An Investigation of Posttraumatic Stress Symptoms and Physical Health Status in Sexual Assault Survivors

by
Erin MacKenzie Eadie
B.Sc., University of Toronto, 2004

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Abstract

This study investigated links between sexual assault experiences, posttraumatic stress symptoms (PTSS), and adverse physical health outcomes among adult women. Existing models in which posttraumatic stress disorder (PTSD) mediate the relationship between trauma exposure and physical health outcomes have been established within a variety of trauma populations, but had yet to be specifically tested with the trauma of sexual assault. Through the use of structural equation modelling (SEM), support was found for a model in which posttraumatic stress symptom (PTSS) severity partially mediates the association between sexual assault exposure and physical health problems. While PTSS severity served as a partial mediator, it was revealed that depression symptoms did not. A multivariate multiple regression was conducted to test whether the three PTSD symptom clusters (i.e., reexperiencing, avoidance, and hyperarousal symptoms) were differentially related to physical health outcomes, but it was found that no single symptom cluster explained the association between PTSD and adverse physical health outcomes. It was revealed, however, that reexperiencing symptoms and avoidance symptoms had unique associations with health care utilization and health perceptions, respectively. Finally, a

unique relationship between sexual assault exposure and reproductive and sexual health problems was revealed, suggesting that this is a particularly important area of health concern among sexual assault survivors.

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Introduction

Exposure to trauma and the related diagnosis of posttraumatic stress disorder (PTSD) have been studied in a wide variety of populations. Originally, PTSD was closely linked to the trauma of military combat and frequently observed in veterans after they returned from war. More recently, PTSD has been observed and investigated in a number of civilian populations, ranging from victims of natural disasters and terrorist attacks, to survivors of sexual assault and child abuse. While the psychological implications of trauma exposure have been well-established, the impact of traumatic experiences on physical health is becoming an important area of focus in the research literature.

The present study examines specific hypotheses and research questions regarding the links between trauma, posttraumatic stress symptoms (PTSS), and physical health status in a population of women who have experienced sexual assault. In particular, this investigation will test a hypothesized model in which PTSS severity mediates the association between sexual assault exposure and physical health outcomes.

Prevalence of Trauma Exposure and PTSD

Exposure to a trauma involves the experiencing or witnessing of a potentially traumatic event or situation (e.g., a natural disaster, a physical attack, military combat). The trauma itself is an event that involves "actual or threatened death or serious injury, or a threat to the physical integrity of self or others" (American Psychiatric Association, 2004, p. 463). The subsequent development of posttraumatic stress disorder (PTSD) requires a distress response that involves intense fear, horror, or helplessness. Specifically, PTSD is characterized by three sets of symptoms that last for at least a month. These include indications that the traumatic event is being reexperienced through

disturbing flashbacks, dreams, or intrusive thoughts, the avoidance of stimuli associated with the trauma combined with a numbing of emotional responsiveness, and symptoms that indicate increased physiological arousal, such as concentration problems and sleep disturbances. (APA, 2004)

The National Comorbidy Study (NCS; Kessler, Sonnega, Bromet, Hughes & Nelson, 1995) is the largest study to date that has investigated rates of trauma exposure. Of the 5877 adults who participated in this study, approximately 60% of men and 51% of women reported experiencing at least one traumatic event during his or her lifetime. Other studies have found even higher rates of trauma exposure. In a sample of college students, Bernat, Ronfeldt, Calhoun, and Arias (1998) reported a lifetime prevalence of 67% for trauma exposure. In addition, 69% of respondents in the National Women's Study indicated that they had experienced a trauma at some point in their lives (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). Moreover, 36% of this sample had been exposed to crime-related traumas, which included sexual assault, attempted sexual assault, sexual molestation, physical assault, and homicide.

Despite high rates of trauma exposure, not all individuals who experience a traumatic event will suffer significant posttraumatic psychological symptoms. Approximately 8 to 14% of men and 20 to 31% of women develop posttraumatic stress disorder after being exposed to a traumatic event (Breslau, Davis, Andreski, & Peterson, 1991; Kessler et al., 1995; Resnick et al., 1993). In general populations (including exposed and non-exposed individuals), this amounts to an overall lifetime prevalence rate for PTSD of approximately 8 to 9% (Breslau et al., 1991; Kessler et al., 1995).

Even though men report slightly higher rates of trauma exposure, women develop PTSD at up to twice the rate that men do (Kessler et al., 1995; Breslau et al., 1998), suggesting that gender is an important factor in determining risk for PTSD. In addition, Resnick and colleagues (1993), report that PTSD occurs at a remarkably higher rate in victims of crimes than in individuals exposed to non-criminal traumas (26% versus 9% for lifetime rates and 10% versus 3% for current PTSD). In particular, PTSD rates in this study were highest among physical and sexual assault victims as compared to all other trauma victims.

Trauma Exposure and Health

Across a diverse range of populations, exposure to trauma has been consistently linked to adverse physical health outcomes. These outcomes include increases in self-reported health problems, poorer perceptions of overall health, more diagnosed medical conditions, higher rates of medical service utilization, and even increased mortality (Friedman & Schnurr, 1995; Green & Kimerling, 2004; Schnurr & Jankowski, 1999). As indicated by the range of these outcomes, physical health is a multidimensional construct with both objective and subjective components. In particular, one's health status is determined by the presence and severity of both physical symptoms and organic pathology, level of physical functioning, and overall perceptions of health.

Research linking trauma with physical health has been previously reviewed in great detail by Friedman and Schnurr (1995), and Green and Kimerling (2004). These reviews indicate that self-reports of physical symptoms, chronic health conditions, and poor perceptions of health status are strongly related to trauma exposure in a number of traumatized populations. Furthermore, severity of exposure has been linked to poorer

reported health status. Research involving medical service utilization data shows that trauma exposed individuals are hospitalized more often, undergo more surgeries, visit their physicians more frequently, and have higher rates of overall service utilization than individuals not exposed to trauma. In addition, combat veterans and prisoners of war show increased morbidity rates as indicated by objective measures such as laboratory tests and physician diagnoses. In particular, gastrointestinal, cardiovascular, and neurological diseases are most commonly reported among those exposed to combat-related traumas. Finally, mortality data reveals that veterans and war-exposed trauma victims experience higher rates of death due to accidents, suicide, heart attacks, hypertension, gastrointestinal problems, and cancer. It should be noted, however, that morbidity and mortality data in war-exposed populations can be confounded with injuries and medical conditions that result directly from combat-related events.

In a large community sample, Ullman and Siegel (1996) found that trauma exposure predicted poor perceived health status, more chronic medical conditions, and greater limitations in physical functioning, even after controlling for stressful life events, demographic variables, and psychiatric history. Similarly, criminal victimization has been shown to predict perceived health over and above the contribution of demographic variables and other stressful life events in a population of female health maintenance organization (HMO) members (Koss, Woodruff, & Koss, 1990). In addition, Koss et al. found that positive health perceptions were related to younger age, higher income, and higher level of education. In terms of service utilization, these authors also reported that participants' use of medical services increased in the two years following their criminal victimization experiences.

PTSD and Health

As with trauma exposure, existing evidence has linked PTSD to subsequent physical health problems (see Schnurr & Jankowski, 1999, for a comprehensive review). Most of these findings come from studies with Vietnam veterans, such as the National Vietnam Veterans Readjustment Study (NVVRS), which found that male and female veterans with PTSD reported significantly more chronic health problems and poorer health perceptions than those without PTSD (Kulka et al., 1990). In addition, Beckham et al. (1998) found that among male combat veterans, PTSD status was related to both self-reported and physician-diagnosed current and lifetime health problems. In a large community sample of young adults, an association was found between PTSD and self-reported somatization symptoms. While some of this relationship was accounted for by comorbid psychiatric conditions, PTSD remained significantly related to total somatization symptoms, cardiopulmonary symptoms, and sexual symptoms after controlling for additional psychiatric diagnoses (Andreski, Chilcoat, & Breslau, 1998). Mechanisms that help to explain the link between PTSD and health will be discussed below.

Sexual Assault, PTSD, and Health

Sexual assault is a relatively common trauma experience with a high probability of leading to posttraumatic stress disorder (Kessler et al., 1995), making victims of sexual assault an important population within the domain of trauma research. Specific rates of sexual assault can vary considerably based on how this experience is measured. In particular, assessment methods (e.g., order and wording of questions), reporting conditions (e.g., level of anonymity), and sources of sexual assault reports (i.e., crime

statistics vs. population surveys), lead to wide ranges in reported rates of sexual victimization (Johnson, 1996). Nevertheless, Statistics Canada (1993) reports that as many as 4 out of 10 Canadian women have been sexually assaulted at some point in their lives. True prevalence rates, however, are thought to be even higher, as a considerable proportion of women do not readily report sexual assault experiences (Acierno, Resnick, & Kilpatrick, 1997; Statistics Canada, 1993).

The significance of sexual victimization is further emphasized by research results that identify rape as the trauma most likely to lead to PTSD (Kessler et al., 1995; Kilpatrick, Saunders, Veronen, Best, & Von, 1987). In fact, PTSD was diagnosed in almost half (48%) of individuals who reported sexual assault in the National Comorbidity Study (Kessler et al., 1995), and in 57% of women participating in Kilpatrick et al.'s criminal victimization study. These rates are more than double what is found in general populations of trauma exposed women, suggesting that sexual assault victims are at a remarkably higher risk of developing PTSD than other trauma-exposed populations. Despite these striking statistics, research examining the relationships between trauma exposure, PTSS/PTSD, and physical health status in sexual assault victims remains quite limited.

Similar to other types of trauma, sexual assault has been linked to a variety of adverse physical health outcomes. In particular, women who have been sexually assaulted report more frequent and severe somatic symptoms, poorer health perceptions, higher rates of chronic disease, increased utilization of medical services, and greater physical limitation when compared to control populations (Golding, 1994; Kimerling & Calhoun, 1994).

In addition, sexual victimization is markedly more prevalent among groups of women with particular health problems, specifically gastrointestinal disorders and chronic pelvic pain. For example, Leserman et al. (1996) reported a remarkably high rate of child and adult sexual abuse (55%) in their sample of female gastroenterology patients, and found that among this group, sexual victimization was associated with more general physical symptoms, more severe pain, an increased number of surgeries, and greater functional disability. Another study looked at 100 women scheduled for a diagnostic laparoscopy, 50 of whom had medically unexplained chronic pelvic pain and a comparison group of 50 women requiring unrelated gynecological examinations (Walker et al., 1995). Participants being examined for chronic pelvic pain were significantly more likely to report sexual victimization than the comparison group, with 58% of chronic pain sufferers reporting sexual abuse in childhood and 52% indicating they were sexually assaulted in adulthood. In fact 12 of the 14 participants reporting *severe* childhood sexual abuse (CSA) were in the chronic pelvic pain group. Furthermore, when compared to the non-pain control group, chronic pain sufferers also had higher rates of psychiatric disorders and sexual dysfunctions, and reported more medically unexplained physical symptoms. Yet, despite this increased reporting of physical symptoms, no differences were found between the chronic pain and the non-pain groups on objective findings from laparoscopy. In a reanalysis of this study's data, authors found that the number of medically unexplained physical symptoms was one of the best predictors of severe CSA history, along with lifetime histories of panic disorder and substance dependence (Walker et al., 1992).

In a population of sexual assault victims, Zoellner, Goodwin, and Foa (2000) investigated the relationship between PTSD severity and physical health problems. These researchers found that the severity of chronic PTSD symptoms predicted physical health concerns over and above the contribution of depression, anger, and negative life events. Unfortunately, the investigators did not include comparison groups of sexual assault victims without PTSD, or women with no history of sexual assault in their sample. Despite this limitation, Zoellner and colleagues did provide preliminary findings that PTSD symptoms are related to adverse physical health among sexual assault victims. Further research will be needed to clarify this and other related associations.

