, the workplace, public spaces, and online (Statistics Canada, 2018). The survey was developed in collaboration with Women and Gender Equality Canada (WAGE), to gain a better understanding of gender-based violence in Canada and address prior knowledge gaps (Statistics Canada, 2019). The survey asks respondents to recall experiences from their lifetime and the 12 months that preceded the date of the survey (Statistics Canada, 2018). The target population for the survey was all non-institutionalized persons 15 years of age or older, living off reserves in the ten provinces and three territories of Canada (Statistics Canada, 2018).

3.1.2 Sampling Method

The sampling frame for the survey was made up of landline and cellular telephone numbers retrieved from administrative sources and the address registrar listing all of the dwellings in the provinces (Statistics Canada, 2019). The frame includes groups of one or several telephone numbers associated with the same address, and telephone numbers that are not linked to any address (Statistics Canada, 2018). The survey used a stratified random sampling design to select 106,000 units from their sampling frame (Statistics Canada, 2018). Stratification was conducted at the province/census metropolitan area

(CMA) level (Statistics Canada, 2018). For the territories, the sampling frame from the Labor Force Surveys was used (Statistics Canada, 2019). Sampling from the territories involved both one-stage simple random sampling and two-stage sampling designs (Statistics Canada, 2019). One individual aged 15 years old or over from the contacted household was randomly selected to participate in the SSPPS questionnaire (Statistics Canada, 2018). Initial contact was made by mail for households with addresses available (Statistics Canada, 2018). If no address was given, contact was made by telephone (Statistics Canada, 2018).

3.1.3 Data Collection

Data were collected from the survey respondents, as well as extracted from administrative files (Statistics Canada, 2018). For the provinces, data were collected voluntarily from either an electronic respondent self-completed questionnaire or from a computer assisted telephone interviews (CATI) (Statistics Canada, 2019). For the territories, the majority of the data were collected using computer assisted personal interviewing (CAPI), and occasionally CATI (Statistics Canada, 2019). Responses were made in either English or French, with no proxy responses permitted (Statistics Canada, 2018). To obtain quality income data, respondents were linked to their personal tax records (T1, T1FF, or T4) to obtain the respondent's income (Statistics Canada, 2018). Respondents were informed both before and during the survey regarding the linkage, and those who refused were excluded from the linkage (Statistics Canada, 2018). The response rate was 43.1% for the provinces and 73.2% for the territories (Statistics Canada, 2019).

3.1.4 Target and Study Population

The target population for this study was individuals living in Canada, aged 15 and up, who had been in an intimate relationship. Intimate relationships include current or former dating partners, spouses, and common law partners (Statistics Canada, 2019). Our study population included the survey respondents aged 15 and up who reported that they had been in an intimate relationship at some point in their lifetime. We restricted our sample to those who have been in an intimate relationship in their lifetime, rather than in the past

12 months, as IPV can occur from both current and past partners. Individuals who have been in intimate relationships were identified by asking survey respondents their current marital status (married, common law, widowed, separated, divorced, and single/never married), as well as asking whether they have ever been in an intimate relationship (married, living common law, or dating someone).

3.2 Study Measures

3.2.1 IPV measurement rationale

IPV exposure for our study was measured using multiple questions from the SSPPS that best captured IPV, including sexual, physical, and psychological violence (Cotter, 2021b). The IPV questions used in the SSPPS were adapted from the Conflicts Tactics Scale (CTS) from the GSS as well as the more recently developed Composite Abuse Scale Revised – Short Form (CASr-SF) (Statistics Canada, 2019). The use of IPV questions from the CASr-SF in the 2018 SSPPS filled in gaps that previous surveys, such as the GSS, failed to consider (Statistics Canada, 2019). This includes considering forms of IPV that are not criminal offences (e.g., financial abuse) and other important components of measuring severe IPV (e.g., choking) (Ford-Gilboe et al., 2016). This allows for better measurement of IPV that will be used to produce more accurate prevalence of IPV in Canada (Ford-Gilboe et al., 2016). Previous surveys that did not include non-physical forms of IPV including psychological/emotional violence likely has underestimated the prevalence of IPV and does not fully capture experiences of IPV among victims (Ford-Gilboe et al., 2016).

The literature has differentiated between forms of violence that are bi-directional and less frequent in nature known as “situational couple violence” versus violence that is rooted in patterns of power and control called ‘intimate terrorism’ or ‘coercive controlling violence’ (Kelly & Johnson, 2008). Since intimate terrorism has been found to cause much more severe mental and physical health outcomes, Wathen et al., (2021) have developed a new classification system using the responses from the CASr-SF to identify those who are experiencing more harmful and severe forms of IPV that lead to more

severe health outcomes (Wathen et al., 2021). This classification system was used when measuring IPV exposure in our study.

3.2.2 IPV variable coding

The outcome of this study was binary, measuring IPV exposure in the past 12 months. This study used questions from the SSPPS that were taken from the CASr-SF, which were created to measure IPV severity in the past 12 months. These questions measure both the exposure frequency of IPV behaviours in the past 12 months (Ford-Gilboe et al., 2016). Frequency of the event in the past 12 months was measured by providing the following response options: 0= 'Not in the past 12 months', 1= 'Once', 2= 'A few times', 3= 'Monthly', 4= 'Weekly', and 5= 'Daily/almost daily.' Although it was developed to measure IPV severity, the questions are also able to classify exposure to IPV (Ford-Gilboe et al., 2016).

The classification system for IPV exposure includes three levels: (1) IPV positive (meets the threshold for IPV), (2) sub-threshold (non-zero values which do not meet threshold) and (3) no IPV (true zeros) (Wathen et al., 2021). This study considered only those who have met the IPV positive threshold as exposed to IPV in the past 12 months. Those who are in the sub-threshold and true zero groups were coded as not exposed to IPV in the past 12 months.

To be classified as IPV positive, participants have to meet at least one of the physical, psychological, or sexual abuse subscale thresholds (Wathen et al., 2021). Each subscale is scored separately using survey items corresponding to that scale (either physical, psychological, or sexual IPV). The threshold for the physical abuse subscale is a total score of greater than 1, psychological abuse is a total score of greater than 4, and sexual abuse is a total score greater than 0 (Wathen et al., 2021). Any participant that reports being choked by their partner was classified as IPV positive due to the severity of the behaviour, regardless of whether they met initial thresholds (Wathen et al., 2021). See Appendix A and B for the CASr-SF questions and subscale scoring (Ford-Gilboe et al., 2016).

For the physical and psychological abuse subscales, when participants had responses to at least 70% of survey items, case-specific mean was used to impute values of missing responses. Participants who responded to less than 70% of survey items for the scale were counted as missing for that scale. For the sexual abuse subscale, scores can only be computed for those who responded to both sexual abuse items, as there were only two survey items. Those with missing responses for any sexual abuse item was counted as missing for this scale.

3.2.3 Independent variables

The following variables were included as potential independent variables to use in forming the intersection groups. These variables were selected due to their contextual importance in the experiences of IPV in the Canadian setting in existing literature.

Sex/gender. The 2018 SSPPS was the first survey to follow the new Statistics Canada standard on sex and gender by asking separate questions on sex assigned at birth and lived gender (Statistics Canada, 2019). Respondents were asked "What was your sex at birth?" Responses included male and female. They were then asked, "What is your gender?" Responses include male, female, and please specify. This has allowed for the inclusion of trans and gender diverse individuals into this study by cross classifying the sex and gender variables. However, due to small sample size limitations, trans females, trans males, and gender diverse/non-binary individuals were categorized with cisgender females. The rationale for including them in this category is that trans and non-binary identifying people share similarities to cisgender females in terms of risk of gender-based violence due to societal patriarchal/gender norms. Therefore, sex/gender in this study was categorized as either (1) 'cisgender male', or (2) 'cisgender female, trans male, trans female, or non-binary identifying'.

Race/ethnicity. Respondents were asked questions regarding their race/ethnicity, and whether they identified as Aboriginal. To identify those who are Indigenous respondents born in Canada, the United States, Germany, or Greenland were asked "Are you an

Aboriginal person, that is, First Nations, Métis or Inuk (Inuit)?" To identify those who were visible minorities, the following race/ethnicity question was asked: "Are you white, South Asian (e.g., East Indian, Pakistani, Sri Lankan), Chinese, Black, Filipino, Latin American, Arab, Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai), West Asian (e.g., Iranian, Afghan), Korean, Japanese, or Other?" Those who reported they were single origin white, Aboriginal, and multiple origin white/Latin American and white/Arab-West Asian were categorized as non-visible minority in accordance with the Census definition. Race/ethnicity was then categorized as (1) 'Black visible minority', (2) 'non-Black visible minority', (3) 'Indigenous', and (4) 'white/Caucasian' based on the participants self-reported race or cultural group.

Age. Age of the respondent at the time of the survey interview date was derived by Statistics Canada from the household roster. Age ranged from 15 years of age to 104 years of age. This was then categorized into three age groups, (1) '15–24 years old', (2) '25–44 years old', and (3) '45 years old and up'. This categorization was chosen since younger girls and women (age 15 to 24 years old) often face the highest prevalence of IPV, with risk decreasing with age (Policastro & Finn, 2021; Savage, 2021b).

Sexual orientation. Respondents were asked to identify their sexual orientation by responding to the question "What is your sexual orientation?" Responses included heterosexual, homosexual (e.g., lesbian or gay), bisexual, and please specify. Sexual orientation was categorized as (1) 'heterosexual', (2) 'gay/lesbian' and (3) 'bisexual'. The few respondents who answered under 'please specify' were categorized as missing.

Marital status. Respondents were asked "What is your marital status?" Marital status was categorized into two categories including (1) 'married, living common law, separated' and (2) 'single/never married, divorced, widowed'. The rationale behind this categorization was to categorize those who have legal ties to their partner in a separate category from those who are less likely to have legal ties.

Employment/student status. To understand respondents' employment or student status, a series of questions were asked. Respondents were asked "Last week, did you work at a job or business?" Responses included yes or no. Those who responded no were then asked the follow up question "Last week, did you have a job or business from which you were absent?" Responses included yes or no. Those who did not confirm whether they worked last week, or were absent from work due to temporary or seasonal layoff, or due to working a casual job where no work was available were then asked, "In the past 12 months, did you work at a job or business?" Responses included yes or no. Those who reported they did not work at a job or business in the past 12 months were asked, "During the past 12 months, what was your main activity?" Responses included: looking for paid work, going to school, caring for your children, household work, retired, paternity or parental leave, long-term illness, volunteering, or caregiving other than for your children, or other. All respondents were also asked about their student status with the question "Are you currently attending school, college, CEGEP, or university?" Responses included yes or no. For this study, those who reported they worked or were absent from their job or business in the last week, worked in the past 12 months, or were on paternal leave were considered employed. Those who were unemployed in the past 12 months due to looking for paid work, caring for children, household work, long term illness, volunteering, or caregiving other than for their children, or other were considered unemployed. Those who reported they were attending school, college, CEGEP, or university, or were unemployed due to going to school were considered a student regardless of their employment status. Employment status was categorized into (1) 'student', (2) 'employed in the past 12 months', (3) 'unemployed in the past 12 months' and (4) 'retired'.

Household income. Household income was measured using the Statistics Canada low-income measure cut points (Statistics Canada, 2021). This measure used both the household size of the respondent and their household income. Household size was derived from the household roster, which ranged from 1 to 20 people. To obtain household income for those living in the provinces, family income in 2017 was obtained using their 2017 T1 Financial File. Responses were measured on a continuous scale in

dollar value, from -19,2587 to 99,999,999. To obtain household income for those living in the North, respondents were asked, “What is your best estimate of your total household income, received by all household members, from all sources, before taxes and deductions, during the year ending December 31, 2017?” Responses were measured on a continuous scale, ranging from 0 to 2,222,222. Respondents were categorized into (1) ‘above the low-income cut-off’ and (2) ‘below the low-income cut-off.’

Resource deprivation. Resource deprivation was used to measure a participant’s financial security. All respondents were asked “Could you/your household handle an unforeseen expenditure of $5,000, today?” Responses included yes easily, yes but with some difficulty, or no could not handle the expenditure. Those who reported they could not handle an expenditure of $5,000 were then asked, “Could you/your household handle an unforeseen expenditure of $500, today?” Responses included yes easily, yes but with some difficulty, or no could not handle the expenditure. For this study, resource deprivation was categorized into three levels including: (1) ‘could handle an unforeseen expenditure of $5,000’, (2) ‘could not handle an unforeseen expenditure of $5,000 but could handle an unforeseen expenditure of $500’, or (3) ‘could not handle an unforeseen expenditure of $500’. Those households that could handle the cost either easily or with difficulty were categorized into that level. The limitation of this measure is that victims of IPV may not have access to this money since it includes household finances, especially if their partner is withholding resources from them (e.g., financial abuse). Additionally, one’s financial security may fluctuate over time, and the survey is only asking about their financial security during the present time of the survey.