Of particular significance is the research finding that sexual assault has been linked to reproductive and sexual health symptoms that include pelvic pain, excessive menstrual bleeding, lack of sexual pleasure, and painful intercourse (Chapman, 1989; Golding, 1994; Golding, 1996). In one of her studies, Golding (1996) found that sexual symptoms were strongly associated with assault experiences that involved completed intercourse, use of persuasion, multiple assaults, and assaults perpetrated by a spouse. Comparatively, characteristics of the assault that were most significantly related to reproductive symptoms were physical violence and being assaulted by a stranger. Golding also reported that a stronger association between history of sexual assault and reproductive symptoms was found among women with lower levels of income and education. She suggests that chronic economic stress and variations in characteristics of the assault across education levels are possible reasons for these associations.

Chapman (1989) conducted a four-year longitudinal investigation of sexual and gynecologic health among victims of sexual assault and intimate partner violence (IPV).

Findings from this study indicated that 61% of these victims reported a sexual dysfunction (e.g., desire or arousal disorders), with approximately the same proportion having gynecologic problems (e.g., pelvic pain, painful menstruation). For most participants, sexual dysfunctions were evident for a duration of two to four years post-assault, indicating the chronicity of these disorders.

Prior to this, Judith Becker and colleagues had conducted a series of studies that investigated the presence of sexual dysfunctions in women who had been sexually victimized (Becker, Skinner, Abel, & Cichon, 1986; Becker, Skinner, Abel, & Treacy, 1982). Initially Becker et al. (1982) interviewed a relatively small sample of adult women who had been sexually victimized either as children or as adults. It was found that almost 57% of this sample experienced sexual dysfunctions, with 71% of this group reporting that the sexual problems were precipitated by the assault. These results were later corroborated with a larger sample of adult sexual assault victims (Becker et al., 1986). The most common sexual dysfunctions reported in both studies were fear of sex, and problems with arousal or desire. This study also found there were differences in the characteristics of the assaults experienced by women who developed sexual dysfunctions as compared to those who did not. In particular, women suffering from impaired sexual functioning were more likely to be both verbally coerced and to experience penetration during their assault when compared to nondysfunctional women. This suggests that more forceful and coercive assaults are related to adverse sexual outcomes.

Letourneau, Resnick, Kilpatrick, Saunders, and Best (1996) reported that trauma exposure was significantly related to sexual problems in their sample of female crime victims. While severe sexual assaults (i.e., completed rape) were most strongly related to

sexual problems, these researchers also found evidence that sexual problems are associated with criminal victimization in general, and not just with sexual assault history.

Other Related Populations

Intimate partner violence (IPV) is an area of interpersonal violence that is related to, and often includes, sexual assault experiences. In a review of the literature in this domain, Campbell (2002) states that long-term health consequences of IPV are generally indicated by poor health status, poor quality of life, and increased use of health services, which tend to last beyond the duration of the violent relationship. Specific problems that have been linked to IPV include chronic pain, neurological symptoms, fainting, seizures, gastrointestinal symptoms and functional gastrointestinal disorders, as well as cardiovascular symptoms such as hypertension and chest pain. Furthermore, victims of IPV seek health care at three times the rate of non-abused women.

Campbell (2002) reports that the odds of developing a gynecologic problem are three times greater in victims of IPV than among non-victims. Researchers (Campbell & Soeken, 1999; Sharps & Campbell, 1999) tend to contribute these symptoms to the sexual assault experiences that occur within the context of IPV. In particular, Campbell and Soeken found, in their investigation with female victims of IPV, that a history of partner-perpetrated sexual assaults significantly predicted physical health symptoms over and above impact of physical abuse and demographic variables. Furthermore, they report that 46% of battered women in their sample were sexually assaulted by their partners and that these women had significantly more gynecologic symptoms than those without a history of sexual assault.

Finally, in a large representative sample of women, Plichta and Abraham (1996) found that having a history of child sexual abuse, IPV, or criminal victimization all significantly increased the odds that both single and married or cohabitating women had experienced a diagnosed gynecological problem. The authors reminded readers that sexual violence can negatively impact gynecologic health in women both through direct pathways, such as injury, as well as through indirect pathways that alter biological or psychological functioning.

In another related area of trauma, Runtz (2002b) found that child physical maltreatment (CPM) was associated with general physical health concerns as well as menstrual and premenstrual symptoms in a sample of university women. While child sexual abuse (CSA) was not significantly related to general health symptoms, severity and duration of CSA did predict higher levels of premenstrual distress. Furthermore, women who experienced both physical and sexual abuse in childhood reported greater premenstrual emotional distress. Finally, menstrual distress was significantly related to severe sexual victimization in childhood, suggesting that further examination of reproductive health concerns in sexually victimized populations is warranted.

PTSD as a Mediator between Trauma and Health

With established empirical evidence for the existence of associations between trauma exposure and physical health as well as PTSD and health, researchers have begun to investigate posttraumatic stress disorder (PTSD) as an important mediator in the relationship between trauma exposure and adverse health outcomes. (Friedman & Schnurr, 1995; Schnurr & Green, 2004; Schnurr & Jankowski, 1999). In particular, it has been found that following exposure to trauma, considerably more physical health

problems are reported among individuals who develop PTSD or significant subclinical levels of posttraumatic stress symptoms (i.e., moderate to severe symptoms in one or more areas without complete fulfillment of diagnostic criteria).

As with previously reviewed research, tests of mediation have been primarily conducted with combat veterans. Initially, a study by Wolfe, Schnurr, Brown, and Furey (1994) found that PTSD partially mediated an established relationship between combat exposure and self-reported physical health in a population of female war veterans. The data from this study was later reanalyzed by Friedman and Schnurr (1995) using path analysis, which revealed that over half of the relationship between war-zone exposure and current health status was indirectly mediated through PTSD, as was three-quarters of the association between trauma exposure and number of current health problems. Two additional studies provided further evidence that PTSD is a primary pathway through which trauma exposure negatively impacts physical health, at least with war-exposed populations (Kimerling, Clum & Wolfe, 2000; Wagner, Wolfe, Rotnitsky, Proctor, & Erickson, 2000).

Among a civilian population of bus drivers, Vedantham et al. (2001) found evidence that PTSD is a critical component in the pathway from trauma exposure to physical health problems. Specifically, trauma exposed drivers who developed PTSD reported more health complaints, poorer overall health status, and greater utilization of services than those without PTSD. In particular, bus drivers who developed PTSD were more likely to visit health specialists in the past year, more likely to have used medications in the past month, and more likely to describe their health as average or poor.

Furthermore, trauma exposed participants who did not meet diagnostic criteria for PTSD were no different than non-exposed controls on any physical health outcomes.

In another study, Weisberg et al. (2002) addressed an important limitation in this area of research: a lack of psychiatric controls. This group of investigators used a comparison group with anxiety disorders other than PTSD to isolate the effects of PTSD on physical health. Results from this study indicated not only that PTSD predicted medical problems better than trauma exposure, but also that participants with PTSD reported more physical health conditions than individuals with other anxiety disorders. Authors suggest several possible explanations for this effect. PTSD could be associated with specific biological changes such as lowered immune functioning which may result in increased rates of medical illness. Alternatively, individuals with PTSD may be more likely than those with other anxiety disorders to report medical complaints. Similarly, PTSD sufferers may have some pre-existing personality traits that are associated both with the development of PTSD and with over-reporting of physical health problems (e.g., neuroticism, borderline personality traits). These investigators also recognize that somatization may be driving this effect, but they do note that participants with PTSD did not differ from trauma victims without PTSD and non-victims in their reporting of symptoms most commonly associated with somatization disorder (e.g., headache, dizziness). Additional mechanisms that help to explain the relationship between PTSD and physical health are discussed below.

Not all research in this area, however, has provided support for the hypothesis that PTSD acts as a mediator of physical health outcomes. A study by Rosenberg et al. (2000) did not find evidence that PTSD mediates the relationship between trauma and physical

health in their population of high-risk primary care patients. Results from this investigation revealed that trauma exposure was related to higher rates of medical utilization, while PTSD was not. Yet, PTSD in victims of severe abuse was associated with help-seeking behaviour among the group with the highest rates of medical utilization. To explain this unexpected result, authors suggest that some of their participants may be more likely to display somatization symptoms or other secondary effects of trauma exposure that lead to use of medical services without the development of PTSD. Moreover, the rate of trauma exposure in this population was extremely high, with 89% of participants reporting exposure to at least one trauma and a mean number of 5.9 traumas experienced by this sample. When compared to a lifetime prevalence rate of 7.8% in the National Comorbidity Study, and an average number of 1.9 traumas experienced by trauma victims in that study (Kessler et al., 1995), the Rosenberg et al. study appears to have utilized a very unusual sample. In addition, this study only included data on use of medical services within a single hospital site. Data were not obtained for medical utilization from any external sources over the two year study period, indicating that data for this variable may be incomplete. Authors acknowledge the limitations of their study and suggest that further research is still required to appropriately clarify the relationships between trauma, PTSD and health service utilization.

Schnurr and Green (2004) have recently integrated this expanding literature on trauma and physical health into a comprehensive model, proposing PTSD as the primary pathway through which trauma exposure leads to adverse physical health outcomes. Evidence supporting this model suggests that an individual's psychological response to a traumatic stressor is the essential component that triggers changes in physical health

status. In other words, it is something specific to an individual's distress response following the trauma, rather than the traumatic experience itself, that negatively impacts physical health. Specific mechanisms that help to explain the link between this psychological response (i.e., PTSD) and adverse physical health outcomes will be discussed below.

While physical symptoms tend to accompany a number of psychological disorders, research shows that the association between PTSD and adverse physical health outcomes remains after controlling for other psychological disorders (Andreski, Chilcoat, Breslau, 1998; Schnurr & Jankowski, 1999; Weisberg et al., 2002; Zoellner et al.; 2000). Moreover, PTSD appears to be the only disorder that adequately explains physical health problems in the context of trauma exposure (Schnurr & Green, 2004).

With strong research supporting the mediational role of PTSD with regard to health outcomes, investigators have begun to explore various mechanisms that may account for the relationship between PTSD and health. Schnurr and Green (2004) have developed a theoretical model that incorporates several of the mechanisms hypothesized to explain the link between PTSD and physical health. Because their method of grouping mechanisms into psychological, biological, attentional and behavioural domains helps to maintain clarity, the same method of grouping will be used here. In addition, the relative impact that separate clusters of PTSD symptoms (i.e. reexperiencing, avoidance, and hyperarousal) have on physical health outcomes will be reviewed.

Psychological Mechanisms

PTSD is linked to, and can have a significant impact on, many components of psychological functioning. Disorders that are commonly comorbid with PTSD, such as

depression and anxiety disorders, are themselves associated with adverse physical health outcomes (Ford, 2004; Schnurr & Green, 2004). Depression, in particular, is a comorbid condition present in almost half of PTSD sufferers (Kessler et al., 1995). Moreover, depression may put an individual at risk for development of cardiovascular disease through its association with health factors such as hypertension, and decreased heart rate variability (Ford, 2004). Furthermore, physical complaints commonly reported by PTSD sufferers are some of the same physiological symptoms contained within the diagnostic criteria for comorbid diagnoses of depression and anxiety disorders (e.g., fatigue, nausea, dizziness). However, some researchers have accounted for this by rerunning their analyses without items listed on mood and anxiety disorder symptom lists and have found there to be little or no change in their results (e.g., Zoellner et al., 2000). In addition, many health status indicators, other than symptom checklists, have demonstrated an association with PTSD. It is probable that comorbid disorders play some role in the link between PTSD and physical health link. It is unlikely, however, that such disorders entirely account for the relationship between PTSD and health, as many research investigations have shown PTSD to have a unique impact on health that is independent of other psychological disorders (e.g., Andreski et al., 1998; Weisberg et al., 2002).