Immigration. Respondents were asked “Are you now, or have ever been a landed immigrant in Canada?” Responses include yes or no. Respondents who were born in Canada were considered a valid skip for this question. Those who answered no or were valid skip were considered non-immigrants. Those who responded yes were considered established immigrants. Participants who reported that they were not born in Canada were asked, “In what year did you first come to Canada to live?” The response range was the year 1924 to the year 2018. Those who came to Canada in the past five years

(between 2013 to 2018) were considered newcomers. For this study, immigrant status was categorized into (1) ‘non-immigrants’, (2) ‘newcomer to Canada in the past five years’, and (3) ‘established immigrant (lived in Canada for over five years)’. It is important to note that landed immigrants include those who have been granted the right by immigration authorities to permanently reside in Canada. The limitation of this measure is that is does not capture those who are undocumented.

Disability. The Statistics Canada disability measure encompasses a wide range of disabilities including seeing, hearing, mobility, flexibility, dexterity, pain-related, learning, developmental, mental health-related and memory by asking participants a series of questions on their difficulties doing specific activities (Cloutier, Grondin, & Levesque, 2018). They ask participants to only report difficulties or long-term conditions that have lasted or are expected to last for 6 months or more. The Statistics Canada Global disability severity class was used by the SSPPS to categorize participants into severity categories including does not have a disability, mild, moderate, severe, very severe, and unknown disability (Cloutier et al., 2018). For this study, these categories were used to create the disability status variable with the following three categories: (1) ‘no disability’, (2) ‘mild disability’, and (3) ‘moderate to very severe disability’. Those who reported having a disability of unknown severity were categorized as missing. Those with a moderate to very severe disability were included within the same category based on recent findings from the 2018 SSPPS (Savage, 2021a). They reported that there was no statistically significant difference in IPV risk among women with moderate disabilities and severe/very severe disabilities (Savage, 2021a). For this reason, these individuals were grouped together into one category.

Religiosity. The SSPPS measures the importance of religious beliefs by asking participants, “How important are your religious or spiritual beliefs to the way you live?” Responses included very important, somewhat important, not very important, and not important at all. For this study, respondents were categorized as (1) ‘religious’ or (2) ‘not religious.’ The religious category included those who reported that their religious or spiritual beliefs were very important to the way they live. All other responses were

categorized as not religious. The purpose of this categorization was to capture those whose religious beliefs would strongly impact their relationships and social interactions.

Rural area. The SSPPS categorizes geographic areas using the Statistics Canada population centre/rural area type of residence derived from participants postal code of residence. Area types include rural area, core, fringe, population centre outside CMAs and CAs, and secondary core. The postal code of the participants residence was used to determine whether they reside in a rural area. Living in a rural area was defined as having a zero as the second position of the forward sortation area code (the designated postal delivery area in Canada, represented by the first three characters of the postal code) (Statistics Canada, 2017). The rural area variable for this study was categorized as (1) 'living in a rural area', or (2) 'not living in a rural area'.

Education level. Highest level of education was measured by the SSPPS by asking participants, "What was is the highest certificate, diploma, or degree that you have completed?" Responses included less than a high school diploma or its equivalent; high school diploma or a high school equivalency certificate; trades certificate or diploma; college, CEGEP or other non-university certificate or diploma (other than trades certificates or diplomas); university certificate or diploma below the bachelor's level; bachelor's degree; and university certificate, diploma, or degree above the bachelor's level. For this study, these responses were grouped into three categories: (1) 'high school education or less', (2) 'completed post-secondary education', or (3) 'completed education beyond bachelor's degree'.

Languages spoken. Participants were asked, "Of English or French, which language(s) do you speak well enough to conduct a conversation?" Responses included English only, French only, both English and French, or neither English nor French. In this study, responses were categorized into (1) 'speaks English and/or French' or (2) 'does not speak English and/or French'. The limitation of this variable is that survey interviews were conducted in either English or French. Therefore, those who face significant language

barriers may have disagreed to participate in the survey and would not be included in these results.

3.2.4 Exploratory Descriptive Variables

Among those who experienced IPV in the past 12 months, the following variables were used to explore the consequences of the violence, help-seeking and reporting behaviours, and risk factors. The purpose of this is to better understand the severity and impact that IPV has among intersectional groups. It will also provide a better understanding of which intersections may be facing greater barriers to help-seeking and reporting IPV.

Experienced sexual IPV. Participants who experienced IPV and met the threshold for sexual IPV (see Appendix A and B) were coded as (1) 'experienced sexual IPV'. Those who did not meet the threshold for sexual abuse were coded as (2) 'did not experience sexual IPV.'

Partner was drinking during violence. Participants who experienced IPV in the past 12 months were asked, "Did any of the abusive or violent behaviour in the past 12 months occur while your partner was drinking?" Responses included yes or no. Responses for this variable were categorized as either (1) 'partner was drinking during violence' or (2) 'partner was not drinking during violence.'

Pregnant when violence occurred. Participants who experienced IPV in the past 12 months and identified as cisgender females were asked, "Did any of the abusive or violent behaviour in the past 12 months happen while you were pregnant?" Responses included yes or no. Responses were categorized into (1) 'partner was pregnant at the time of violence' and (2) 'partner was not pregnant at the time of violence.'

Fear of partner. Participants who reported experiencing IPV at some point in their lifetime were asked, "As a result of these experiences, have you ever been afraid of any partner?" Responses included yes or no. This variable was categorized into (1) 'never afraid of partner' and (2) 'has been afraid of partner'.

Felt controlled or trapped by partner. Participants who reported experiencing IPV at some point in their lifetime were asked, "As a result of these experiences, have you ever felt controlled or trapped by any partner?" Responses included yes or no. This variable was categorized into (1) 'never felt controlled or trapped by a partner' and (2) 'has felt controlled or trapped by a partner'.

Felt anxious or on edge because of partner. Participants who reported experiencing IPV at some point in their lifetime were asked, "As a result of these experiences, have you ever felt anxious or on edge because of any partner?" Responses included yes or no. This variable was categorized into (1) 'has never felt anxious or on edge because of partner' and (2) 'has felt anxious or on edge because of partner'.

Physical injuries from violence. Participants who experienced violence by an intimate partner in the past 12 months were asked, "As a result of the violence you experienced by an intimate partner in the past 12 months, were you physically injured in any way?" Responses included yes or no. This variable was categorized into (1) 'was not physically injured' and (2) 'was physically injured.'

Anxiety/depression because of violence. Participants who experienced violence by an intimate partner in the past 12 months were asked, "At the time of the abusive or violent behaviour, how did this experience affect you emotionally? – Depression or anxiety attacks." Responses included yes or no. This variable was categorized into (1) 'experienced anxiety/depression because of violence' or (2) 'did not experience anxiety/depression because of violence.'

Lowered self-esteem because of violence. Participants who experienced violence by an intimate partner in the past 12 months were asked, "At the time of the abusive or violent behaviour, how did this experience affect you emotionally? – lowered self-esteem." Responses included yes or no. This variable was categorized into (1) 'violence lowered self-esteem' or (2) 'violence did not lower self-esteem.'

Police reporting. Participants who reported experiencing some form of IPV in the past 12 months were asked "Did the police find out about the abusive or violent behaviour in any way?" Responses included yes or no. This variable was categorized into: (1) 'abuse was not reported at all', and (2) 'abuse was reported themselves or by someone else.'

Spoke to someone about abuse. Participants who reported experiencing some form of IPV in the past 12 months were asked "Other than the police, who did you talk to about the abusive or violent behaviour?" Responses included a family member, a friend or neighbour, a co-worker, a doctor or nurse, a lawyer, a priest, rabbi, imam, elder, or other spiritual advisor, other, or did not talk to anyone. These responses were then categorized into (1) 'spoke to someone about the abuse' and (2) 'did not speak to anyone about the abuse'.

Service use. Participants who reported experiencing some form of IPV in the past 12 months were asked "During the past 12 months, did you ever contact or use any services for help because of the abusive or violent behaviour?" Responses included yes or no. Responses for this variable were categorized as either (1) 'did not use any services' or (1) 'did use services.'

Witnessed parents being abusive in childhood. Respondents were asked, "Before age 15, how many times did you see or hear any one of your parents, stepparents or guardians hit each other or another adult?" Responses included never, 1 or 2 times, 3 to 5 times, 6 to 10 times, more than 10 times. Responses were categorized into either (1) 'witnessed parents being abusive in childhood' or (2) 'did not witness parents being abusive in childhood.'

3.3 Statistical Analysis

Population health researchers interested in intersectionality have begun researching the most appropriate methods for conducting quantitative intercategorical intersectionality studies that describe health inequalities (Bauer, 2014; Evans, Williams, Onnela, & Subramanian, 2018; Mahendran, Lizotte, & Bauer, 2022a; Merlo, 2018). The two new

quantitative intersectionality methods that were chosen for sequential use in this study are random forest and multilevel analysis of individual heterogeneity and discriminatory accuracy (MAIHDA). All statistical analyses were conducted at the Statistics Canada Research Data Centre at Western University (Appendix I). Data cleaning and descriptive statistics were performed in SAS v. 9.4, except for the recoding the outcome variable, which was coded in SPSS 27 (IBM Corp, 2017) using Wathen et al., (2021)'s IPV classification. Data were imported into RStudio v. 3.6.1 (RStudio Team, 2020) using the R package "haven" (Wickham & Miller, 2021) to run statistical models.

3.3.1 Random Forest

3.3.1.1 Random forest rationale

Random forest is a type of machine learning method that aggregates multiple decision trees using bootstrapped subsamples of the data (Banerjee, Reynolds, Andersson, & Nallamothu, 2019; Breiman, 2001). Decision trees are a set of machine learning methods that use specific rules to partition data which are found to be similar to the outcome of interest (Mahendran et al., 2022a). Random forest is unique compared to other tree-based methods in that each split of a decision tree uses a random sample of the predictor variables (James, Witten, Hastie, & Tibshirani, 2021). This technique is used as a way to decorrelate the multiple decision trees, thus making the results more reliable by improving the prediction accuracy (Banerjee et al., 2019; James et al., 2021). A limitation of using random forest is that a complete dataset is needed with no missing observations. Another limitation is that predictor variables used in random forest should not be highly correlated with one another (Strobl, Hothorn, & Zeileis, 2009).

Tree-based methods, including random forest, have been used across a variety of disciplines to deal with complex data (Banerjee et al., 2019). Recently, population health researchers have been applying this method to study health inequalities using an intersectional approach (Mahendran et al., 2022a). Since there may be many possible social groups which may be of interest from a theoretical point of view, it may not be possible for researchers to include all the intersections of interest to them. High-

dimensional intersections may lead to intersection groups with sample sizes that are too small to properly analyze. Therefore, researchers need to carefully decide which social groups will be used to form the intersections for their study. Random forest can solve this issue by helping to narrow down which social groups to include in the analysis (Mahendran et al., 2022a). The purpose of using random forest in this study was to use a methodologically driven approach, in combination with the existing literature, to identify social groups which are the most statistically relevant to predict IPV. These social groups were then used to cross-classify the final social groups to form intersection groups for this study.

This approach was done by utilizing the variable importance measure (VIM), which provides a value of importance for each predictor variable (Strobl et al., 2009). The VIM assesses for the quantitative relevance of predictor variables to the outcome (Mahendran et al., 2022a). More specifically, the permutation importance measure was used to predict which social groups are the most statistically relevant to predicting IPV (Strobl et al., 2009). P-values for the VIM were also assessed, to obtain more information and improve interpretability of variable importance (Altmann, Toloşi, Sander, & Lengauer, 2010). The permutation importance measure was chosen for this study, as it allows us to assess p-values along with the VIM, which has been demonstrated to reduce bias, by providing a corrected measure of feature importance (Altmann et al., 2010). To decide which social groups would be used to form the intersections for this study, both the VIM values and p-values were considered. Variables with the highest VIM that are statistically significant took priority in forming the intersections.

3.3.1.2 Random forest analysis

Random forest was performed using the R package “ranger” (Wright & Ziegler, 2017). Only observations with complete data for all variables in the model were included.
The random forest model included IPV as the outcome variable. The following independent variables were included in the model to assess their importance in predicting the outcome: sex/gender, race/ethnicity, age, sexual orientation, marital status, employment, resource deprivation, immigrant status, disability, religiosity, rural area,

education, and language. Resource deprivation was chosen over household income for the analysis, as it better captures one's access to financial resources, and income may not be an accurate reflection of one's financial stability. Additionally, household income and resource deprivation were found to be correlated with each other in the dataset ($phi_{weighted}$=0.23; $p<0.0001$), with resource deprivation having fewer missing data compared to household income.