Coping strategies are another psychological mechanism that has been linked both to PTSD and to physical health outcomes (Aldwin & Yancura, 2004). Specific coping strategies can have either beneficial or destructive effects on psychological and physical health in the aftermath of trauma exposure. In particular, certain emotion-focused coping strategies, such as avoidance and denial, have negative effects on physical health outcomes, and it is precisely these emotion-focused strategies that are common among

PTSD sufferers. Similarly, low levels of social support in the aftermath of trauma exposure are associated with both PTSD and with adverse health outcomes (Schnurr & Jankowski, 1999).

Biological Mechanisms

In terms of biological mechanisms, a significant factor in PTSD is the dysregulation of the hypothalamic-pituitary-adrenocortical (HPA) system. This is one of the primary systems involved in a typical stress response. The dysregulation that occurs can lead to abnormally high or abnormally low levels of cortisol, an increase in glucocorticoid receptors, as well as increased glucocorticoid receptor sensitivity (Dougall & Baum, 2004). Such alterations in the HPA system can have widespread impact throughout the body affecting neurotransmitter and neuroendocrine levels, immune functioning, and the cardiovascular system, to name a few areas (Friedman, 2005; Friedman & McEwen, 2004).

Particularly relevant to PTSD sufferers are the effects that changes in cortisol levels have on immune functioning. Research in this area has been relatively inconclusive as PTSD has been associated with increased levels of cortisol, as well as decreased levels. Cortisol has an immunosuppressive effect, so high levels of cortisol, especially when combined with increased receptor sensitivity, can impair immune functioning. This could increase an individual's susceptibility to infectious disease, exacerbate dormant or pre-existing conditions, and delay the healing process from physical injury (Dougall & Baum, 2004). Alternatively, low levels of cortisol can lead to increases in immune system activity which may result in autoimmune disorders such as rheumatoid arthritis and diabetes, and an increase in allergic responses (Friedman, 2005).

Research has shown that enhanced immune functioning is more common following acute stressors, while chronic stressors can lead to suppression of the immune system (Dougall & Baum, 2004). Yet, PTSD is associated with both kinds of changes in immune functioning, and with both types of resultant disease. To explain this anomaly, Friedman and McEwen (2004) have suggested that PTSD sufferers may experience ongoing periods, resembling chronic stress, that are characterized by a suppressed immune system, with intermittent phases of increased immune functioning. Furthermore, it is possible that these episodes of heightened immune system activity may, in fact, occur in response to acute stressors, such as reminders of the trauma. While this hypothesis appears to explain inconsistencies in the research, it has yet to be properly tested.

Other biological changes that may relate PTSD to adverse physical health include elevated catecholamine levels and increased adrenergic reactivity which may heighten risk for cardiovascular disease. Also dysregulation in opioid functioning (i.e., the system of internal pain regulation), may lead to increased pain perception and a heightened risk for chronic pain syndromes (Friedman & McEwen, 2004; Friedman & Schnurr, 1995).

Attentional Mechanisms

An attentional mechanism that is commonly used to explain physical symptom reporting among PTSD sufferers is the mislabelling of psychological, emotional, or autonomic changes as physical health problems. Similarly, individuals with PTSD show an increased sensitivity to physical symptoms and a subsequent propensity to worry and report such symptoms, in a manner that is similar to panic disorder sufferers (Schnurr & Green, 2004).

A separate, but related mechanism is somatization, or the tendency to present psychological distress as somatic symptoms. Somatization tendencies are substantially more common among PTSD sufferers than the general population (Engel, 2004), suggesting that this may account for some of the relationship between PTSD and self-reported physical symptoms. It has also been suggested that individuals with PTSD report physical symptoms as a way of avoiding thoughts about the traumatic experience and refocusing their distress onto less upsetting physical ailments.

Through conditioning, physiological arousal may become associated with alarming cognitions that occurred at the time of the trauma, such as feeling one's life is threatened. Arousal symptoms then trigger these cognitions, causing sufferers to believe they need to seek medical help. Conditioning may also play an important role in the link between PTSD and sexual health symptoms among sexual assault victims. All types of PTSD sufferers have a significant likelihood of being conditioned to experience distress when they encounter cues that remind them of the trauma. Due to the nature of their trauma, women who have been sexually victimized are likely to encounter these cues during subsequent healthy sexual interactions. The resultant distress may then impair sexual functioning and lead to the sexual dysfunction symptoms described earlier.

While most attentional mechanisms attempt to explain increased symptom reporting and medical utilization behaviour in individuals with PTSD, they provide less in terms of understanding morbidity data. Recently, however, Schnurr and Green (2004) suggested that PTSD sufferers who are experiencing episodes of dissociation may fail to recognize serious physical ailments. This lack of attention to symptoms may allow a serious medical problem to go unnoticed and untreated.

Behavioural Mechanisms

PTSD is associated with two types of behaviour that places one's health at risk. The first of these is use and abuse of substances. The National Comorbidity Study (Kessler et al., 1995) found that 35% of individuals with PTSD had comorbid alcohol abuse or dependence and 29% had a comorbid drug use disorder. It is hypothesized that PTSD sufferers may engage in alcohol, tobacco, and other drug use as a form of self-medication to help them cope in the aftermath of a trauma. The second type of health risk behaviour common among those with PTSD is a failure to engage in preventative strategies, such as maintaining a healthy diet, exercising, engaging in safe sex practices, and regular health care. Individuals suffering from PTSD are also likely to be experiencing low self-efficacy, a lack of social support, and symptoms of depression, all of which are expected to have a negative impact on motivation levels. This lack of motivation may be the key to explaining health risk behaviours (Rheingold, Acierno, & Resnick, 2004).

PTSD Symptom Clusters

A handful of research investigations have indicated that separate clusters of PTSD symptoms may be more or less responsible for the impact of this disorder on physical health. As mentioned previously, PTSD is currently conceptualized in terms of three sets of symptoms: reexperiencing, numbing and avoidance, and hyperarousal symptoms. Kimerling et al. (2000) chose to separate the numbing/avoidance cluster into two separate sets of symptoms and subsequently investigated the relative impact of these four clusters of PTSD symptoms on physical health status. Despite hypothesizing that both numbing

and hyperarousal symptoms would be significantly related to physical health, these researchers found that only the hyperarousal symptom cluster accounted for a unique proportion of the variance in health complaints and global health assessments. Authors suggest that a mislabelling process, such as that discussed previously, is likely responsible for this effect, in that PTSD sufferers believe that hyperarousal symptoms are actually physical health problems. They point out that cardiovascular problems, sleep disturbances, and concentration difficulties, all of which may be a consequence of heightened arousal, are among the most commonly reported physical symptoms. What Kimerling and colleagues do not acknowledge is that chronic hyperarousal is also likely to have immunosuppressant effects, making those experiencing this hyperarousal more susceptible to disease.

Zoellner et al. (2000) also hypothesized that the hyperarousal cluster would be most strongly related to self-reported physical symptoms but found that reexperiencing symptoms best accounted for physical health status in their study. The original hypothesis was based on the belief that chronic physiological arousal can suppress immune system functioning, making one more susceptible to disease and infection. Authors also believed that hyperarousal can lead to a heightened perception of internal body states. To account for their unanticipated finding, these authors suggested that reexperiencing symptoms have significant physiological components such as increased heart rate and trembling. It may be that these physiological components are related to an existing biological susceptibility that places PTSD sufferers at an increased risk of disease. Authors also suggested that reexperiencing symptoms, rather than chronic hyperarousal, could lead to a heightened perception of physical symptoms.

This explanation is consistent with research results found by McFarlane, Atchison, Rafalowicz, and Papay (1994). These authors suggested that heightened physiological arousal, which is prompted by stimuli that remind them of the trauma (i.e., a component of reexperiencing), may help to explain the association between PTSD and physical health symptoms in their sample of trauma-exposed fire fighters. Furthermore, the specific types of symptoms reported in their sample (cardiovascular, respiratory, and neurological) are consistent with physiological components of arousal.

As is apparent by these few preliminary studies, the differential impact of separate PTSD symptom clusters on physical health status remains unclear. Yet, it is quite possible that specific PTSD symptom clusters may affect different domains of health status (e.g., pain, health perceptions, etc.). As such, further investigation into this area of research is warranted.

Limitations in Existing Research

As with most areas of research, a number of limitations exist among studies on trauma and physical health. First, the majority of research in this domain utilizes self-report measures to assess physical health status, which is often identified as a methodological weakness. Self-reports of health tend to be quite subjective and are often influenced by psychosocial factors. Nevertheless, self-reported physical health among trauma-exposed populations has been corroborated by more reliable morbidity and mortality data (Beckham et al., 1998; Friedman & Schnurr, 1995). Furthermore, self-report measures provide a wealth of information regarding personal perceptions of physical health and individual experiences such as level of physical functioning.

A second limitation is that prospective, longitudinal studies are rarely employed in investigations of trauma, PTSD, and physical health. As such, pre-trauma baseline data regarding psychological and physical health must be determined through retrospective recall. The unpredictable nature of traumatic events limits the ability of researchers to begin collecting data prior to the onset of trauma exposure. Nevertheless, post-exposure longitudinal designs provide extremely valuable information about the changing dynamics of the relationship between trauma and physical health across time, and should be utilized more frequently. Current studies often collect data at only a single point in time, and as a result, they heavily rely on retrospective accounts of physical health and psychological experiences.

Another important limitation of the research is that studies investigating the impact of PTSD on physical health rarely include psychiatric controls. Consequently, it is often difficult to determine whether changes in physical health status are a result of PTSD or of more general psychological difficulties. A few recent studies have found evidence for the specificity of the PTSD – physical health relationship through the inclusion of psychiatric controls (Andreski et al., 1998; Weisberg et al., 2002); however, further research is required to confirm such findings.

Finally, as previously mentioned, the vast majority of research linking trauma, PTSD, and physical health has been conducted with Vietnam war veterans. This considerably limits the generalizability of results to the civilian population. As such, further research involving non-military populations will be highly informative.

Summary

In summary, research investigating the relationships between trauma exposure, PTSD, and physical health outcomes has accumulated over the past few decades. This has most recently led to the integration of theory and empirical findings in Schnurr and Green's (2004) multidimensional model. Yet, despite what we have learned about trauma victims, their posttraumatic stress experiences, and their physical health, limitations in the research and the need for clarification remain. Furthermore, the hypothesis that PTSD mediates the relationship between trauma exposure and physical health has not been adequately tested with all groups of trauma victims. Women who have been victimized by sexual assault compose a particularly significant group, for which this is the case.

Present Study

The present study intends to investigate links between sexual assault, posttraumatic stress symptoms (PTSS), and physical health. The primary goal of this research is to examine the role of PTSS severity as a mediator in the relationship between trauma exposure and physical health outcomes through the use of structural equation modelling. The hypothesized model is presented in Figure 1. Similar mediation models have been established and supported for other forms of trauma (Schnurr & Green, 2004), but have not yet been tested in a population of sexual assault survivors. Existing models have primarily focused on mediation of health through PTSD diagnosis. While there is a great deal of value in investigating PTSD as a dichotomous mediator, it is also important to examine posttraumatic stress symptom (PTSS) severity as a continuous variable in these models. In particular, the inclusion of PTSS severity allows us to capture the impact

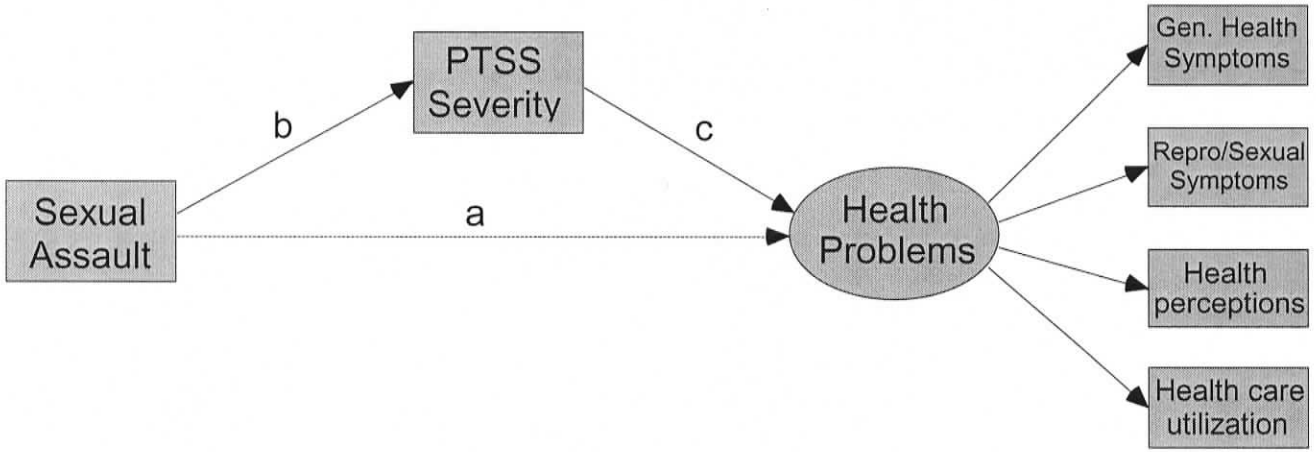

Figure 1. Hypothesized model of PTSS severity as a mediator in the relationship between sexual assault and physical health problems.
Note. Components represented by square boxes are measured variables, while the component represented by a circle is a latent variable.

of subclinical posttraumatic stress symptoms, which are likely to cause significant distress and adjustment difficulties (Black, 2004).

The current literature has also begun to explore mechanisms through which PTSS/PTSD leads to adverse physical health outcomes, resulting in the suggestion that specific PTSD symptom clusters may be more strongly associated with physical health status than others. This exploratory hypothesis will be examined in the present study. Finally, existing research has linked sexual assault histories with sexual and reproductive health problems, in addition to general health symptoms. Thus, in this study, these specific health concerns will be assessed separately from more general health problems. In summary, the present investigation intends to test the following hypotheses and research questions:

Hypotheses:

1. When compared to women with no history of sexual assault, sexual assault survivors will report more general health symptoms, and sexual and reproductive health concerns, poorer global health perceptions, and will have higher levels of health care utilization.
2. Posttraumatic stress symptom (PTSS) severity will operate as a mediator in the relationship between sexual assault exposure and physical health status.

Research Questions:

3. Are PTSD symptom clusters (i.e. reexperiencing, avoidance, hyperarousal) differentially associated with physical health outcomes?
4. Are sexual and reproductive health concerns related to sexual assault exposure and subsequent PTSS in different ways than general health symptoms?

Methods

Participants

The sample for this study consisted of 160 female undergraduate students. All of the participants were enrolled in either the Introductory Psychology or the Research Methods in Psychology courses at the University of Victoria in the spring term of 2006. All students received bonus credit towards their course grade in exchange for their participation in the study. Participant recruitment was conducted through an online system in which students signed-up to participate in studies administered through the Department of Psychology. This study was described as a 'confidential and anonymous questionnaire' that will ask questions about 'women's experiences in the areas of physical and mental health, victimization, and general demographics.' Participation in this study was restricted to female students.

While a total of 160 women initially participated in this study, the data from 5 participants were removed prior to analyses. Each of these participants indicated in the last section of the questionnaire that they had experienced a serious medical condition (e.g., cancer, tuberculosis) that could confound the hypothesized relationships investigated in this study.

The remaining 155 participants ranged in age from 17 to 39 years, with a median age of 19 years ($M = 19.6$, $SD = 2.8$; 95% were under 24 years of age). The vast majority of participants reported that they were Canadian citizens (90%), that their primary language was English (85.2%), that they were single (92.9%), and heterosexual (96.7%). Seventy-four percent of respondents identified their racial affiliation as Caucasian, 11.6% as Asian, 1.3% as First Nations, and the same proportion as African-Canadian, while

5.8% identified as having a mixed racial background (e.g., Asian and Caucasian), and 5.8% identified their racial affiliation as 'other.' At the age of 18 (or currently, for those under 18), 73.5% of participants' families of origin had a household income of $50 000 or more, with the median household income falling between $70 000 and $79 999. In terms of education, 47% of participants' mothers and 50.3% of participants' fathers had an undergraduate, graduate, or professional degree. The mean score for participants' families on the Hollingshead Index of Socioeconomic Status (SES) was 48.8 ($SD = 9.27$) with a possible range on this scale of 8 to 66 (Hollingshead, 1957). The average SES score in this sample is synonymous with middle- to upper-middle class status. Details on the demographic characteristics of this sample are presented in Table 1.

Procedures

Paper-and-pencil questionnaires were administered to groups of less than 30 participants in a classroom setting. Prior to administering the survey, participants were seated with at least one empty desk on either side of them to ensure privacy. A brief introduction to the study was provided during which verbal instructions for filling out the questionnaire were given and participants were encouraged, at any time, to address questions or concerns they might have, with the investigator or research assistant. No individuals chose to exercise this option. Students were asked to read and sign a Letter of Informed Consent (Appendix A) before responding to the questionnaire. The Letter of Informed Consent emphasized that participation in the study was completely voluntary, that participants could opt to leave certain items blank without explanation, and that they could choose to discontinue the study at any time without penalty. In addition, participants were reassured that all responses would remain anonymous and confidential.

Table 1

Demographics of the Participants

Continuous Variables

Variable	*M*	*SD*	Range
Age	19.6	2.85	17-39
SES	48.8	9.27	24-66

Categorical Variables

Variable	*N*	*N*	*%*
Marital status	155		
Single, never married		144	92.9
Married		1	0.6
Common-law		10	6.5
Citizenship	155		
Canadian		137	88.4
Other		18	11.6
Racial affiliation	155		
Caucasian		115	74.2
Asian		18	11.6
African-Canadian		2	1.3
Aboriginal		2	1.3
Mixed race		9	5.8
Other		9	5.8

Due to the sensitive nature of the questionnaire content and the possibility that participants may have experienced some emotional distress as a result of participating, contact information for community and university counselling services were also provided on the Letter of Informed Consent.

After completing the questionnaire, which took approximately 30 to 45 minutes, participants placed their signed consent forms and their questionnaires in separate piles. Following this, questionnaires were stored separately from signed consent forms to ensure anonymity of questionnaire responses. Participants were also provided with a written receipt of participation (Appendix B), a copy of the Informed Consent Letter, and a Debriefing Form (Appendix C). The debriefing form thanked respondents for their participation, reiterated that their responses would be kept anonymous and confidential, summarized the rationale and purpose of the investigation, and provided resources for those interested in following up on the content of the study.

Measures

The 16-page questionnaire was comprised of 12 sections, which are outlined in detail below. Descriptive statistics for each of the scales are presented in Table 2.

Demographics

Participants were asked a series of demographic questions regarding their age, marital status, citizenship, racial background, first language, sexual orientation, employment status, personal education and income levels, as well as parents' education, occupation, and income levels (see Appendix D). Demographic information is summarized in the previous section on participants.

Table 2

Descriptive Statistics for Main Variables

Measure	*M*	*SD*	Range
Sexual Assault	1.4	1.6	0-4
CSA	0.7	2.4	0-21
CPA	18.5	4.1	16-39
CPM	15.6	11.0	1-42
PTSS Severity	10.3	11.0	0-46
Depression	36.4	11.3	21-76
HSC	35.8	19.6	5-111
RHQ[a]	39.8	9.3	24-65
Health perceptions	32.3	4.4	19-40
Past health	7.6	1.9	2-10
Current health	7.3	1.5	3-10
Future health	8.5	1.3	3-10
Best health	9.0	1.0	6-10
Health care utilization	3.4	2.9	0-17

[a]RHQ values presented here have been rescaled as a proportion out of 100

Posttraumatic Stress

Posttraumatic Stress Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997). The PDS was used to assess for the presence and severity of posttraumatic

symptoms. Participants rated the frequency of their symptoms, an indicator of severity, on 17 items which follow the *DSM-IV* diagnostic criteria for PTSD. These symptoms are clustered into three subscales: *Reexperiencing symptoms* (e.g., "having bad dreams or nightmares about the traumatic event"), *Avoidance symptoms* (e.g., "trying not to think about, talk about, or have feelings about the traumatic event"), and *Hyperarousal symptoms* (e.g., "having trouble falling or staying asleep"). Each symptom is rated on a scale of 0 (not at all or only one time) to 3 (five or more times a week/almost always) over the previous month. This assessment tool also includes questions about the type of traumatic event experienced, whether or not fear, helplessness, physical injury, or a threat to their own or someone else's life was experienced, the recency of the traumatic event, as well as ways in which posttraumatic symptoms may have interfered with the respondent's life. The PDS provides an advantage over many other PTSD assessment measures as it is designed for, and normed with, a diverse range of trauma-exposed populations rather than exclusively with a population of combat veterans. Only those participants who had experienced at least one traumatic event completed the PDS.

The scale is reported to have good diagnostic performance with a sensitivity of 82% and specificity of 77%, and has reported test-retest reliabilities that range from .83 to .87 (Foa et al., 1997). Agreement between the assessment of PTSD on the PDS and the SCID (Structured Clinical Interview for DSM-IV) was found to be 79%. The PDS had an excellent internal consistency reliability ($\alpha = .93$) in the current sample. In addition, all three subscales yielded good internal consistencies with Cronbach's alphas ranging from .84 to .87. Symptom severity scores ranged from 0 to 46 (possible range: 0-51) with a mean score of 9.6 ($SD = 10.39$).

Depression

Center for Epidemiologic Studies – Depressed Mood Scale (CES-D; Radloff, 1977). The CES-D is a short, structured self-report scale that was used to measure current levels of depression in this sample. Respondents rate each of 20 symptoms on a Likert-type scale from 1 (rarely or none of the time) to 4 (most or all of the time) as experienced in the past week. Items include statements such as, "During the past week…I felt lonely" and "During the past week…I had crying spells." See Appendix E for a complete list of items.

This measure was developed to assess relationships between depression and other variables in the general population, and thus is an appropriate assessment tool for use with this sample. The CES-D demonstrated good internal consistency in previous research with alphas of .90 in psychiatric populations and .85 in the general population. In the present sample, this scale demonstrated excellent internal consistency with a Cronbach's alpha of .92. Scores on this measure ranged from 21 to 76 (possible range: 20-80), with a mean score of 36.4 (SD = 11.3).

Sexual Assault History

Sexual Experiences Survey (SES; Koss & Oros, 1982). The SES was utilized to assess sexual victimization experiences that occurred from the age of 14 to the present time. Various age points, ranging from 12 to 18 have been used in published research to separate childhood sexual abuse from victimization in adolescence or adulthood. A division at age 14 was guided by the Criminal Code of Canada, which defines both the legal age of consent and the upper age limit for childhood sexual abuse to be 14 years of age (Department of Justice, 2003). This particular age cut-off also allowed for sexual

victimization experienced in the context of adolescent dating relationships to be appropriately classified as sexual assaults, rather than incidents of child abuse.