Variable selection for this analysis was done using the permutation-based measure of importance which allows for the inclusion of Altmann's p-values for variable importance (Altmann et al., 2010). Statistical significance was defined at an alpha level of 0.05. After the results were obtained, the VIM and p-values were then assessed to decide which social groups to use to form intersections. Sex/gender was decided a priori to be included in intersections due to IPV being a form of gender-based violence. Groups which had the lowest VIM and were not statistically significant were eliminated from the decision-making process. Those with the highest VIM and significant p-values were considered for forming the intersections. Sample size also needed to be considered per intersectional group, as each intersection needs a sufficient sample size to ensure statistical power and that Statistics Canada release rules were followed.

3.3.1.3 Sensitivity analyses

Two sensitivity analyses were conducted to ensure the reliability of the VIM results. The first sensitivity analyses repeated the model with an additional tuning step using the R package "tuneRanger" which has been shown to improve model performance (Probst, Wright, & Boulesteix, 2018). The model with the tuning step used the function 'tuneMtryFast' to tune the parameter Mtry. The second sensitivity analysis used the impurity-based measure rather than the permutation measure to assess whether there were any differences in the VIM results.

3.3.2 MAIHDA

3.3.2.1 MAIHDA rationale

MAIHDA is a novel multi-level modelling method that researchers have used to apply intersectionality into population health research (Evans, Williams, Onnela, & Subramanian, 2018). This intersectional method was originally applied to studying health inequalities using a continuous outcome (Evans et al., 2018); however, MAIHDA has also been applied to binary outcomes as well (Fisk et al., 2018; Mahendran, Lizotte, & Bauer, 2022b). In our study, the purpose of using MAIHDA was to obtain point estimates of the prevalence of IPV for each intersection group, along with their 95% confidence intervals.

MAIHDA is a type of multilevel modelling method that uses only individual level data; this is unlike typical multilevel models that use both individual and contextual data such as neighbourhoods or schools. In the case of MAIHDA, the individuals are nested within the context of their intersectional position. This model assumes that individuals belonging to a particular intersection are correlated due to their contextual experiences of being a part of that intersection. The first level (level 1) includes the individual participant observations. These observations are then nested within their intersection group (level 2) (Evans et al., 2018). A null MAIHDA model for binary outcomes can be written out as follows:

Level 1:

$$logit\left(P\left(Y_{ij}=1\right)\right)=\beta_{0j}$$

Level 2:

$$\beta_{0j}=\gamma_0+\mu_{0j}$$

$Level\ 2\text{: }\mu_{0j}\sim N(0,\sigma_u^2)$

$Level\ 1\text{: }e_{0ij}\sim N(0,\sigma_{e0}^2)$

Where:

β_{0j} is the strata level intercept;

γ_0 is the overall intercept across the strata;

μ_{0j} is the strata level random effect;

σ_u^2 is the variance for the strata level random effects;

σ_{e0}^2 is the variance for the individual level residuals;

The subscript *i* indexes the individual within the intersection and *j* indexes the intersection group.

Multilevel models require that the following assumptions hold: (1) the level 2 residuals are independent between clusters, (2) the level 2 intercepts and coefficients are independent from the level 1 residuals, (3) level 1 residuals have a normal distribution and constant variance, and (4) the level 2 intercept and slopes have a multivariate normal distribution and constant covariance matrix (Finch, Bolin, & Kelley, 2019).

The multilevel approach has been found to be advantageous in comparison to other intersectional methods for a variety of reasons (Evans et al., 2018; Mahendran et al., 2022b). Firstly, it uses weighted residuals which means this method is better at handling small intersections with few individuals by reducing the effect of outliers (Evans et al., 2018). Additionally, it is more parsimonious compared to the conventional fixed effects model, as adding more social groups into the intersections will grow the multilevel model linearly rather than geometrically (Evans et al., 2018). Another advantage of MAIHDA is that it allows for the variance to be given at both the strata and individual levels, thus providing researchers an understanding of the heterogeneity within and between intersection groups (Evans et al., 2018). Having both between group (level 2) and within group (level 1) variance is important, since it prevents the "tyranny of averages" also known as the "mean centric approach" (Evans et al., 2018). The Evans et al. (2018) study explains that by only comparing the mean across intersection groups without considering the between and within variances, it makes the health inequality an 'individual level issue' and the mean is not reflective of everyone's risk within that intersection.

The variance of the random effects provided in the null MAIDHA model (no fixed effects) can be used to measure the discriminatory accuracy of the intersection groups, which is how well intersection membership predicts one's exposure to the outcome (Merlo, 2018). This is done by comparing the variance within and between intersections using the intra-class correlation (ICC) formula also known as the variance partition coefficient (VPC) (Fisk et al., 2018):

$$ICC = \frac{\sigma_u^2}{\sigma_u^2+3.29}\ x\ 100\%$$

Where σ_u^2 represents the between stratum variance for the random effects and the within-stratum variance for the logistic distribution is $\frac{\pi^2}{3} = 3.29$ (Fisk et al., 2018). There is no official grading scale for the ICC value; however, the higher the ICC, the greater the similarity in the outcome among individuals within the same intersection group (lower variation) and the larger the difference in the outcome among those between intersections (higher variation) (Merlo, 2018). Fisk et al. (2018) propose a grading system for the ICC % value: non-existent (0-1), poor (> 1 to ≤ 5), fair, good (> 10 to ≤ 20), very good (> 20 to ≤ 30), and excellent (> 30). The ICC calculated for the full MAIHDA model (with fixed effects and random intercepts) provides an understanding of the degree to which the intersectional differences are explained by the random effects (Holman, Salway, & Bell, 2020). An ICC value that is close to zero for the full MAIHDA model would indicate the differences between intersections are well explained by the fixed/main effects only (Holman et al., 2020).

The percent change in variance (PCV) when comparing the null and full models can also be obtained with the following formula (Bell, Holman, & Jones, 2019):

$$PCV = \frac{\sigma_{u(0)}^2-\sigma_{u(1)}^2}{\sigma_{u(0)}^2}\ x\ 100\%$$

Where $\sigma^2_{u(0)}$ is the between stratum variance for the random effects in the null model and $\sigma^2_{u(1)}$ is the between stratum variance for the random effects in the full model (Mahendran et al., 2022b). The PCV also provides an indication of the level of multiplicative intersectionality (Bell et al., 2019).

For this study, MAIHDA was chosen as the preferred method for estimating the prevalence of IPV based off findings from a simulation study comparing quantitative intersectional methods for studying health inequalities in population health research with binary outcomes (Mahendran et al., 2022b). When comparing MAIHDA to the conventional non-intersectional main-effects regression approach, in simulated data with intersectional effects, MAIHDA performed better, though this advantage was lost at small sample sizes (Mahendran et al., 2022b). Additionally, the simulation study recommends MAIHDA as an unbiased approach for conducting intercategorical intersectional analyses (Mahendran et al., 2022b). This is because even at small sample sizes when main effects perform as well as MAIHDA, the main effects model is still misspecified when there are intersectional multiplicative effects, as it is treating the fixed effects as additive (Mahendran et al., 2022b). MAIHDA has other advantages including the ability to obtain confidence intervals which machine learning methods such as random forest cannot produce (Mahendran et al., 2022a). The limitation of MAIHDA is that independent variables must be categorical (Mahendran et al., 2022a).

3.3.2.2 MAIHDA analysis

MAIHDA was performed using the glmer function from the R package “lme4” to run a logistic multilevel model with random intercepts (Bates, Mächler, Bolker, & Walker, 2015). Previous MAIHDA applications have used the Bayesian methodology, which was preferred over frequentist methods which rely on the assumption that the confidence intervals are asymptomatically correct, as the number of strata approaches infinity (Evans et al., 2018; Fisk et al., 2018). However, this study used the frequentist method due to inability to access the tools for the Bayesian package “brms” within the Statistics Canada Research Data Centre. However, the frequentist method has been shown to have comparable point estimates to the Bayesian MAIHDA method (Mahendran et al., 2022a).

The first model (the null model) was a logistic multilevel model which only included the intersections as random intercepts:

$$logit\left(P\left(IPV_{ij}=1\right)\right)=\beta_{0j}$$

This model was used to calculate the VPC value, using the between stratum variance for the random effects. The 95% confidence interval for the VPC value was calculated by bootstrapping with 1000 iterations, using the 'bootMer' function from the package "lme4" (Bates et al., 2015).

The second logistic multilevel model (the full model) for this study included three variables, sex/gender, age, and disability, as fixed effects along with the intersections as random intercepts. This model can be written out as follows:

$$logit\left(P\left(IPV_{ij}=1\right)\right)=\ \beta_{0j}+\beta_1 sexgender_{ij}+\ \beta_2 25\ to\ 44\ yrs_{ij}+$$
$$\beta_3\ 45\ yrs\ and\ up_{ij}+\ \beta_4 mild\ disability_{ij}+$$
$$\beta_5 moderate\ to\ very\ severe\ disability_{ij}$$

Where sex/gender is a binary variable, with the reference group being 'cisgender men'. Age is a categorical variable with the reference group being 'age 15-24 years old'. Disability is a categorical variable with 'no disability' as the reference group. The subscript *i* indexes the individual within the intersection and *j* indexes the intersection group.

The between stratum variance for the random effects from the full model was zero. Thus, the VPC for the full model was also zero, creating a singularity. From these findings, we observed that all of the variation has been captured by the fixed effects (Holman et al., 2020). For this reason, a more appropriate method for this analysis would be a single level regression with only fixed effects included.

A single level logistic regression with a logit link function was run in R using the glm function. The three social identities/positions included in the model were sex/gender, age, and disability. The model can be written out as follows:

$$\ln\left[\frac{\Pr(IPV=1|x)}{\Pr(IPV=0|x)}\right] = \beta_0 + \beta_1 sexgender_i + \beta_2 25\ to\ 44\ yrs_i + \beta_3\ 45\ yrs\ and\ up_i + \beta_4 mild\ disability_i + \beta_5 moderate\ to\ very\ severe\ disability_i$$

Where sex/gender is a binary variable, with the reference group being ‘cisgender men’. Age is a categorical variable with the reference group being ‘age 15-24 years old’. Disability is a categorical variable with ‘no disability’ as the reference group. The subscript *i* indexes the individual within the intersection.

The predict function was then used to estimate the prevalence of IPV in the past 12 months for each intersection group, along with their standard errors. Standard errors were used to calculate 95% confidence intervals for each prevalence estimate.

3.3.2.3 Sensitivity analysis

Two sensitivity analyses were performed to assess the way that missing data for the outcome variable may have under- or over-estimated the prevalence of IPV per intersection group. Our analyses are not likely to be representative of a realistic scenario, as they characterize the most extreme scenarios in either direction. For the first sensitivity analysis, the model was re-run with all IPV missing observations recoded as experiencing the outcome. For the second sensitivity analysis, the model was re-run with all missing observations recoded as not experiencing the outcome. A third sensitivity analysis was done where trans and non-binary individuals were excluded from the analysis. The purpose of this was to assess whether grouping trans and non-binary individuals with cisgender women affected the prevalence estimates.

3.3.3 Exploratory Descriptive Statistics

The contextual experiences of participants that were exposed to IPV in the past 12 months were further explored using descriptive statistics. For the descriptive analysis, intersections were aggregated to meet Statistics Canada's minimum sample size for release. Descriptive statistics for intersection groups were obtained using PROC SURVEYFREQ in SAS. Cross-tabulation tables were created using the intersection variable and exploratory variables of interest. Bootstrap and sample weights provided in the SSPPS were used to produce percentages and Wilson 95% confidence intervals.

Age categories 15-24 years old and 25-44 years old were grouped, as well as those with mild and moderate to very severe disabilities. This gave a total of 2x2x2=8 intersections which included sex/gender (1=cisgender male 2=cisgender female, trans, non-binary identifying), age (1= 15-44 years old 2= 45+ years old), and disability (1=no disability, 2=mild to very severe disability). Variables that were explored across the 8 intersections included: fear of partner, felt controlled or trapped by partner, felt anxious or on edge because of partner, anxiety/depression because of violence, lowered self-esteem because of violence, spoke to someone about abuse, service use, partner was drinking during violence, and witnessed parents being abusive in childhood. Only participants who had no missing data for all these exploratory variables were included in this analysis to ensure confidentiality, as per Statistics Canada guidelines.

Some exploratory variables could not be stratified across the 8 intersection groups, due to sample sizes being too small for release. These variables included experienced sexual IPV, experienced physical injuries from the violence, violence was reported to the police, and pregnancy during the violence. Due to this limitation, descriptive results for these variables were gathered separately for each social group. Only participants who had no missing data for the following variables were included in this analysis, to ensure confidentiality: violence was reported to the police, experienced sexual IPV, as well as all variables discussed in the previous paragraph.

3.4 Data Considerations

3.4.1 Weights

Sample weights and bootstrap weights created by Statistics Canada for the SSPPS were used to obtain standard errors and 95% confidence intervals for estimates that were not modelled. Statistics Canada created one thousand sets of bootstrap weights for the 2018 SSPPS. Bootstrap weights allow for the variance estimates that consider the complex sampling design of the survey (Statistics Canada, 2019).

3.4.1.1 Producing Sample Weights

To produce weights for respondents living in the provinces, the following steps were taken by Statistics Canada: (1) design weights were made by dividing the number of records in the stratum on the frame by the number of records selected in the stratum, (2) adjustments were made to account for households that were represented by multiple records, (3) records with telephone numbers that were out-of-scope (businesses, institutions, or other out-of-scope dwellings) were removed, (4) non-responses were removed and adjustments were made for non-respondents, (5) person level weights were created by multiplying the household level weight by the number of household members aged 15 and up (6) person level weights were calibrated so the sum of the weights matched the demographic population counts at the province level, by age, by sex. These weights were also calibrated to the CMA demographic counts for CMA's included in the stratification of the sample (Statistics Canada, 2019).

To produce weights for respondents living in the Territories, the following steps were taken by Statistics Canada: (1) design weights were made using the inverse of the probability of selection, (2) out-of-scope dwellings were removed, (3) non-responses were removed and adjustments were made to account for non-respondents, (4) person level weights were created by multiplying the household level weight by the number of household members aged 15 and up, (5) weights were calibrated to match the sum of weights to the demographic population counts at the territory level, by age, by sex. Additionally, the weights were calibrated so that the proportion of people residing inside

and outside the capitals, and the proportion of Indigenous persons matched the 2016 Census (Statistics Canada, 2019).

3.4.2 Missing data

For the independent variables, 0.21% of the weighted sample had missing data for either sex/gender or disability. There were no missing data for age. Since there were low levels of missingness for independent variables, it was not necessary to use imputation methods for models. The outcome variable, exposure to IPV in the past 12 months, had 20.0% missingness among the weighted sample. The high percentage of missing responses for the outcome variable is likely due to the sensitive nature of IPV. Additionally, this missingness was likely compounded by our outcome variable involving a multi-item recode, as those who did not respond to 70% of the CASr-SF survey items were considered missing. We suspect IPV is under-reported, and many of the non-respondents have been exposed to IPV in the past 12 months.

Chapter 4

4 Results

This chapter will describe the results obtained from random forest, sample characteristics of the analytic sample, MAIHDA, logistic regression, and sensitivity analyses. The chapter will also provide descriptive results for those within the intersections who were exposed to IPV in the past 12 months.

4.1 Objective 1: Random Forest

The purpose of the random forest analysis was to decide which social groups would be used in forming intersections for the analysis. The sample used for random forest comprised of participants who had ever been in a relationship in their lifetime and had complete data for all 14 variables included in the model.

The results from the permutation-based random forest indicated age had the highest variable importance measure and was statistically significant (VIM=0.004; p=0.03) (Table 1). The second highest VIM that was statistically significant was disability (VIM= 0.0005; p=0.01) (Table 1). Since age and disability were the statistically significant variables with the highest VIM's, they were prioritized in forming intersections. Sex/gender was also included in forming intersections a priori, due to the nature of IPV being rooted in sex/gender. Further statistically significant variables were considered in forming intersections (education, marital status, and religiosity); however, to produce meaningful estimates and to have sufficient sample size per intersection group (as per Statistics Canada's policies), they were not included in the final intersections.

Two sensitivity analyses were done to ensure reliability of the results. The first sensitivity analysis was done using an additional tuning step, which gave the same VIM's (Appendix C). A second sensitivity analysis was done using the impurity-based measure (Appendix D). Random forest using the impurity-based measure also resulted in age and disability having the highest VIM's. For this reason, the final intersections chosen were disability, age, and sex/gender.

Table 1. Variable importance measure (VIM) and Altmann p-values from the permutation-based random forest

Variable	*VIM*	*p-value*
Age	0.003777	0.03*
Employment	0.002919	0.06
Immigrant	0.000678	0.09
Race/ethnicity	0.000566	0.21
Disability	0.000533	0.01*
Education	0.000434	0.01*
Marital status	0.000372	0.01*
Religiosity	0.000191	0.02*
Language	0.000089	0.08
Sex/gender	0.000069	0.46
Rural	0.000019	0.98
Resource deprivation	0.000019	0.78
Sexual orientation	-0.000068	1.00

*Statistically significant at alpha=0.05

4.2 Objective 2: Sample Characteristics

4.2.1 Descriptive characteristics for analytic sample

The final analytic sample for our study includes the 32,400 respondents who reported being in an intimate relationship at some point in their lifetime, and had no missing data for the outcome, sex/gender, age, and disability. Weighted sample characteristics for the analytic sample are included in Table 2.

Table 2. Weighted sample characteristics

Variable	Category	Frequency ($n_{weighted}$)	Percentage ($\%_{weighted}$)
Sex/gender	*Cisgender male*	11,173,000	50.7
	Cisgender female	10,825,000	49.1
	Transgender/non-binary	45,500	0.2
	Total	22,043,500	100.0
Race/ethnicity	*white*	17,049,500	78.1
	Black	501,500	2.3
	Non-Black visible minority	3,578,000	16.4
	Indigenous	693,500	3.2

Age	*Total*	21,822,000	100.0
	15-24 years old	1,654,500	7.5
	25-44 years old	8,120,000	36.8
	45+ years old	12,268,500	55.7
Marital status	*Total*	22,043,500	100.0
	Single/never married	2,814,500	12.8
	Married	14,259,000	64.8
	Common law	3,674,500	16.7
	Divorced	703,000	3.2
	Separated	432,500	2.0
	Widowed	126,000	0.6
Income	*Total*	22,009,500	100.1
	Below low-income cut-off	3,564,000	16.3
	Above low-income cut-off	18,234,000	83.7
Immigration	*Total*	21,797,500	100.0
	Non-immigrant	16,766,500	76.3
	Newcomer past 5 years	583,000	2.6
	Established immigrant (5+ years)	4,632,500	21.1
Resource deprivation	*Total*	21,982,000	100.0
	Could handle an expenditure of $5,000	16,690,500	76.9
	Could handle an expenditure of $500, but not $5,000	3,666,000	16.9
	Could not handle expenditure of $500	1,358,500	6.2
Sexual orientation	*Total*	21,715,500	100.0
	Heterosexual	20,910,500	96.8
	Lesbian/gay	319,500	1.5
	Bisexual	377,500	1.7
Religiosity	*Total*	21,608,000	100.0
	Non-religious	16,321,000	74.9

	Religious	5,455,500	25.1
	Total	21,776,000	100.0
Rural location	*Not living in rural area*	16,431,500	81.0
	Living in rural area	3,858,000	19.0
	Total	20,289,000	100.0
Education	*High school education or less*	6,928,500	31.6
	Post-secondary education below bachelor's/ bachelor's completion	12,453,500	56.7
	Education beyond bachelor's degree	2,562,500	11.7
	Total	21,944,500	100.0
Employment	*Employed/parental leave*	14,996,000	68.1
	Unemployed	1,424,500	6.5
	Retired	3,804,000	17.3
	Student (regardless of employment)	1,778,500	8.1
	Total	22,003,000	100.0
Disability	*No disability*	14,567,500	66.1
	Mild disability	4,883,500	22.1
	Moderate to very severe disability	2,593,000	11.8
	Total	2,2043,500	100.0
Language	*Speaks English or French*	2,1820,500	99.4
	Does not speak English or French	125,500	0.6
	Total	2,1946,000	100.0

4.2.2 Intersection group descriptive statistics

Intersections were formed using three social groups selected based on the random forest VIM results. These social groups were sex/gender (1= 'cisgender male', 2= 'cisgender female, trans, or non-binary') disability (1= 'no disability', 2= 'mild disability', 3= 'moderate to very severe disability') and age (1= '15–24 years old', 2= '25–44 years old', 3= '45 years old and up'). The three variables were used to create a matrix which formed

a total of 2 x 3 x 3 = 18 intersection groups. The weighted frequencies and percentage of the analytic sample within each intersection is displayed in Table 3.

Table 3. Weighted frequencies and percent per intersection group

Intersection	Frequency ($n_{weighted}$)	Percentage ($\%_{weighted}$)
Cis male, 15-24 years old, no disability	535,500	2.4
Cis male, 15-24 years old, mild disability	176,000	0.8
Cis male, 15-24 years old, moderate to very severe disability	61,500	0.3
Cis male, 25-44 years old, no disability	2,963,500	13.4
Cis male, 25-44 years old, mild disability	727,500	3.3
Cis male, 25-44 years old, moderate to very severe disability	257,000	1.2
Cis male, 45+ years old, no disability	4,273,500	19.4
Cis male, 45+ years old, mild disability	1,336,000	6.1
Cis male, 45+ years old, moderate to very severe disability	843,000	3.8
Cis female/trans/non-binary, 15-24 years old, no disability	446,500	2.0
Cis female/trans/non-binary, 15-24 years old, mild disability	299,500	1.4
Cis female/trans/non-binary, 15-24 years old, moderate to very severe disability	136,500	0.6
Cis female/trans/non-binary, 25-44 years old, no disability	2,772,000	12.6
Cis female/trans/non-binary, 25-44 years old, mild disability	986,500	4.5
Cis female/trans/non-binary, 25-44 years old, moderate to very severe disability	414,000	1.9
Cis female/trans/non-binary, 45+ years old, no disability	3,577,000	16.2
Cis female/trans/non-binary, 45+ years old, mild disability	1,358,000	6.2
Cis female/trans/non-binary, 45+ years old, moderate to very severe disability	881,000	4.0
Total	**22,043,500**	**100.1**

4.2.3 Frequency of IPV for the analytic sample

In the weighted sample, 3.4% of those who were in an intimate relationship in their lifetime met the threshold for experiencing IPV in the past 12 months. Additionally, 5.3% were sub-threshold for IPV, and 91.3% did not report any IPV. Those who were sub-threshold for IPV or did not experience IPV (96.6%) were considered to not have the outcome (Table 4).

Table 4. Weighted frequency of the analytic sample exposed to intimate partner violence (IPV) in the past 12 months

IPV Threshold	Frequency ($n_{weighted}$)	Percent ($\%_{weighted}$)
Meets threshold for IPV	751,000	3.4
Sub-threshold IPV	1,176,000	5.3
No IPV (true zeros)	20,117,000	91.3
Total	22,043,500	100.0

4.3 Objective 3: Prevalence of IPV and 95% confidence intervals across intersections

4.3.1 MAIHDA

A logistic multilevel model with random intercepts was run to obtain the prevalence estimates of IPV and their 95% confidence intervals for each intersection group. The between stratum variance for the null model, which only included the random intercept, was 1.20 (95% CI: 0.64, 2.56). This gave a VPC value of 26.7% (95% CI: 13.0% , 39.1%) (Table 5), which is considered to be ‘very good’ according to Fisk et al., (2018). However, when running the full model, which included sex/gender, disability status, and age group as fixed effects and random intercepts, the between stratum variance was zero (Table 5). Since the variance was zero, the VPC value for the full model was also calculated to be 0%. This tells us that the variance was fully explained by the fixed effects, and none of the variation was explained by random effects (Holman et al., 2020). For this reason, a single level model with only fixed effects was run to obtain prevalence estimates and 95% confidence intervals.

Table 5. Measure of discriminatory accuracy for multilevel analysis of individual heterogeneity and discriminatory accuracy (MAIHDA)

Measure	Estimate	95% Confidence Interval
Random effects null model		
Between stratum variance	1.20	0.64, 2.56
VPC	26.7%	13.0%, 39.1%
Random effects full model		
Between stratum variance	0.00	-
VPC	0.00%	-

4.3.2 Logistic Regression

A single level logistic regression was run using sex/gender, age, and disability as independent variables. The results of the regression model showed that the odds of experiencing IPV in the past 12 months was 1.32 times greater (95% CI: 1.16, 1.51) among cisgender women, trans, and non-binary individuals, compared to cisgender men (Table 5). The odds of experiencing IPV increased with increasing severity of disability. Those with moderate to very severe disability had 3.77 times greater odds of IPV (95% CI: 3.21, 4.44), compared to those without disabilities (Table 5). As age increased, the odds of IPV decreased, with those aged 45 and up having 0.11 times lower (95% CI: 0.09, 0.13) and those with aged 25-44 having 0.33 times lower (95% CI: 0.27, 0.40) odds of IPV compared to those aged 15-24 years old (Table 5).