The SES is a scale of 10 behavioural items that ask about a series of experiences ranging from unwanted sexual contact to forced rape, which the participant responds to in a yes/no fashion (see Appendix F). The SES is a commonly used assessment tool in research on sexual aggression and victimization. The authors of this scale have conceptualized sexual victimization from a dimensional perspective, rather than from a typological one. This is particularly valuable for identifying 'hidden rape victims' or those women who may have been overlooked by more traditional, categorical methods of assessing sexual assault. The items increase in severity along the following continuum: coerced sexual contact, forced sexual contact, attempted intercourse through coercion, attempted rape, coerced intercourse (due to a man's continual arguments and pressure, or his position of authority), forced intercourse through use of drugs and alcohol, and unwanted intercourse or sex acts that occurred through use of physical force.

The structure of this measure allows for scoring to be based on the highest item endorsed by each participant. Thus, as recommended by Koss et al. (1987), the SES was scored as follows: participants who endorsed items 8, 9, or 10 were considered to have had a 'rape experience' (forced sexual intercourse through the threat to use or actual use of physical force). Women who answered 'yes' to items 4 or 5, but not to any of the higher numbered questions were classified as having experienced 'attempted rape' (attempted but not completed forced intercourse). Participants for whom items 6 or 7 were their highest endorsed items were considered to have experienced 'sexual coercion' (e.g., gave in to intercourse because of a man's continual arguments and pressure).

Women who only endorsed items 1, 2, or 3 were classified as having 'unwanted sexual contact' (had sex play – fondling, kissing, or petting – because a man used his position of authority to make you). The format of the SES also allowed for participant responses to be scored as a continuous variable that ranged from 0 to 4. The absence of any reported victimization experiences were coded as a zero, unwanted sexual contact was coded as 1, sexual coercion as 2, attempted rape as 3, and incidents of rape were coded as 4.

Previous research with an undergraduate student population indicated that the SES had an internal consistency reliability of .74 among women and a test-retest reliability of .93 (Koss & Gidycz, 1985). This sample yielded a slightly higher internal consistency of .80.

Childhood Victimization

Childhood Sexual Experiences (CSE; Runtz, 2002a). The CSE was used to obtain information regarding sexual abuse experiences in childhood. Participants were asked to retrospectively self-report how frequently they experienced a list of non-consensual sexual behaviours before14 years of age on a Likert-type scale that ranges from 'never' to 'more than 20 times.' Participants are asked to respond for each of three potential groups of perpetrators: adults (18 years or older), individuals less than 18 years of age but who were at least five years older than the participant at the time of the incident (older child/adolescent subscale), and individuals less than five years older than the participant with whom interaction was non-consensual (peer subscale). As the CSE was primarily used to assess a control variable in this study, a portion of this scale that asks for additional detail about the specific incidents of abuse was not included in the questionnaire.

The CSE showed excellent internal consistency in a previous sample with Cronbach's alphas ranging from .90 to .94 for the separate subscales (Sengsouvanh, 2004). In the present sample, Cronbach's alphas were as follows: .87 for the Adult subscale, .77 for the Adolescent subscale, and .94 for the Peer subscale. Scores were concentrated at the lower range of the scale, spanning from 0 to 41 out of a possible range of 0 to 135.

In order to statistically control for child sexual abuse in the analyses, respondents were categorized dichotomously on this variable based on whether or not they had experienced child sexual abuse. Participants were considered to have experienced sexual abuse in childhood if they indicated that at least one of the following incidents had been perpetrated by an older child, adolescent or adult: the other person kissed or touched her body in a sexual way, touched the sexual or private parts of her body, got her to kiss or touch the other person's body in a sexual way, got her to touch the sexual or private parts of the other person's body, physically attempted to have sexual intercourse with her, engaged in sexual intercourse with her, performed oral sex on her, got her to perform oral sex on the other person, or sexual penetrated her body with a finger or other object. Nonconsensual experiences with peers were not included in the definition of child sexual abuse in the present study. A copy of the scale is reproduced in Appendix G.

Psychological Maltreatment subscale of the Childhood Maltreatment Interview Schedule Short Form (CMIS-SF; Briere, 1992). Childhood psychological maltreatment was assessed with the Psychological Maltreatment subscale of the CMIS-SF. This scale consists of 7 items representing psychological maltreatment (See Appendix H). Respondents retrospectively rate how often they experienced each item in an average

year prior to 14 years of age. Participants are asked to respond for events perpetrated by parents, stepparents, foster parents, or any other adult in charge of him/her as a child. Items consist of statements such as "yell at you," "criticize you," and "ridicule or humiliate you," and are rated on a 7-point Likert-type scale that ranges from 0 (never) to 6 (20+ times a year). Two previous studies demonstrated good internal consistencies with Cronbach's alphas of .87 and .90 for the Psychological Maltreatment subscale in their samples (Briere & Runtz, 1988; Van Bruggen, Runtz, & Kadlec, 2006, respectively). A similar level of internal consistency reliability was found in this sample ($\alpha = .91$). The mean score on this measure of psychological maltreatment was 15.77 ($SD = 11.08$) with a range of 1 to 42.

Physical Abuse Questionnaire (PAQ; Demaré, 1995). Childhood physical abuse was measured using the PAQ, which is a retrospective, self-report scale consisting of 16 physically abusive behaviours. Participants are asked to indicate how often, before the age of 18, they experienced each type of behaviour as perpetrated by a parental figure (See Appendix I). Items are rated on a 5-point Likert-type scale ranging from 1 (never) to 5 (very often). The PAQ consists of two subscales: General Physical Abuse, which includes 10 items (e.g., "hit or punch you with a closed fist," "kick you with their foot, or strike you hard with a knee or elbow"), and Severe Physical Abuse, which consists of 6 items (e.g., "burn or scald you on purpose," "try to kill you"). In this sample, the PAQ was found to have a good internal consistency of .82, with slightly higher Cronbach's alphas reported in previous research ($\alpha = .89$ and .90; Demaré, 1996). Scores on the PAQ ranged from 16 to 39 out of a possible range of 16 to 80, with a mean score of 18.5 ($SD =$

4.11), which is quite close to the mean found by Demaré (1996) in his sample (M = 19.1; SD = 6.1)

Physical Health Status

Health Symptom Checklist (HSC; Runtz, 2002b). General physical health symptoms were examined through the use of the HSC. This measure assesses for the presence and frequency of 54 general health symptoms (e.g., nausea, fatigue, backaches; see Appendix J). Symptoms experienced in the past 6 months are rated on a Likert-type scale from 1 (experienced occasionally) to 5 (occurs daily). Participants were also asked to indicate whether they have sought health care for each symptom during the past 6 months. The HSC showed good internal consistency reliability (α = .89) in past research, with a similar Cronbach's alpha of .88 in this sample. Validity has been previously demonstrated through significant correlations with a range of health-related variables (e.g., disease conviction, use of prescription and nonprescription medication, social, academic, and occupational functioning). The average total score on the HSC in this sample was 35.8 (SD = 19.6) with a range of 5 to 111.

The HSC consists of five subscales: Muscular/Skeletal symptoms (14 items), Sensory/Nervous System symptoms (12 items), Stomach/Abdominal symptoms (9 items), Vaginal/Genital symptoms (8 items), and Allergy/Cold/Flu symptoms (8 items). Cronbach's alphas for the subscales ranged from .56 to .80 in the present sample. Intercorrelations between subscales are presented in Table 3.

Table 3

Intercorrelations of the Subscales on the Health Symptom Checklist (HSC)

Subscale	1	2	3	4	5
1. Muscular/skeletal	--				
2. Sensory/nervous system	.43**	--			
3. Stomach/abdominal	.64**	.40**	--		
4. Vaginal/genital	.32**	.23**	.39**	--	
5. Allergies/cold/flu	.25**	.23**	.40**	.24**	--

**$p < .01$.

Reproductive Health Questionnaire (RHQ). The RHQ is 40-item scale, designed by the author for the present study. The purpose of this measure is to assess for reproductive and sexual health concerns in women. A review of the literature prior to development of the RHQ revealed that while scales exist for the assessment of general health symptoms (e.g., the Health Symptom Checklist, Runtz 2002b), and certain components of reproductive health (e.g., menstrual and premenstrual distress – the Menstrual Distress Questionnaire, Moos, 1968), no existing self-report measure could be identified for the overall assessment of reproductive and sexual health in women. Consequently, the RHQ was developed and piloted prior to use in the present study.

On the RHQ, respondents are asked to self-report how often they have experienced each symptom or health concern over the past 6 months by choosing the appropriate frequency category, ranging from never (1) to often (4). In addition, nine

items included 'not applicable' (N/A) as a possible response category as they were all specifically relevant to having experienced sexual intercourse. It was felt that the inclusion of this category was necessary given the young age of the sample for this study (median age = 19.0 years), and the possibility that some participants may not have been sexually active during the past 6 months. For each symptom, participants were also instructed to indicate whether they had sought health care for this symptom during the past 6 months. A pilot study, conducted with a shorter (33-item) version of this questionnaire, demonstrated good internal consistency ($\alpha = .83$) in a sample of female undergraduate students. Use of the 40-item version in the present sample, yielded a Cronbach's alpha of .89. The RHQ is presented in Appendix K.

An exploratory factor analysis was also conducted on the 40-item (N = 120) scale, which elicited a four-factor solution, and resulted in the following subscales: Sexual Dysfunction (9 items), Menstrual Cycle Symptoms (10 items), Urogenital Concerns (9 items), and Atypical and Irregularity Symptoms (11 items). Internal consistency reliabilities for the subscales ranged from .74 to .88. Intercorrelations among subscales of the RHQ are presented in Table 4.

Of the 155 participants in this study, 125 (81%) women provided responses to all 40 items. For these participants, scores ranged from 42 to 105 (possible range: 40-160) with a mean score of 65.2 ($SD = 15.0$). The remaining 30 participants chose the N/A option for at least one of the nine items for which that option was given. These responses were coded as missing data and participants' total scores were computed as a proportion of their total possible score. For example, if a participant answered 35 of the 40 items on the RHQ and provided N/A responses for the remaining 5 items, their total score was

computed out of 140 (35 items x 4 possible responses). Subsequently, all total scores on this scale were rescaled to represent a value out of 100.

Table 4

Intercorrelations of the Subscales on the Reproductive Health Questionnaire (RHQ)

Subscale	1	2	3	4
1. Sexual dysfunction	--			
2. Menstrual cycle symptoms	.48**	--		
3. Urogenital concerns	.36**	.31**	--	
4. Atypical and irregularity symptoms	.35**	.53**	.24**	--

**$p < .01$.

The Cantril Self-Anchoring Ladder (Cantril, 1965). The Cantril Ladder was utilized in this study to assess for overall health perceptions. This measure consists of a visual image of a ladder with the rungs numbered from 1 to 10. The bottom rung (1) represents the worst possible health and the top rung (10) represents the best possible health. Participants are asked to choose a number on the ladder that most accurately depicts each of the following: their current health, their health in the past, their health in the future, and the best their health has ever been (See Appendix L).

Prior research with this measure tended to just use the value for current health perceptions (e.g., Arnold et al., 2005) or use each value separately in their data analyses (e.g., Hilton, Budgen, Molzahn, & Attridge, 2001). Thus, no precedence could be found for use of an overall score for health perceptions. Yet, a single overall score was desirable

in the present study in order to limit the number of variables entered into the structural model. An exploratory factor analysis was conducted on the four items and found that a single factor was extracted. This single factor accounted for 59% of the overall variance and loadings that ranged from .69 to .81. Consequently, the four perception scores were treated as items on a scale and summed into an overall value for health perceptions. The internal consistency reliability for this measure was acceptable with a Cronbach's alpha of .74. Test-retest reliability has been established by Molzahn (1989) to be .79. Overall scores on the Cantril Ladder ranged from 19 to 40 (possible range 4-40), with a mean score of 32.3 (SD = 4.38). Means for the individual items are presented in Table 2.

Health Care Utilization. In order to assess utilization of health care services in this sample, participants were asked to indicate the number of visits they made to a variety of health care professionals and health services in the past six months. Options included their regular physician, medical specialists, walk-in clinics, hospital emergency ward, chiropractor, physiotherapist, psychologist, psychiatrist, other mental health practitioner, naturopath, and an option to specify any other health care professional (adapted from the Women's Health and Relationships Study by Runtz, 2003). Visits to medical professionals and centres (the first four options) were then summed to determine the total number of medical visits. The median number of visits was 3.0, representing category of 3 to 5 visits in the past six months. Because of considerable positive skew, a logarithmic transformation was performed on this variable. The transformed variable was used in all analyses. See Appendix L for a copy of the version used in this study.

Medical Conditions Checklist. The final section on this questionnaire asked participants to check off any past or ongoing medical conditions from a provided list. The

format of this checklist is similar to screening measures used during initial patient intake in physicians' offices and includes conditions such as cancer, diabetes, and epilepsy. See Appendix M for the complete list. The purpose of this measure was to screen out participants with serious medical problems that may skew other indicators of physical health status (e.g., number of visits to medical professionals). As mentioned previously, five participants were deleted from the analyses based on medical conditions they indicated on this checklist.

Results

The results section is divided into five subsections. Following a review of missing data procedures, the first section of results presents prevalence rates for trauma and victimization experiences in this sample. The second section reviews associations between demographic variables and all other main variables, while the third section presents intercorrelations and relationships among the measures. The fourth section reviews the results of tests of the hypothesized structural model, which examines the potential role of PTSS severity as a mediator between sexual assault and physical health outcomes. The final section presents the results from examining two additional research questions, one of which investigates the relative associations between each PTSD symptom cluster and health outcomes, and the second considers the differential prediction of general health symptoms and reproductive/sexual health symptoms from sexual assault and PTSS severity. All statistical analyses were conducted with SPSS 13.0 (SPSS, 2004), with the exception of the structural equation modelling (SEM), which was performed with AMOS 5 (Arbuckle, 2003).

Missing Data

Questionnaire data were checked for accuracy and missing values. Missing value analyses revealed that all questionnaire items and scale totals had less than 5% missing data, with the exception of the Posttraumatic Stress Diagnostic Scale (PDS; Foa et al., 1997). The PDS, however, was expected to have a greater proportion of missing data as only participants who indicated that they had experienced one of the traumatic events listed on this measure were required to complete the rest of the items on the scale.

The variables on which there was a small amount of missing data were checked for patterned responding; however, it was evident that, for the most part, missing values were the result of a small number of randomly skipped items. The one exception was on the Center for Epidemiologic Studies – Depressed Mood Scale (CES-D; Radloff, 1977), on which 2 participants had missing data for all items on the scale and another 2 participants responded to less than half of the items. Consequently, for these 4 participants missed items were left blank, total scores on the CES-D were not computed, and their scores were not used in analyses with this variable.

Missing data on remaining scales were handled in the following ways. On the physical health (HSC) and the reproductive health (RHQ) scales, missing values were replaced with the sample mean for that item. As discussed earlier, responses of 'not applicable' (N/A) to items on the RHQ pertaining to sexual experiences were left blank and total scores for these participants were computed based on the items for which they did provide responses. Missing data on the health utilization measure (i.e., visits to medical professionals) was imputed using an expectation maximization (EM) algorithm.

Missed items on the PAQ, which assessed for childhood physical abuse, were left blank, due to the sensitive and personal nature of responding to the questions on this scale. The absence of a response on this measure may have indicated a reluctance to disclose a particular experience, and therefore, replacement with the sample mean or with a response of 'never' could be inappropriate. Despite a small amount of missing data on the PAQ, total scores were computed for 97.4% of participants and 98.7% of participants provided sufficient responses to be classified as having experienced physical abuse in

childhood or not. There were no missing data on the scales assessing sexual victimization in adulthood or psychological maltreatment in childhood.

On the Childhood Sexual Experiences (CSE) measure, the pattern of missing data was such that a few participants left an entire column of responses blank, but provided responses to at least one other column. (Recall that this measure contained three columns: one for sexual contact with adult perpetrators, one for sexual contact with older children or adolescent perpetrators, and one for non-consensual sexual experiences with peers). It was likely that missed responses following this pattern occurred because participants were not aware that they had to provide responses to each item in all three columns, resulting in responses to just the first, or the first and second columns. Therefore, missing values that followed this pattern were replaced with a score of zero (0), indicating that the behaviour had never been experienced by the participant.

I. Prevalence Rates

Prevalence of Trauma Exposure and PTSD

In their responses on the Posttraumatic Stress Diagnostic Scale (PDS), 54.8% (n = 85) of this sample indicated that they had been exposed to a traumatic event at some point in their lifetime. The experiences of more than half of this group (n = 48; 31.4% of the total sample) fit the *DSM IV-TR* definition of trauma exposure for the diagnosis of PTSD. In other words, 48 individuals in this sample experienced a traumatic event that involved "actual or threatened death or serious injury, or a threat to the physical integrity of self or others" and to which they responded with "fear, helplessness, or horror" (APA, 2000, p. 463).

Lifetime prevalence of posttraumatic stress disorder (PTSD), determined by self-reported symptoms on the PDS, within the complete sample (i.e., both exposed and unexposed participants) was 11.6% (n = 18). Thus, out of those participants who experienced a traumatic event, 21.2% subsequently developed symptoms that would qualify them for a diagnosis of PTSD. Of the 82 participants who completed all items on the PDS, 35.4% had a symptom severity rating of moderate or higher, regardless of whether or not they met the diagnostic criteria for PTSD. Table 5 includes numbers and percentages of participants meeting diagnostic criteria for each of the individual symptom clusters. The reexperiencing symptom criterion is met if 1 or more of the 5 relevant symptoms are endorsed. The requirement for the avoidance and numbing cluster is satisfied if at least 3 of the 7 applicable symptoms are endorsed, while the hyperarousal symptom criterion is met if 2 or more of the 5 symptoms are endorsed. Frequency of responses to specific symptoms ranged from 16.3% (n = 15) of participants indicating a loss of interest in important activities to 74.2% (n = 72) endorsing a feeling of emotional upset at a reminder of the traumatic event. Of those responding to all items on the PDS, 72% (n = 59) indicated some level of impairment in social, occupational, or other areas of functioning. Values for specific levels of impairment in functioning are presented in Table 5.

Table 5

Prevalence Rates for Trauma Exposure, PTSD Diagnosis and Symptom Severity

Variable	n	%
Trauma exposure	85	54.8
PTSD diagnosis	18	11.6
Symptom severity rating		
Mild	41	50.0
Moderate	16	19.5
Moderate to severe	9	11.0
Severe	4	4.9
Reexperiencing criterion met[a]	66	77.6
Avoidance/numbing criterion met[b]	32	37.4
Hyperarousal criterion met[c]	41	48.2
Level of impairment		
Mild	32	39.0
Moderate	14	17.1
Severe	13	15.9

Note. values in % column are valid percents based on *n* reporting for each item.
[a]1 or more symptoms endorsed; [b]3 or more symptoms endorsed; [c]2 or more symptoms endorsed

Prevalence of Victimization Experiences

Sexual assault (SA). The Criminal Code of Canada defines sexual assault as any act of sexual touching that is done on purpose, whether directly or indirectly, without the consent of the other party (Department of Justice Canada, 2003b). According to this definition, answering 'yes' to any of the 10 questions on the Sexual Experiences Survey (SES; Koss et al., 1987) would qualify an individual as having experienced sexual assault. Accordingly, more than half of the sample (53.5%; n = 83) for this study has been a victim of sexual assault at some point since the age of 14. Rape, the most severe form of sexual victimization, was experienced by 19.4% (n = 30) of the women in this sample. Twenty-two percent (n = 34) of participants indicated that they had experienced an attempted rape, while 30.3% (n = 47) had been coerced into having sex when they did not want to, either as a result of verbal pressure or the use of authority. Finally, 47.1% (n = 73) of participants experienced some sort of unwanted sexual contact (fondling, kissing, etc.), in adolescence or adulthood. Table 6 summarizes the number of participants who endorsed each type of experience as their *most severe* form of sexual victimization.

Table 6

Prevalence Rates for Sexual Assault, Child Sexual Abuse, and Child Physical Abuse

Type of Victimization	n	%	Cumulative %
Sexual Assault			
Rape	30	19.4	19.4
Attempted Rape	15	9.7	29.0
Sexual Coercion	18	11.6	40.6
Sexual Contact	20	12.9	53.5

Note. values in % columns are valid percents based on *n* reporting for each item

Child sexual abuse (CSA). Participants who indicated that they had experienced at least one of the incidents on the adult subscale or older child/adolescent subscale of the Childhood Sexual Experiences (CSE; Runtz, 2002a) scale were classified as having experienced sexual abuse in childhood. Recall that the experiences listed on this scale range from kissing and sexual touching to acts of oral sex, sexual penetration of the body, and intercourse. Accordingly, 17.6% of the sample (n = 27) were considered to have experienced some form of sexual abuse in childhood (i.e., they stated that they had at least one sexual experience prior to the age of 14 with either an adult, or with an older child or adolescent who was at least 5 years older than the participant). This definition is relatively consistent with the Criminal Code of Canada's classification of 'sexual interference' as any sexual activity (touching, or invitation to touching, with a sexual

purpose) that is conducted with a child under the age of 14 (Department of Justice Canada, 2003a).

Child physical abuse (CPA). Participants were classified as having experienced child physical abuse if they endorsed any of the 6 items on the Severe Physical Abuse subscale, or if they indicated that any of the other 10 items on the Physical Abuse Questionnaire (PAQ; Demaré, 1995) occurred at least 'sometimes' in their childhood. According to this definition, 22.2% (n = 34) of this sample were considered to have experienced physical abuse in childhood. Moreover, 60.8% (n = 93) of this sample endorsed at least one item on the PAQ, with 60.3% (n = 91) of participants indicating that they had experienced at least one incident on the Physical Abuse subscale, while only 6.5% (n = 10) endorsed one or more items on the Severe Abuse subscale.

Child psychological maltreatment (CPM). It is typically more difficult to classify individuals into a psychological or emotional maltreatment group, as this type of abuse does not involve specific incidents or physical contact. In addition, some of the experiences included on the Psychological Maltreatment subscale of the Childhood Maltreatment Interview Schedule (CMIS-SF; Briere, 1992), the measure used to assess psychological maltreatment in this study, are considered to be acceptable child-parent experiences when occurring at a low rate of frequency (e.g., your parent yelled at you).

Nevertheless, it was found that every participant in this sample endorsed at least one item on the CMIS-SF. Overall, endorsement of items ranged from 39.4% (n = 61) of participants stating that parental figures ridiculed or humiliated them at least once a year to 97.4% (n = 151) indicating that a parental figure yelled at them at least once a year. At the most frequent level of endorsement (more than 20 times a year), responses ranged

from 5.8% of participants indicating that they were ridiculed or humiliated by a parental figure to 31% (n = 48) endorsing a statement that a parental figured yelled at them more than 20 times a year. A complete list of item frequencies on the Psychological Maltreatment subscale of the CMIS-SF are included in Table 7.