This model was then used to predict the prevalence of IPV and their 95% confidence intervals for each of the 18 intersection groups (Table 7). We found the highest prevalence of IPV was 30.3% (95% CI: 25.7%, 34.8%), which was experienced by cisgender female, transgender, and non-binary individuals, aged 15-24 years old, with moderate to very severe disabilities. The lowest prevalence of IPV was 0.9% (95% CI: 0.8%, 1.0%), which was among cisgender men, aged 45+, with no disabilities.

The findings showed that those in the youngest age group had the highest prevalence of IPV, and the prevalence decreased with increasing age (Figure 3). Within each age

category, prevalence of IPV increased as disability severity increased (Figure 3). When comparing differences across sex/gender, cisgender females, trans, and non-binary individuals experienced a greater prevalence of IPV, compared to cisgender males of the same age and disability status (Figure 3).

Since 20% of the outcome values were missing, we conducted a sensitivity analysis to get a better understanding of how missing data may have influenced our results. If all missing responses were in fact exposed to IPV, the prevalence in each intersection would be much higher (Appendix E). If all missing responses were in fact not exposed to IPV, the prevalence in each intersection would go down (Appendix F). We assume that people who experience IPV may be less likely to report it in self-reported surveys, so we assume the real prevalence of IPV in these groups would be higher than what is presented in Table 7.

Due to the small number of participants with trans and non-binary identities, these individuals were grouped with cisgender females for our analysis. A sensitivity analysis was done to understand how the results were changed by combining cisgender females together with trans and non-binary individuals into the same category. We found comparable results when excluding trans and non-binary individuals from the analysis (Appendix G).

Table 6. Logistic regression odds ratios and 95% confidence intervals

Variable	Odds Ratio	95% confidence interval		p-value
		Lower level	Upper level	
Sex/gender				
Cisgender male		Reference		
Cisgender female/trans/non-binary	1.32	1.16	1.51	<0.001
Disability status				
No disability		Reference		
Mild disability	2.02	1.73	2.35	<0.001
Moderate to very severe disability	3.77	3.21	4.44	<0.001
Age group				
15-24 years old		Reference		
25-44 years old	0.33	0.27	0.40	<0.001
45+ years old	0.11	0.09	0.13	<0.001

Table 7. Predicted prevalence of intimate partner violence (IPV) and 95% confidence interval (CI) per intersection group

Intersections	Prevalence (%)	95% CI	
		Lower bound	Upper bound
Cis male, 15-24 years old, no disability	8.0	6.5	9.5
Cis male, 15-24 years old, mild disability	14.9	12.1	17.7
Cis male, 15-24 years old, moderate to very severe disability	24.7	20.3	29.0
Cis male, 25-44 years old, no disability	2.8	2.4	3.1
Cis male, 25-44 years old, mild disability	5.4	4.6	6.3
Cis male, 25-44 years old, moderate to very severe disability	9.7	8.1	11.3
Cis male, 45+ years old, no disability	0.9	0.8	1.0
Cis male, 45+ years old, mild disability	1.8	1.5	2.1
Cis male, 45+ years old, moderate to very severe disability	3.4	2.8	3.9
Cis female/trans/non-binary, 15-24 years old, no disability	10.3	8.5	12.2
Cis female/trans/non-binary, 15-24 years old, mild disability	18.8	15.7	22.0
Cis female/trans/non-binary, 15-24 years old, moderate to very severe disability	30.3	25.7	34.8
Cis female/trans/non-binary, 25-44 years old, no disability	3.6	3.2	4.1
Cis female/trans/non-binary, 25-44 years old, mild disability	7.1	6.1	8.0
Cis female/trans/non-binary, 25-44 years old, moderate to very severe disability	12.5	10.7	14.2
Cis female/trans/non-binary, 45+ years old, no disability	1.2	1.0	1.4
Cis female/trans/non-binary, 45+ years old, mild disability	2.4	2.0	2.8
Cis female/trans/non-binary, 45+ years old, moderate to very severe disability	4.4	3.8	5.1

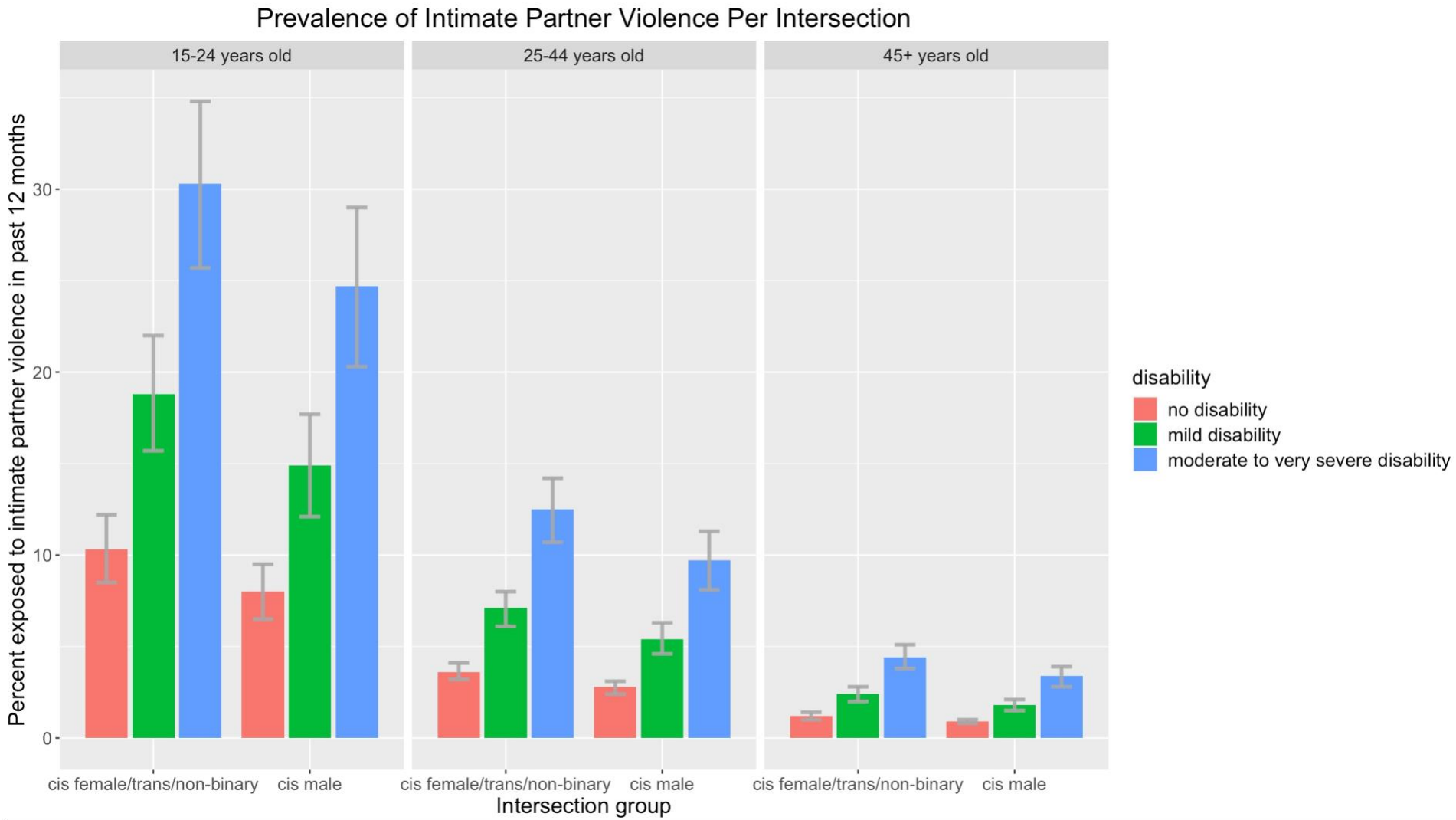

Figure 2. Predicted prevalence of intimate partner violence in the past 12 months and 95% confidence intervals for each intersection across age categories.

4.4 Objective 4: Exploratory descriptive results

Participants within the analytic sample who were exposed to IPV in the past 12 months were grouped into 8 intersections, based on sex/gender, age, and disability to explore help-seeking and reporting behaviours, consequences of the violence, and risk factors (Table 8). Participants were aggregated from 18 intersections into 8 intersections for this objective, due to sample size limitations. For exploratory variables that could not be analyzed across the 8 intersection groups (experienced sexual IPV, physical injuries from violence, and violence was reported to police), due to small cell sizes (as per Statistics Canada release guidelines), descriptive statistics were reported for each social group separately (Table 9).

4.4.1 Help Seeking

Across all 8 intersections, a high percentage of participants spoke to someone about the violence, other than the police (53.5% to 85.9%). A greater percent of cisgender women, trans, and non-binary people spoke about the violence to someone (66.4% to 85.9%), compared to cisgender men (53.5% to 66.1%). Younger (aged 15-44 years old) cisgender women, trans, and non-binary individuals were the most likely to speak to someone about violence, regardless of disability status. The least likely to speak to someone other than police were cisgender male aged 15-44 with no disability (53.5%). Use of services for IPV was lowest among cisgender men aged 15-44 years old with (7.3%) and without disabilities (4.8%). Service use among cisgender men was greater for those aged 45 and older with (12.9%) and without disabilities (19.0%). Women were more likely to seek out services for IPV (17.6% to 30.5%), with the greatest service use among cisgender women, trans, and non-binary individuals aged 45 and over with disabilities (30.5%).

Although many participants spoke to someone about the violence, majority of the violence was not reported to the police. Cisgender women, trans, and non-binary individuals were more likely to have the violence reported to the police (15.7%), compared to cisgender men (8.8%). Those with mild disabilities had a lower percent of violence reported to the police (9.9%), compared to those with no disabilities (14.2%) and moderate to very severe disabilities (14.3%). Very few participants aged 15-24 years

old had the violence reported to the police (3.7%), compared to those aged 25-44 (18.8%) and 45+ years old (15.0%).

4.4.2 Consequences of violence

A high percentage of participants across all intersections felt anxious or on edge because of the violence (54.9% to 90.5%), with the lowest reported among cisgender men aged 15-44 years old with (59.9%) and without disabilities (54.9%). Cisgender women, trans, and non-binary individuals were more likely to be afraid of their partner (52.3% to 74.1%), compared to cisgender men (15.7% to 26.0%). Cisgender women, trans, and non-binary individuals aged 45 years and older, reported the most severe psychological consequences of the violence, including being the most likely to feel controlled or trapped by their partner (84.5%), feel anxious or on edge because of their partner (90.5%), feel afraid of their partner (74.1%), have their self-esteem lowered from the violence (67.9%), and report having anxiety and depression due to the violence (64.1%). When comparing individuals of the same sex/gender and age group, those with disabilities were more likely to feel controlled or trapped by their partner, be afraid of their partner, have lowered self-esteem, and experience anxiety and depression because of the violence, compared to those without disabilities.

Cisgender female, trans, and non-binary individuals were more likely to experience sexual IPV (33.0%) and be physically injured from the violence (20.5%), compared to cisgender men (18.6%, 18.5%, respectively). Those with mild (34.7%) and moderate to very severe disabilities (30.4%) experienced a greater prevalence of sexual IPV, compared to those without disabilities (18.5%). Those with moderate to very severe disabilities had the greatest percent of those who were physically injured from the violence (22.6%), compared to those with no disabilities (18.9%) and mild disabilities (18.1%). The percent of those who experienced sexual IPV decreased as age increased, with the greatest prevalence of sexual IPV among those aged 15-24 years old (37.3%). Those aged 25-44 were the most likely to experience physical injuries from the violence (26.2%), compared to those aged 15-24 (14.3%) and 45 years and older (16.1%).

4.4.3 Risk factors

Across intersections that included cisgender women, trans, and non-binary individuals, the percent that reported their partner was drinking when the violence occurred ranged from 38.8% to 48.3%. Cisgender women, trans, and non-binary individuals without disabilities, aged 15-44 (48.3%) and 45 and over (47.2%) were most likely to experience their partner drinking during the violence. Across intersections that included cisgender men, the percent that reported their partner was drinking during the violence ranged from 21.2% to 40.9%, with the lowest percentages reported among men in the older (45+) age groups. When comparing individuals of the same sex/gender and age groups, those with disabilities were less likely to report their partner was drinking when the violence occurred. Most intersections had a moderate percentage of participants reporting they witnessed abuse between parents/guardians in childhood (before age 15), ranging from 11.2% to 37.6%. Cisgender men aged 15-44 with disabilities had the highest percentage of participants reporting witnessing their parents being abusive towards one another in childhood. Younger (15-44 years old) cisgender men (17.1%) and cisgender women, trans, and non-binary individuals (11.2%) with no disabilities, had the lowest percentages of individuals witnessing abuse between parents in childhood. Among cisgender women only, 4.3% (95% CI: 2.0%, 8.9%) were pregnant during the time of the violence.