Table 7

Percent of Participants Reporting Child Psychological Maltreatment (CPM) Symptoms at Each Frequency Level

CPM items	Frequency in times per year						Any CPM
	once	twice	3-5	6-10	11-20	>20	
Yell at you	7.1	6.5	21.3	14.8	16.8	31.0	97.4
Insult you	14.2	9.7	7.1	8.4	7.1	7.7	54.2
Criticize you	10.3	11.0	14.8	13.5	14.2	15.5	79.4
Try to make you feel guilty	14.8	12.9	11.6	11.6	12.3	12.9	76.1
Ridicule or humiliate you	13.5	2.6	7.7	5.2	4.5	5.8	39.4
Embarrass you in front of others	18.7	12.3	12.9	8.4	2.6	7.7	62.6
Make you feel like a bad person	11.0	13.5	7.1	4.5	3.2	8.4	47.7

Note. values in % columns are valid percents based on *n* reporting for each item

II. Demographics

All relationships among demographic variables and victimization, psychological, and health variables were analysed. Correlations with continuous demographic variables (age and socioeconomic status) are presented in Table 8. All other significant results are discussed below.

Table 8

Correlations Between Continuous Demographic Variables and All Other Model Variables

Variable	Age	SES
Sexual assault	.13	.04
Child sexual abuse	.03	.09
Child physical abuse	.18*	-.12
Child psychological maltreatment	.21*	-.06
PTSS severity	.23*	.08
Depression	.16	.04
HSC	.06	-.03
RHQ	.13	-.06
Health perceptions	-.27**	.16*
Health care utilization	-.12	.01

Note. SES = socioeconomic status; HSC = general physical health symptoms; RHQ = Reproductive and sexual health symptoms

*p < .05. **p < .01

Age

As presented in Table 8, age of participants in this sample was positively correlated with scores on measures of child psychological maltreatment and child physical abuse. No significant association was found between age and history of child sexual abuse, or with history of sexual assault in adulthood. There was, however, a significant relationship between age and the experience of sexual coercion in adulthood. Specifically, participants who had experienced coerced sexual intercourse were more likely to be older than those who have not had sexually coercive experiences (Welch's t (58.8) = 2.15, $p < .05$; Levene's test for equality of variances: $F(3, 152) = 7.55$, $p < .01$).

Age was positively correlated with PTSS severity indicating that, in general, older participants had higher PTSS severity ratings. More specifically, age was correlated with scores on the hyperarousal symptom cluster ($r = .24$, $p < .05$) and the avoidance symptom cluster ($r = .26$, $p < .05$), but not with reexperiencing symptoms. There was no association between age and trauma exposure or between age and PTSD diagnosis.

Finally, age was negatively correlated with health perceptions, such that older participants have worse perceptions of their health. Specifically, there were slightly stronger correlations between age and perceptions of current health ($r = -.28$, $p < .001$) and perceptions of past health ($r = -.28$, $p < .001$), than with perceptions of best health ($r = -.16$, $p < .05$). Age was not correlated with participants' perceptions of future health or with any of the other health outcome variables.

Socioeconomic Status (SES)

Scores on the Hollingshead Index of Socioeconomic Status were used as a measure of SES in participants' families of origin. In this sample, family SES was

positively correlated with health perceptions such that higher levels of SES are associated with more positive perceptions of health. Specifically, significant associations were found between SES and participants' perceptions of past health ($r = .25, p < .01$) as well as their perceptions of their best health ($r = .17, p < .05$). SES was not significantly related to any of the other health variables, PTSS variables, depression, or victimization experiences.

Racial Affiliation

A one-way ANOVA revealed a significant association between participant racial affiliation and total scores on child physical abuse; ($F(5, 145) = 3.0, p < .05$). The Games-Howell post-hoc test indicated that the only significant difference was between Asian participants ($M = 20.9$, $SD = 4.94$) and Black participants ($M = 16.5$, $SD = .70$), with Asians reporting higher levels of child physical abuse. Racial affiliation was not related to other victimization variables, or to any of the psychological or health variables.

Citizenship

There was a significant association between citizenship and three of the health variables. Specifically, Canadian citizens ($M = 37.0$, $SD = 20.12$) had higher symptom scores on the HSC than participants with non-Canadian citizenship, ($M = 26.8$, $SD = 11.75$), $t\ (153) = 2.10, p < .05$. In addition, Canadian citizens, when compared to citizens of other countries, had higher reproductive health symptom scores, $t\ (153) = 2.45, p < .05$, ($M = 41.2$, $SD = 9.39$ vs. $M = 35.6$, $SD = 7.08$, respectively) and made more visits to medical professionals $t\ (149) = 2.43, p < .05$, ($M = 3.63$, $SD = 2.86$ vs. $M = 1.88$, $SD = 2.29$, respectively). Citizenship was not significantly related to any of the victimization or psychological variables.

III. Relationships Among Measures

Associations among the measures were evaluated using Pearson correlations. Correlation coefficients and associated levels of significance are presented in Table 9

Victimization Variables

Adult sexual assault experiences were represented by a continuous variable where assault experiences increased in severity from 1 (coercion) to 4 (rape), and zero indicated no victimization. Sexual assault was positively correlated with child physical abuse, as assessed by total scores on the PAQ and with the Physical Abuse subscale on the PAQ ($r = .17, p < .05$), but not with the Severe Physical Abuse subscale. Psychological maltreatment in childhood (CPM) was not associated with adult sexual assault. CPM was, however, strongly, positively correlated with child physical abuse as well as with both of the subscales on the PAQ (Physical Abuse subscale, $r = .63, p < .001$; Severe Physical Abuse subscale, $r = .29, p < .001$). No other significant relationships were found among victimization variables.

Psychological Variables

Participants in this study responded to measures of two types of psychological problems: posttraumatic stress symptom (PTSS) severity (PDS, Foa et al., 1997) and depression (CES-D; Radloff, 1977). Total scores on these two scales were moderately correlated.

Physical Health Measures

Physical health status was assessed in this study through the use of four measures. The HSC (Runtz, 2002a) evaluated number and frequency of general health symptoms, while the RHQ assessed reproductive and sexual health concerns. Recall that high scores

Table 9
Correlations Among Victimization, Psychological, and Health Variables

Variable	SA	CSA	CPA	CPM	PTSS	Depression	HSC	RHQ	Health perceptions	Health care utilization
SA	--									
CSA	.06	--								
CPA	.17*	.09	--							
CPM	.16	-.06	.62***	--						
PTSS	.31**	.16	.44**	.30**	--					
Depression	.15	.14	.39**	.30***	.48***	--				
HSC	.13	-.08	.28***	.33***	.32**	.41***	--			
RHQ	.33***	-.02	.27***	.31***	.38***	.39***	.67***	--		
Health perceptions	-.17*	.02	-.31***	-.39***	-.33**	-.33***	-.30***	-.37***	--	
Health care utilization	.11	.01	-.10	-.08	.16	.06	.18*	.22**	-.01	--

Note. SA = adult sexual assault; CSA = child sexual abuse; CPA = child physical abuse; CPM = child psychological maltreatment; PTSS = posttraumatic stress symptom severity; HSC = general health symptoms; RHQ = reproductive and sexual health symptoms.
*$p < .05$. **$p < .01$. ***$p < .001$

on the HSC and RHQ mean that more symptoms were experienced, and at a higher rate of frequency, indicating poorer physical health. A health care utilization measure inquired about number of visits to medical health services in the past 6 months, with high scores representing more visits, also an indicator of poorer physical health status. Finally, the Cantril Self-Anchoring Ladder (Cantril, 1965) was used to measure health perceptions in this sample. In contrast to the other three health measures, high scores on the Cantril Ladder indicate more positive health perceptions, suggesting better overall physical health status.

Total scores on the HSC were positively correlated in this sample with scores on the RHQ and health care utilization scores, and were negatively correlated with health perceptions. Similarly, total scores on the RHQ were positively correlated with use of health care services, and negatively correlated with health perceptions. Health care utilization and health perceptions were not significantly correlated.

Victimization and Psychological Variables

PTSS severity was positively correlated with adult sexual assault, CPA, and CPM, but not with CSA. Depression scores were positively correlated with CPA and CPM, but not with the sexual victimization variables (adult sexual assault and child sexual abuse). Classification into a dichotomous CSA variable, however, indicated a significant relationship with depression scores, $t\,(148) = 2.34$, $p < .05$. Participants with a history of child sexual abuse had higher total depression scores ($M = 40.93$, $SD = 12.75$) than those with no CSA history ($M = 35.37$, $SD = 10.79$).

Victimization and Health Variables

A number of significant correlations existed between victimization experiences and physical health variables. Specifically, sexual assault was positively correlated with reproductive and sexual health symptoms, and negatively correlated with health perceptions, but was not associated with general health problems. Both CPA and CPM were positively correlated with general health and reproductive/sexual health symptoms, and negatively correlated with health perceptions. Child sexual abuse was not significantly related to any of the four health variables. Similarly, health care utilization scores were not significantly related to any of the victimization measures.

Psychological and Health Variables

Both PTSS severity and depression scores were significantly, positively correlated with physical health symptom scores (HSC), reproductive and sexual symptoms (RHQ) and negatively correlated with health perceptions. However, only PTSS severity was significantly correlated with health care utilization scores. See Table 9 for specific correlation coefficients.

IV. Path Analysis

Through the use of AMOS 5, structural equation modeling (SEM) was employed to evaluate the hypothesized structural model, presented in Figure 1 (see Introduction). Specific hypotheses and descriptions of the models are outlined below.

Path models are evaluated based on the fit of the proposed model to the data. A number of fit indexes are used to assess model fit. First and foremost, the *chi-square goodness-of-fit index* is a measure of the discrepancy between the observed covariances in the data and the pattern of covariances outlined in the model. A nonsignificant chi-

square value is desirable as this indicates that the observed covariances are consistent with the relationships specified in the model (Hoyle & Panter, 1995). However, the chi-square test is considerably impacted by sample size; thus multiple indices are used to determine model fit. Additional indices of fit are based on a comparison to one of two types of baseline models. The independence model is the most restricted and represents a model in which all variables are assumed to be independent of each other (i.e., all relationships between variables are zero). In contrast, the saturated model is the least restricted and represents a model in which the number of parameter estimates is equal to the number of data points. (Byrne, 2001).

The *Comparative Fit Index* (CFI) evaluates how well the model fits as compared to a baseline model, typically the independence model. CFI values range from zero to 1.0, with values of .95 or higher indicating good fit (Hu & Bentler, 1995). Finally, the *Root Mean Square Error of Approximation* (RMSEA) estimates the lack of model fit as compared to the saturated model. RMSEA values less than .05 represent excellent fit, values from .05 to .08 indicate good fit, and values from .08 to .10 indicate mediocre fit. (MacCullum et al., 1996; as cited in Byrne, 2001)

For all models, maximum likelihood (ML) was used to estimate parameters. Not only is ML the most commonly used method of estimation, but it also functions well under less than optimal conditions, such as violations of normality and excessive kurtosis (Hoyle, 1995).

Hypothesized Model

It was hypothesized that PTSS severity would mediate the association between sexual assault and physical health outcomes. The hypothesized model (Figure 1) consists

of adult sexual assault (SA) as the predictor variable, physical health problems as the outcome (or criterion) variable, and PTSS severity as the mediator. The latent variable of health problems consisted of 4 indicators: physical health symptoms (HSC), reproductive and sexual health concerns (RHQ), health perceptions, and health care utilization. Child victimization variables were controlled for by statistically partialling them from the continuous SA variable, and using a variable of residuals in the path model. As demonstrated in Figure 2, the full model (Model 1) includes a direct pathway from SA to health problems (Path *a*), as well as an indirect pathway via PTSS severity (Paths *b* and *c*).