Table 8. Contextual experience among those exposed to intimate partner violence in the past 12 months across intersections

	Weighted Percent (95% confidence interval)								
Intersection group	Spoke to someone about violence (other than police)	Used services for violence	Felt controlled or trapped by partner	Felt anxious or on edge because of partner	Felt afraid of partner	Lowered self-esteem because of violence	Anxiety/ depression from violence	Perpetrator was drinking when violence occurred	Witnessed parents being abusive in childhood
Cis male x 15-44 years old x no disability	53.5 (39.9, 66.6)	4.8 (2.1, 10.5)	48.3 (34.6, 62.2)	54.9 (41.2, 67.9)	15.7 (9.1, 25.9)	19.6 (10.6, 33.4)	11.4 (6.1, 20.1)	40.9 (28.2, 54.9)	17.1 (9.3, 29.4)
Cis male x 15-44 years old x disability	66.1 (50.2, 79.0)	7.3 (3.5, 14.4)	55.4 (39.6, 70.2)	59.9 (42.7, 75.0)	26.0 (14.6, 41.9)	39.3 (24.7, 56.2)	38.0 (24.2, 54.2)	33.9 (21.4, 49.2)	37.8 (23.6, 54.4)
Cis male x 45+ years old x no disability	61.3 (44.4, 75.8)	19.0 (8.8, 36.3)	39.5 (24.5, 56.8)	71.6 (54.7, 84.1)	18.4 (8.6, 35.2)	23.9 (12.3, 41.3)	18.6 (8.4, 36.3)	24.8 (12.5, 43.3)	33.3 (19.5, 50.8)
Cis male x 45+ years old x disability	59.5 (44.8, 72.6)	12.9 (7.0, 22.6)	62.4 (47.7, 75.1)	67.6 (51.1, 80.6)	24.3 (15.1, 36.6)	36.1 (23.4, 51.2)	22.9 (13.9, 35.4)	21.2 (12.8, 33.0)	32.4 (20.0, 48.0)
Cis female/trans/non-binary x 15-44 years old x no disability	85.9 (76.7, 91.9)	21.6 (13.0, 33.8)	67.0 (52.7, 78.7)	69.4 (54.6, 81.0)	52.3 (39.0, 65.2)	27.4 (18.2, 38.9)	22.9 (15.1, 33.1)	48.3 (35.2, 61.7)	11.2 (6.2, 19.3)
Cis female/trans/non-	85.8 (74.6, 92.6)	24.6 (15.4, 37.0)	71.9 (60.3, 81.2)	82.4 (70.1, 90.3)	55.8 (42.8, 68.2)	63.2 (50.8, 74.1)	59.6 (46.8, 71.2)	39.7 (28.1, 52.7)	29.3 (18.8, 42.6)

binary x 15-44 years old x disability									
Cis female/trans/non-binary x 45+ years old x no disability	66.4 (47.5, 81.2)	17.6 (8.8, 32.1)	73.0 (56.9, 84.7)	85.9 (74.8, 92.6)	63.5 (47.3, 77.1)	43.3 (27.8, 60.1)	37.7 (23.3, 54.6)	47.2 (30.9, 64.2)	31.5 (17.9, 49.2)
Cis female/trans/non-binary x 45+ years old x disability	72.1 (59.8, 81.8)	30.5 (19.5, 44.3)	84.5 (75.2, 90.8)	90.5 (81.2, 95.4)	74.1 (61.8, 83.4)	67.9 (56.0, 77.9)	64.1 (52.4, 74.3)	38.8 (27.4, 51.7)	29.5 (20.1, 40.9)

Note: 95% Wilson confidence intervals were calculated using bootstrap weights.

Table 9. Contextual experiences of those exposed to IPV in the past 12 months for each social group

Variable	Weighted Percent (95% Confidence Interval)		
	Experienced sexual IPV	Physical injuries from the violence	Violence was reported to the police
Sex/gender			
Cisgender male	18.6 (11.7, 28.2)	18.5 (11.9, 27.5)	8.8 (5.8, 13.3)
Cisgender female/trans/non-binary	33.0 (26.5, 40.2)	20.5 (15.3, 26.9)	15.7 (11.9, 20.3)
Disability			
No disability	18.5 (13.4, 25.0)	18.9 (13.3, 26.2)	14.2 (10.1, 19.6)
Mild disability	34.7 (24.5, 46.5)	18.1 (11.4, 27.4)	9.9 (6.5, 14.9)
Moderate to very severe disability	30.4 (21.2, 41.6)	22.6 (13.8, 34.9)	14.3 (9.2, 21.5)
Age			
15-24 years old	37.3 (25.7, 50.5)	14.3 (7.6, 25.3)	3.7 (1.6, 8.1)
25-44 years old	24.5 (18.1, 32.3)	26.2 (19.6, 34.2)	18.8 (14.0, 24.7)
45+ years old	18.2 (12.8, 25.1)	16.1 (9.5, 25.9)	15.0 (10.7, 20.8)

Note: 95% Wilson confidence intervals were calculated using bootstrap weights.

Chapter 5

5 Discussion

This chapter will discuss the study's research objectives in relation to the existing literature. The chapter will also discuss strengths and limitations of this study and directions for future research.

5.1 Summary of Findings

5.1.1 Social group selection using random forest

The aim of this study was to take an intercategorical intersectional approach to understand the prevalence of IPV in Canada. This approach is focused on the idea that individuals belong to multiple social positions and identities that intersect in complex ways (McCall, 2005), which shape their experiences with IPV. Prior literature has identified many social positions/identities which are at greater risk of IPV, due to interpersonal and societal power structures (Jaffray, 2021a, 2021b; Savage, 2021a, 2021b; Stewart et al., 2012). For this study, the following groups were taken into consideration when forming intersections to study in the context of IPV: sex/gender, age, disability, employment, race/ethnicity, immigrant status, education, marital status, religiosity, language barriers, rural location, resource deprivation, and sexual orientation. Due to limitations in our data, we were unable to include all social groups that were of interest in forming intersections. We recognized that existing quantitative methods are not fully developed to capture the rich Black Feminist theory behind intersectionality (Bauer et al., 2021; Guan et al., 2021). To help handle the limitations of incorporating intersectionality into quantitative methods, this study turned to validated machine learning methods recommended by a prior simulation study (Mahendran et al., 2022b). We chose to use random forest, as Mahendran et al., 2022a suggest it as a potential useful method to narrow down selection of social groups, to be used sequentially in conjunction with MAIHDA.

From the variable selection, we chose to create intersections using the variables: sex/gender, age, and disability status. However, our results revealed that there were also other social groups that were statistically significant (e.g., education and marital status), that we were unable to include due to small sample sizes. There were also social groups (e.g., employment) that were of high variable importance, that did not meet the threshold for statistical significance (α=0.05) that we used for variable selection. For this reason, it is important to recognize that there are still other social groups that existing literature shows are at risk of IPV, that should be investigated in future work. The implication of this is that the intersection groups in this study are still very heterogenous; composed of individuals with varying race/ethnicity, sexual orientations, socioeconomic status, etc.

It is important to address that the variable importance and significance results we report are in the context of our statistical model, and do not necessarily represent real-world/clinical significance of the social groups/positions in understanding IPV. The VIM and p-values provide an estimate of statistical importance (which variables contribute the most to predicting the outcome) in relation to the other variables included within the random forest model. For example, race/ethnicity was not important for our model in a statistical sense, as it did not have a high variable importance or significant p-value. However, from a theoretical perspective, we recognize that one's race/ethnicity is important for understanding experiences of IPV due to social power dynamics. We caution against using random forest in replacement of theory; rather, we recommend it be used in conjunction, if there is difficulty deciding between multiple social groups/positions which are of theoretical importance.

5.1.2 Sample characteristics of the analytic sample

In our analytic sample, we had a small percentage (0.2%) of participants who were trans or non-binary. For this reason, we were unable to describe the prevalence among this group alone and had to aggregate these respondents with cisgender women. Very few surveys have accounted for gender diverse individuals in their analysis (Yerke & DeFeo, 2016). Yerke and DeFeo, (2016) discuss that out of the seven studies of IPV that included trans and non-binary individuals, the same issue occurred, where the percentage of

respondents were too small (1% or lower) to gather any information on the risk of IPV among this group. This under-representation has implications for our research, as the prevalence of IPV, help-seeking, and consequences of IPV among trans and non-binary individuals were obscured in our study and should be interpreted cautiously.

The percentage of respondents within each intersection group was very variable (as is the norm in descriptive intersectional studies), with some intersections having as much as 19.4%, or as little as 0.6% of the weighted sample. We were unable to compare these frequencies with existing literature, as this was the first Canadian study to describe the prevalence of IPV across intersections of sex/gender, age, and disability.

5.1.3 Prevalence of IPV across the analytic sample

The prevalence of IPV has varied widely across studies, depending on the measurement of IPV and the sample population. Our study found 3.4% of individuals living in Canada, who have ever been in an intimate relationship, experienced IPV in the past 12 months leading up to the survey. This proportion differs from Cotter (2021b), which reported that 12% of women and 11% of men experienced IPV in the past 12 months. Both studies analyzed the 2018 SSPPS; however, the way IPV was measured differed across studies. Cotter (2021b) included anyone with a non-zero score for any of the IPV items in the survey (which also included items from the CTS) as having experienced IPV in the past 12 months, regardless of how frequently the violent behaviours occurred. Their goal was to be inclusive of all behaviours that are considered IPV including psychological, physical, and sexual IPV. The way that IPV was measured in their analysis explains why the prevalence of IPV was much higher in their study, as they have likely captured both severe forms of IPV known as ‘intimate terrorism’ which is rooted in patterns of power and control, as well as the less severe ‘situational couple violence,’ as discussed by Johnson (2006). Our study excluded sub-threshold IPV scores from the outcome, so that we primarily focused on individuals that experienced more severe forms of violence that are more likely to be rooted in power and control (Johnson, 2006).

It is important to distinguish what types of violence are being measured in IPV studies, to create more effective interventions (Johnson, 2006; Kelly & Johnson, 2008). The implications of measuring IPV to only include those who experience more severe forms of IPV means that we were better able to capture those who are at experiencing more harmful and frequent patterns of violence and control which can lead to worse mental and physical health outcomes, as well as those who are at greater risk of being seriously injured or murdered (Ford-Gilboe et al., 2016). This information is important to understand from a clinical perspective, by providing healthcare providers with a better understanding of the intersectional groups which may be the most harmed by IPV. Additionally, our findings provide policy and public health decision makers with a better picture of what populations are more severely impacted by IPV, so that interventions can be more appropriately tailored to improve the health and well-being among these groups. It is important to recognize that understanding the prevalence of situational couples' violence can also be relevant from a public health perspective, as it is known to be of higher prevalence and may also harm those exposed.

5.1.4 Prevalence of IPV across intersection groups

The sample was stratified based on sex/gender, age, disability status, to compare the prevalence of IPV across intersection groups. We emphasize that risk of IPV is not inherent or characteristic of the social identities/positions among intersectional groups with the highest prevalence of IPV. Rather, the way that society has disadvantaged these groups through intersecting systems of power has put these individuals at greater risk of being exposed to violence. Understanding IPV in the context of structural power dynamics is crucial, as misinterpretation can create further harm for those who are most affected by IPV.

Our original MAIHDA model allowed for statistical interactions across the three social position/identity variables. Considering the potential for statistical interaction in the first stage of our analysis was necessary for producing proper estimates. However, there was no evidence of any statistical interaction on the multiplicative scale. It is important to note that this does not mean that there is no interaction between groups. The absence of

interaction on the multiplicative scale in a main effects model often suggests that there is interaction present in the additive scale (not to be confused with the additivity assumption discussed in prior intersectional work (Bauer, 2014; Hancock, 2007)). Presence of interaction on the additive scale has been discussed to be more informative from a public health perspective (Bauer, 2014).

We found that younger (15-24 years old) cisgender women and girls, trans, and non-binary individuals, with moderate to severe disabilities were at the greatest risk of experiencing IPV in the past 12 months (30.3%). These findings are supported by previous literature exploring these individually rather than intersectionally, which found that younger women and girls (Policastro & Finn, 2021; Romans et al., 2007), trans and non-binary individuals (King et al., 2019), and women with disabilities (Brownridge, 2006) experience a disproportionately high prevalence of IPV. In a U.S. cross-sectional study, Smith (2008) found that among those with disabilities, being female increased the odds of physical (OR=2.52; 95% CI: 2.2, 2.9) and sexual (OR=12.22; 95% CI: 8.8, 16.9) IPV, as did being of younger (18-49) age (OR=1.51; 95% CI:1.3,1.7; OR=1.24; 95% CI:1.0-1.5, respectively). These findings are consistent with our study, as we found that those who were younger, and female experienced the greatest prevalence of IPV, among those with disabilities. However, our study further breaks down disability and age categories, to show IPV prevalence was greater for those aged 15-24, compared to those aged 25-44, and those with moderate to very severe disabilities, compared to those with mild disabilities.

Our findings are not surprising, as young women/girls, trans, and non-binary people with severe disabilities face many intersecting systems of oppression, which can disempower them and put them at greater risk of violence. Cisgender women, trans, and non-binary individuals, and those with disabilities, face barriers to employment, such as employment discrimination (Grant et al., 2010; Shier et al., 2009), and lower educational attainment (Brownridge, 2006), which can make them more financially dependent and put their partner in a position of power. Those with disabilities may face greater barriers to help seeking including difficulty communicating the violence to others, greater dependence on

others for assistance or care, and social isolation (Cohen, Forte, Du Mont, Hyman, & Romans, 2006). These factors may be exacerbated for those with these intersecting identities.

Among cisgender men, we found that within each age category, the risk of IPV increased with increasing disability severity. This is consistent with previous literature, which found men with disabilities are at greater risk of IPV, compared to men without disabilities (Savage, 2021a). However, we surprisingly found that 15–24-year-old cisgender men and boys with moderate to severe disability were also one of the groups at the highest risk of experiencing IPV. These men experienced a higher prevalence of IPV, compared to cisgender women, trans, and non-binary individuals with mild or no disabilities. These findings were similar to that of Cohen, Forte, Du Mont, Hyman, & Romans (2006), who analyzed data from the Canadian 1999 General Social Survey. They found that men with activity limitations experienced a greater prevalence of IPV compared to men and women without activity limitations. Those with activity limitations were also more likely to experience more severe and frequent forms of violence, compared to those without activity limitations (Cohen et al., 2006).

The majority of studies have focused on IPV risk among cisgender women, as they have been found to experience more severe forms of IPV, compared to cisgender men (Johnson, 2006; Stewart et al., 2012). It is critical to recognize the severity and impact of IPV among women; however, our findings highlight that there are also other groups that are at a high risk of IPV which have been hidden in prior literature. There are limited Canadian studies that have explored risk of IPV among men with disabilities (Cohen et al., 2006). Our findings emphasize the importance of taking an intersectional approach to studying IPV, as previous studies often do not consider IPV risk for cisgender men at the intersection of younger age and disability. Young cisgender men and boys with disabilities face different barriers, compared to cisgender women, when seeking help for IPV including lack of available services for men, and gender norms (Douglas & Hines, 2011). Since men are often assumed not to experience IPV (Douglas & Hines, 2011), and those with more severe disabilities are assumed to not to be in intimate relationships

(Brownridge, 2006), these experiences can intersect to create an even greater barrier for accessing services and being believed by others, for men with disabilities.

Although younger age was a large risk factor for experiencing IPV in this study, there was a lot of heterogeneity across age groups, depending on one's sex/gender and disability status. Among those in the youngest age group (15-24 years old), those with moderate to very severe disabilities had a higher prevalence of IPV compared to those with mild or no disabilities. We saw that cisgender females, trans, and non-binary individuals aged 25-44 with moderate to severe disability had a greater prevalence of IPV than cisgender females, trans, and non-binary individuals aged 15-24 with no disabilities. These findings demonstrate the way that multiple social and interpersonal power dynamics can interact. Researchers and policy makers should keep in mind that individuals have many intersecting identities, which should be considered holistically when understanding IPV risk and help seeking behaviours among victims of IPV.

5.1.5 Descriptive exploratory findings among those exposed to IPV

We sought to use an intersectional approach to understand the help-seeking behaviours, consequences of the violence, and risk factors among those who experienced IPV in the past 12 months. We found that intersections with cisgender men were less likely to speak to someone about the violence, report the violence to the police, and use services to seek help for the violence, compared to intersections with cisgender women, trans, and non-binary individuals. Although cisgender women were aggregated with trans and non-binary individuals in this analysis, we suspect police reporting is one area that may differ between these groups. Many trans and non-binary individuals will choose not to report violence to police, due to a history of harassment and mistreatment by police (Bauer & Scheim, 2014; Grant et al., 2011).

The sex/gender differences in help-seeking observed in our study are likely due to a combination of severity/fear being higher among women and gender minorities, and gendered expectations for cisgender men. Scott-Storey et al. (2022) discuss many

explanations for lower help-seeking behaviours among men compared with women, including being accused of being the perpetrator, not being taken seriously, or feeling that reaching out for support will not be helpful to them (Scott-Storey et al., 2022). Douglas & Hines (2011) found that 67% of men who sought help reported that domestic violence services were not at all helpful. Another potential reason for our findings is 'traditional masculinity' (i.e., where weakness or needing help is not perceived as masculine), which has been discussed to be a major barrier for help seeking among men more generally in healthcare (Galdas, Cheater, & Marshall, 2005). Lower help seeking among cisgender men can have negative implications for those men who are experiencing more severe forms of IPV. This is specifically of concern among younger cisgender men with moderate to very severe disabilities, which were found to experience the second highest prevalence of IPV among intersections.

We found that those with disabilities not only reported a greater prevalence of IPV, but also reported more severe psychological consequences of the violence, compared to those of the same age and sex/gender without disabilities. Additionally, we found that those with mild to very severe disabilities experienced a greater prevalence of sexual IPV. These findings provide us with an indication that those with disabilities are experiencing more severe and damaging forms of IPV. These findings are consistent with previous studies (Breiding & Armour, 2015; Stewart et al., 2012), which found that those with disabilities are more vulnerable to severe forms of IPV. Among these individuals, disability may have been a risk factor and/or result of IPV (Stewart et al., 2012).

We found that those aged 15-44 experienced a higher prevalence of IPV, including a greater prevalence of sexual IPV, compared to those aged 45 and over. These findings are consistent with previous literature, that reports the prevalence of IPV declines with age (Romans et al., 2007). However, our findings indicate that those of older age were more psychologically impacted by the violence. More specifically, we found cisgender women, trans, and non-binary individuals in the oldest age group (45+) with disabilities had the most severe psychological consequences of the violence. This is likely because those over 45 years of age have endured IPV for a longer duration than younger individuals,

and the cumulative impact of the violence has led to more severe mental health impacts (Pathak, Dhairyawan, & Tariq, 2019). Older women may have fewer social supports than younger women, which can lead to worse health outcomes from the violence (Pathak et al., 2019). Additionally, trans people often have less social support from family, compared to their cisgender siblings (Factor & Rothblum, 2008). Those with disabilities may also face greater social isolation (Curry, Hassouneh-Phillips, & Johnston-Silverberg, 2001), creating even fewer social supports for women, trans, and non-binary individuals at the intersection of old age and disability. However, we found that this intersection had the highest percent of individuals using services for IPV. Although older women, trans, and non-binary people (45+) are at lower risk of IPV, compared to those aged 15-24 years old, they should not be overlooked in IPV interventions, as the consequences of the violence are more severe.

Our findings showed that across all intersections, a little less than half the cases exposed to IPV in the past 12 months reported that their partner was drinking when the violence occurred. These findings are consistent with previous studies (Graham et al., 2021; Jewkes, 2002), which discuss alcohol as a risk factor for IPV. Alcohol use by the perpetrator is important in understanding IPV risk, as research has shown that it is associated with more severe acts of physical aggression (Graham, Bernards, Wilsnack, & Gmel, 2011; McKinney, Caetano, Rodriguez, & Okoro, 2010). The highest prevalence of alcohol use during the violence was reported among intersections composed of cisgender women, trans, and non-binary individuals, as well as young (15-44 years old) cisgender males without disabilities. We also found across all intersections that a moderate percentage of those exposed to IPV had witnessed their parents or guardians being abusive in childhood. Fewer individuals aged 15-44 years old with no disabilities witnessed abuse in childhood, compared to other intersections. These findings are not surprising, as witnessing parents being abusive in childhood is a well-known risk factor for IPV (Montalvo-Liendo et al., 2015; Wathen & MacMillan, 2013). A reason this may be the case is that IPV victims learn in childhood that abusive behaviour should be tolerated or is the norm in intimate relationships (Cotter, 2021b).

5.2 Strengths

There are many strengths to this study. This study is among the first of our knowledge, to take a quantitative intercategorical intersectionality approach to understand the prevalence and context of IPV. This study fills gaps in IPV research by considering the way that disability status impacts one's risk of IPV. More specifically, previous studies have not considered the ways that disability, age, and sex/gender may potentially interact with one another to shape the experiences of IPV. This study used a rich theoretical background, designed through the lens of the intersectionality framework. The theory guiding this study allowed us to consider the way that IPV is rooted in both interpersonal and social power, which are said to be necessary to understanding experiences of IPV (Domestic Abuse Intervention Programs, 2017; Yllö, 2005). Taking an intersectional approach to explore the prevalence of IPV among those living in Canada provides valuable knowledge that can be used for future public health decision making and interventions. Additionally, these findings have the potential to drive future research on exploring how structural inequalities influence IPV risk among those at various intersections.

Another strength of our study is that it is among the first to apply novel quantitative intersectionality methods to study binary health outcomes (Mahendran et al., 2022b), including MAIHDA and machine learning methods. This analysis will provide new insights for future scholars who are interested in applying an intersectional approach to studying health inequalities.

The last major strength of this study is the measurement of IPV. Previous self-reported surveys may be more likely to capture forms of IPV that are less severe and less likely to be rooted in patterns of power and control, known as "situational couples' violence" (Johnson, 2006). Additionally, previous IPV surveys have excluded forms of IPV such as psychological and financial IPV or IPV from former partners (Ford-Gilboe et al., 2016; Romans et al., 2007). In this study, IPV was measured using a new scoring approach for the CASr-SF that distinguishes more serious IPV grounded in power and control, from less severe acts of aggression (sub-threshold IPV) and no IPV (Wathen et al., 2021).

Since severe IPV rooted in power and control was distinguished between less severe "situational couples' violence," we were better able to capture the prevalence of IPV among those who are at the greatest risk and may face worse mental and physical health outcomes, including risk of permanent or lethal outcomes. Additionally, many forms of IPV were considered including psychological, sexual, and physical IPV, as well as violence experienced from current or former partners. This approach aimed to reduce misclassification in the study to get a more meaningful measure of IPV.

5.3 Limitations

Although this study aimed to reduce information bias through proper measurement of IPV, these findings may still be influenced by non-response bias. We found 20% of our participants had missing data for the outcome variable. Previous research has discussed that victims of severe IPV may be less likely to report the violence in large self-reported surveys (Johnson, 2006; Romans et al., 2007). We assume that IPV was under-reported for this study due to the sensitivity of partner violence. Many individuals likely responded to the survey from home where they may be living with an intimate partner, and may not feel comfortable reporting experiences of IPV, especially if they are experiencing more severe forms of violence (i.e., control and surveillance). Therefore, is important to keep in mind the prevalence of IPV is likely underestimated in our study.

Since the SSPPS was cross-sectional in nature, we were unable to capture whether participants had a pre-existing disability prior to experiencing IPV, or if the disability was a result of the violence itself. Many victims of IPV will experience disability as a result of the violence, or their pre-existing disability may be further exacerbated by the violence (Sugg, 2015). When interpreting our results, it is important to keep in mind that this study could not determine when the disability began. In addition, there were no proxy responses permitted for the SSPPS. Although those with disabilities were not intentionally excluded from participating in the survey, not allowing proxy responses poses a major barrier among those with disabilities who usually depend on others to aid with survey completion (e.g., intellectual disabilities). Therefore, we assume these individuals were not represented in our study.

This study was only able to include three social identities/positions when forming intersections due to sample size limitations, which were age, disability, and sex/gender; however, we recognize individuals have many other intersecting identities that shape their risk of experiencing IPV. Additionally, another limitation of this study was having to combine trans and non-binary participants with cisgender women due to insufficient sample size. The literature shows that trans and non-binary individuals are at greater risk of IPV, compared to cisgender people (Yerke & DeFeo, 2016), which was not fully captured in our study. We were not able to include homelessness as a potential social group to form intersections in our study, since the SSPPS did not provide a good measure for homelessness at the time of the survey. The survey was only conducted in English and French with no proxy interviews. This poses a major barrier for immigrants who do not speak these languages to participate in the SSPPS. Therefore, our study likely under-represented immigrants who face language barriers when seeking help for IPV. Additionally, the survey did not collect data on the characteristics of the perpetrator (e.g., sex/gender, age). As a result, our study does not inform IPV interventions that target perpetrators.

To gather exploratory descriptive statistics for those who experienced IPV in the past 12 months, intersections needed to be aggregated to have sufficient sample sizes to report the data. Having to aggregate those with mild disabilities together with those with moderate to very severe disabilities likely have obscured meaningful differences across intersection groups, as we observed those with moderate to very severe disabilities have a much higher prevalence of IPV, compared to those with mild disabilities. We expect that those with more severe disabilities are also more likely face greater barriers to seeking help and more severe consequences from the violence. Additionally, having to aggregate trans and non-binary people with cisgender women for descriptive analysis was a major limitation, as the barriers trans and non-binary people face in terms of help-seeking and consequences of IPV are likely to be much different than cisgender women. Small sample sizes for each intersection group led to less precise estimates for descriptive statistics, as observed through wider confidence intervals.

Another limitation was that sample sizes were too small for the following variables to be broken down across intersections: experienced sexual IPV, experienced physical injuries from the violence, and if the violence was reported to the police. The victim's relationship to the perpetrator (if it was a current or former partner), was not able to be reported in this study, as a majority of participants did not respond. Having this data would provide better insights to the severity of IPV experienced by each group, as well as the potential structural barriers they face when seeking help.

5.4 Future research directions

This study found that one's sex/gender, age, and disability all play a part in shaping one's risk and contextual experiences of IPV in the past 12 months. Since individuals have many intersecting identities or social positions which shape their experiences of IPV, we recommend that future studies continue to consider studying more high dimensional intersections, which include other social groups that could not be included in this analysis (e.g., education, employment, race/ethnicity, homelessness etc.). Additionally, it is recommended that future studies continue to provide the opportunity to identify gender diverse individuals in their sample; however, they should also make efforts to increase representation of those with trans and non-binary identities (e.g., through oversampling), to be able to better capture the risk of IPV of those with diverse gender identities.

It is important not only to understand the prevalence of IPV among those at intersections, but also to understand the contextual experiences of those who are victims of IPV. Certain intersection groups may face greater barriers than others, when seeking help or reporting IPV, due to intersecting systems of privilege and oppression. We recommend future studies further explore contextual factors which were not able to be fully explored in this study, including police-reporting experiences of sexual IPV, physical injuries, and the victim's relationship to their perpetrator.

Future qualitative studies should be done to get a more nuanced understanding of the contextual experiences of those found to be at greatest risk of IPV, including younger cisgender men and women, trans, and non-binary individuals with moderate to very

severe disabilities. Qualitative studies among this intersection would provide a better understanding of the barriers that this group faces when trying to navigate experiences of IPV. Understanding the structural barriers of intersection groups found to be at high risk of IPV can be used to create more equitable public health interventions.

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Appendices

Appendix A. Questions from the Composite Abuse Scale Revised – Short Form Wathen et al., (2021) used to measure intimate partner violence exposure in the past 12 months.

My partner(s):	Has this <u>ever</u> happened to you?		If YES how often did it happen in the past 12 months?					
			0	1	2	3	4	5
1. Shook, pushed, grabbed or threw me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
2. Tried to convince my family, children or friends that I am crazy or tried to turn them against me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
3. Used or threatened to use a knife or gun or other weapon to harm me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
4. Made me perform sex acts that I did not want to perform	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
5. Followed me or hung around outside my home or work	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
6. Threatened to harm or kill me or someone close to me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
7. Choked me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
8. Forced or tried to force me to have sex	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
9. Harassed me by phone, text, email or using social media	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
10. Told me I was crazy, stupid or not good enough	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily

11. Hit me with a fist or object, kicked or bit me	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
12. Kept me from seeing or talking to my family or friends	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
13. Confined or locked me in a room or other space	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
14. Kept me from having access to a job, money or financial resources	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
15. Blamed me for causing their violent behaviour	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily
16. Made comments about my sexual past or my sexual performance that made me feel ashamed, inadequate of humiliated.	No	Yes	Not in the past 12 months	Once	A few times	Monthly	Weekly	Daily/ almost daily

Subscale Items: Physical abuse (items 1, 3, 6, 7, 11, 13), Sexual Abuse (items 4 and 8), Psychological Abuse (items 2, 5, 9, 10, 12, 14, 15, 16)

Appendix B. Thresholds to be considered in the IPV positive group (Wathen et al., 2021)

Subscale	Possible range of scores (Based on sum of scores from subscale)	IPV positive threshold score
Physical abuse (Items 1, 3, 6, 7, 11, 13)	0-30	> 1
Sexual abuse (Items 4, 8)	0-10	> 0
Psychological abuse (Items 2, 5, 9, 10, 12, 14, 15, 16)	0-40	> 4

Individuals who meet the threshold for one or more of the subscales are classified as IPV positive. Non-IPV positive cases who have a non-zero score on item 7 “choked me” are converted to IPV positive, regardless of whether initial thresholds are met. Non-zero scores are classified as sub-threshold IPV.

Appendix C. Sensitivity analysis. Permutation-based random forest with tuning step to obtain variable importance measures (VIM)

Variable	*VIM*
Age	0.003777
Employment	0.002919
Immigrant	0.000678
Race/ethnicity	0.000566
Disability	0.000533
Education	0.000434
Marital status	0.000372
Religiosity	0.000191
Language	0.000089
Sex/gender	0.000069
Rural	0.000019
Resource deprivation	0.000019
Sexual orientation	-0.000068

Appendix D. Sensitivity analysis. Impurity-based random forest to obtain variable importance measures (VIM)

Variable	*VIM*
Age	15.99
Disability	14.41
Employment	13.52
Race/ethnicity	12.23
Marital status	12.16
Education	12.01
Resource deprivation	11.97
Sexual orientation	7.81
Religiosity	7.69
Immigrant	7.61
Sex/gender	6.93
Rural	5.66
Language	1.44

Appendix E. Sensitivity analysis. Prevalence of intimate partner violence (IPV) and 95% confidence interval (CI) per intersection group if all missing responses have experienced IPV

Intersections	Prevalence (%)	95% Confidence Interval	
		Lower level	Upper level
Cis male, 15-24 years old, no disability	28.4	26.1	30.6
Cis male, 15-24 years old, mild disability	31.8	29.3	34.3
Cis male, 15-24 years old, moderate to very severe disability	43.7	40.7	46.6
Cis male, 25-44 years old, no disability	12.4	11.8	13.0
Cis male, 25-44 years old, mild disability	14.3	13.5	15.1
Cis male, 25-44 years old, moderate to very severe disability	21.7	20.5	23.0
Cis male, 45+ years old, no disability	20.8	20.1	21.5
Cis male, 45+ years old, mild disability	23.6	22.6	24.6
Cis male, 45+ years old, moderate to very severe disability	33.9	32.6	35.2
Cis female/trans/non-binary, 15-24 years old, no disability	40.7	38.0	43.4
Cis female/trans/non-binary, 15-24 years old, mild disability	44.7	41.8	47.5
Cis female/trans/non-binary, 15-24 years old, moderate to very severe disability	57.3	54.4	60.3
Cis female/trans/non-binary, 25-44 years old, no disability	19.7	18.9	20.6
Cis female/trans/non-binary, 25-44 years old, mild disability	14.3	13.5	15.1
Cis female/trans/non-binary, 25-44 years old, moderate to very severe disability	21.7	20.5	23.0
Cis female/trans/non-binary, 45+ years old, no disability	31.3	30.5	32.1
Cis female/trans/non-binary, 45+ years old, mild disability	34.8	33.7	36.0
Cis female/trans/non-binary, 45+ years old, moderate to very severe disability	47.1	45.8	48.4

Appendix F. Sensitivity analysis. Prevalence of intimate partner violence (IPV) and 95% confidence interval (CI) per intersection group if all missing responses have not experienced IPV

Intersections	Prevalence (%)	95% Confidence interval	
		Lower level	Upper level
Cis male, 15-24 years old, no disability	6.1	4.9	7.2
Cis male, 15-24 years old, mild disability	11.4	9.2	13.5
Cis male, 15-24 years old, moderate to very severe disability	17.6	14.3	20.9
Cis male, 25-44 years old, no disability	2.5	2.2	2.9
Cis male, 25-44 years old, mild disability	4.9	4.1	5.6
Cis male, 25-44 years old, moderate to very severe disability	7.9	6.6	9.1
Cis male, 45+ years old, no disability	0.7	0.6	0.8
Cis male, 45+ years old, mild disability	1.3	1.1	1.5
Cis male, 45+ years old, moderate to very severe disability	2.2	1.8	2.5
Cis female/trans/non-binary, 15-24 years old, no disability	7.5	6.1	8.8
Cis female/trans/non-binary, 15-24 years old, mild disability	13.7	11.4	16.1
Cis female/trans/non-binary, 15-24 years old, moderate to very severe disability	21.0	17.5	24.5
Cis female/trans/non-binary, 25-44 years old, no disability	3.1	2.7	3.5
Cis female/trans/non-binary, 25-44 years old, mild disability	6.0	5.2	6.8
Cis female/trans/non-binary, 25-44 years old, moderate to very severe disability	9.6	8.2	11.0
Cis female/trans/non-binary, 45+ years old, no disability	0.8	0.7	1.0
Cis female/trans/non-binary, 45+ years old, mild disability	1.6	1.4	1.9
Cis female/trans/non-binary, 45+ years old, moderate to very severe disability	2.7	2.3	3.1

Appendix G. Sensitivity analysis. Prevalence of intimate partner violence (IPV) and 95% confidence interval (CI) per intersection group if transgender and non-binary individuals were excluded from intersections

Intersections	Prevalence (%)	95% Confidence interval	
		Lower level	Upper level
Cis male, 15-24 years old, no disability	8.0	6.5	9.6
Cis male, 15-24 years old, mild disability	14.9	12.1	17.8
Cis male, 15-24 years old, moderate to very severe disability	24.9	20.5	29.3
Cis male, 25-44 years old, no disability	2.8	2.4	3.1
Cis male, 25-44 years old, mild disability	5.4	4.6	6.2
Cis male, 25-44 years old, moderate to very severe disability	9.7	8.2	11.3
Cis male, 45+ years old, no disability	0.9	0.8	1.1
Cis male, 45+ years old, mild disability	1.8	1.5	2.1
Cis male, 45+ years old, moderate to very severe disability	3.4	2.8	3.9
Cis female, 15-24 years old, no disability	10.4	8.5	12.3
Cis female, 15-24 years old, mild disability	18.9	15.7	22.1
Cis female, 15-24 years old, moderate to very severe disability	30.5	25.9	35.1
Cis female, 25-44 years old, no disability	3.6	3.2	4.1
Cis female, 25-44 years old, mild disability	7.0	6.1	8.0
Cis female, 25-44 years old, moderate to very severe disability	12.5	10.8	14.2
Cis female, 45+ years old, no disability	1.2	1.0	1.4
Cis female, 45+ years old, mild disability	2.4	2.0	2.8
Cis female, 45+ years old, moderate to very severe disability	4.4	3.8	5.1

Appendix H. Permission to use the Power and Control Wheel

domestic abuse intervention programs

DAIP

01/20/2022

Isabella Aversa

Masters Thesis student - Western University
iaversa2@uwo.ca

Re: Request to use the Power and Control Wheel of DAIP

Dear Isabella,

Thank you for your request to use the Power and Control Wheel image from the Domestic Abuse Intervention Program (DAIP) of Duluth, MN in your Masters Thesis An Intersectional Analysis of Intimate Partner Violence

The Power and Control Wheel is a copyright material and permission from DAIP is required to use this image as well as our other images and materials.

The Power and Control Wheel was developed in Duluth by battered women who were attending education groups sponsored by the local women's shelter. The wheel is used in our Creating a Process of Change for Men Who Batter curriculum, and in groups of women who are battered, to name and inspire dialogue about tactics of abuse. While we recognize that there are women who use violence against men, and that there are men and women in same-sex relationships who use violence, this wheel is meant specifically to illustrate men's abusive behaviors toward women. The Equality Wheel was developed for use with the same groups.

This letter is to inform you that DAIP ***grants*** our permission for your request to **use** the image of the Power and Control wheel in your **Masters Thesis An Intersectional Analysis of Intimate Partner Violence**

Please let us know if you have additional questions about other DAIP training materials or programming.

Sincerely,

Judy Breuer
Training Coordinator Assistant

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Appendix I. Statistics Canada Research Data Centre Disclaimer

This research was supported by funds to the Canadian Research Data Centre Network (CRDCN) from the Social Sciences and Humanities Research Council (SSHRC), the Canadian Institute for Health Research (CIHR), the Canadian Foundation for Innovation (CFI), and Statistics Canada. Although the research and analysis are based on data from Statistics Canada, the opinions expressed do not represent the views of Statistics Canada.

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