The full model consists of the following two nested models. Model 1A (Paths *b* and *c*) represents the mediated model, in which the relationship between sexual assault and health problems is mediated through PTSS severity (Path *a* is set to 0). Model 1B simply consists of a direct pathway from sexual assault experiences to physical health problems. Recall that model components represented by rectangles are observed, or measured variables, while those represented by circles are latent, or unmeasured variables. Variables labelled with an 'e' are error variances associated with measured variables, while those labelled with a 'd' are disturbances that are associated with latent variables. Specific paths values in the model diagrams represent standardized coefficients and are identified as significant by accompanying asterisks (*).

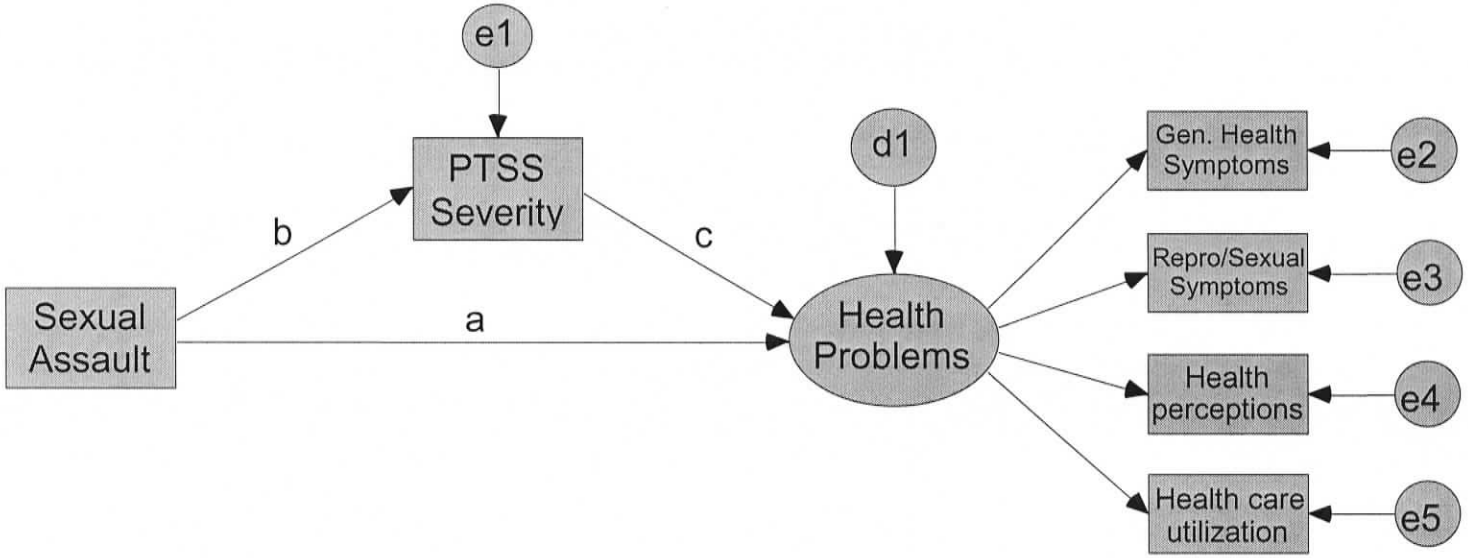

Figure 2. Model 1: Full model representing both the direct and indirect pathways from sexual assault to physical health outcomes

Hypothesis 1. Women who had experienced sexual assault were expected to report more general health symptoms, and sexual and reproductive health concerns, poorer global health perceptions, and to have higher usage levels of health care services than participants who did not report incidents of assault. In order to test this first hypothesis, Model 1B (Figure 3) was evaluated. The primary pathway in this model involves the direct relationship between sexual assault (SA) and physical health problems. Additional pathways from 'health problems' to each of the four measured health variables represent the extent to which these indicators load onto the overall latent variable. The model fit the data exceptionally well, $\chi^2(5) = 6.88$, *ns*, CFI = .99, RMSEA = .045. All pathways were significant, indicating that sexual assault is significantly associated with more general health and sexual/reproductive health symptoms, as well as greater use of health care services. Furthermore, the negative pathway to health perceptions indicates that sexual assault experiences are related to poorer overall health perceptions.

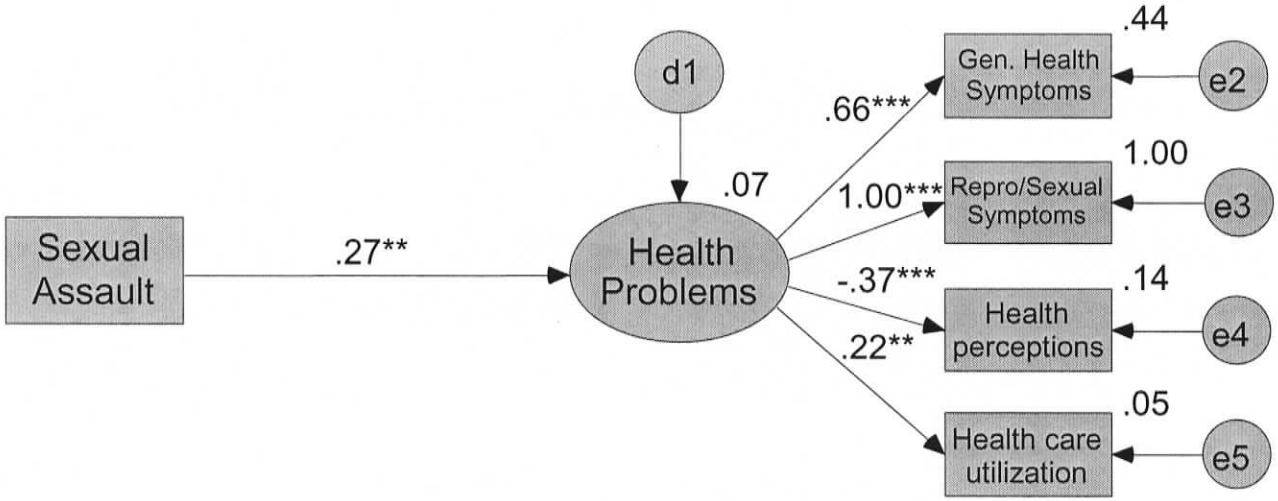

Figure 3. Model 1B: Assessment of the direct impact of sexual assault on physical health problems

Hypothesis 2. Posttraumatic stress symptom (PTSS) severity was expected to operate as a mediator in the relationship between sexual assault victimization and physical health status. It was hypothesized that PTSS severity would partially mediate the association between sexual assault and physical health outcomes. According to Baron and Kenny (1986), three regression equations must be demonstrated to be statistically significant prior to running a mediation model. First, the hypothesized mediator (PTSS severity) must be significantly related to the predictor variable (sexual assault exposure). Second, there must be a significant relationship between the predictor variable (sexual assault exposure) and the outcome variable (physical health problems). Third, the hypothesized mediator (PTSS severity) must significantly impact the outcome variable (physical health problems). Mediation is demonstrated when there is a reduction in the strength of the association between predictor and criterion variables after accounting for the mediator (PTSS severity). In SEM, full mediation is demonstrated in two ways: a) the path from predictor to criterion is non-significant; and b) there is a lack of improvement in model fit when the direct pathway from predictor to criterion is added to a model already consisting of the mediated pathway. In other words, the relationship between sexual assault and physical health problems is entirely mediated by PTSS severity when the direct pathway from sexual assault to physical health adds no significant improvement to the model.

The hypothesized mediated model was tested and resulted in good model fit, $\chi^2(9) = 14.69$, *ns*, CFI = .96, RMSEA = .064 (See Figure 4). Path coefficients indicate that sexual assault experiences are significantly related to PTSS severity, which in turn, is significantly related to health problems. Similar to Model 1B, significant loadings on the

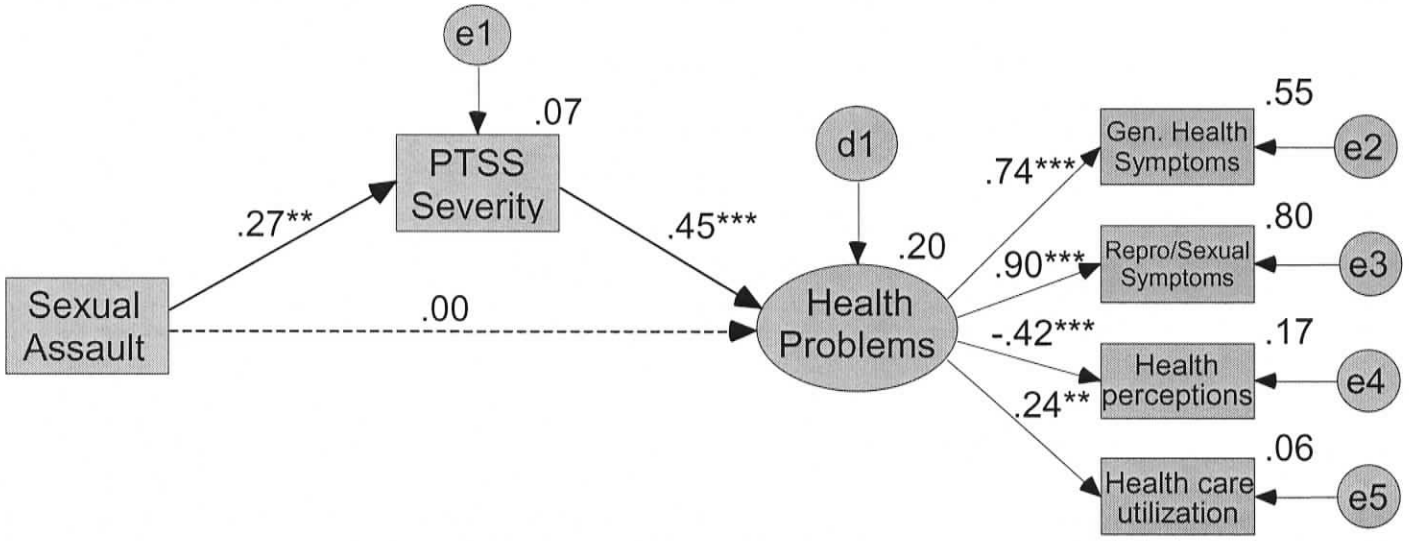

Figure 4. Model 1A: PTSS severity as mediator between sexual assault and physical health problems

latent variable of health problems were evident for all four indicators.

In order to test for full mediation, two versions of the model are evaluated and compared. The mediated model (Model 1A), just presented, is compared to the full model (Model 1), in which all paths are free to vary, including Path *a*. The full model (Model 1) fit the data well, $\chi^2(8) = 10.84$, *ns*, CFI = .98, RMSEA = .048. A chi-square difference test (χ^2_{DIF}) is used to compare the fit of the two models. A non-significant χ^2_{DIF} value is evidence of full mediation as it indicates that the full model does not significantly improve upon the explanation of the data over the mediated model. In this case, the chi-square difference test indicated that there was a significant improvement in model fit, $\chi^2_{DIF}(1) = 3.85$, $p = .05$. However, Model 1A represents *full* mediation, and it was expected that PTSS severity only *partially* mediates the relationship between sexual assault exposure and physical health problems. The degree of partial mediation in a model is found by multiplying the unstandardized path coefficients for the two components of the mediated pathway (Paths *b* and *c*) in the free-to-vary model (Model 1). This results in a significant reduction in the β for Path *a* from .13 to .07 (a reduction of .06, $p < .05$), thereby indicating partial mediation through PTSS severity.

Finally, an alternative, non-nested, model (Model 2) was investigated in which depression symptoms served as the mediator, in place of PTSS severity. Fit indices indicate that this alternative mediation model did not adequately fit the data, $\chi^2(9) = 21.76$, $p = .01$, CFI = .92, RMSEA = .096 (see Figure 5). The poor fit of this model was primarily due to the absence of a significant relationship between sexual assault exposure and depression symptoms.

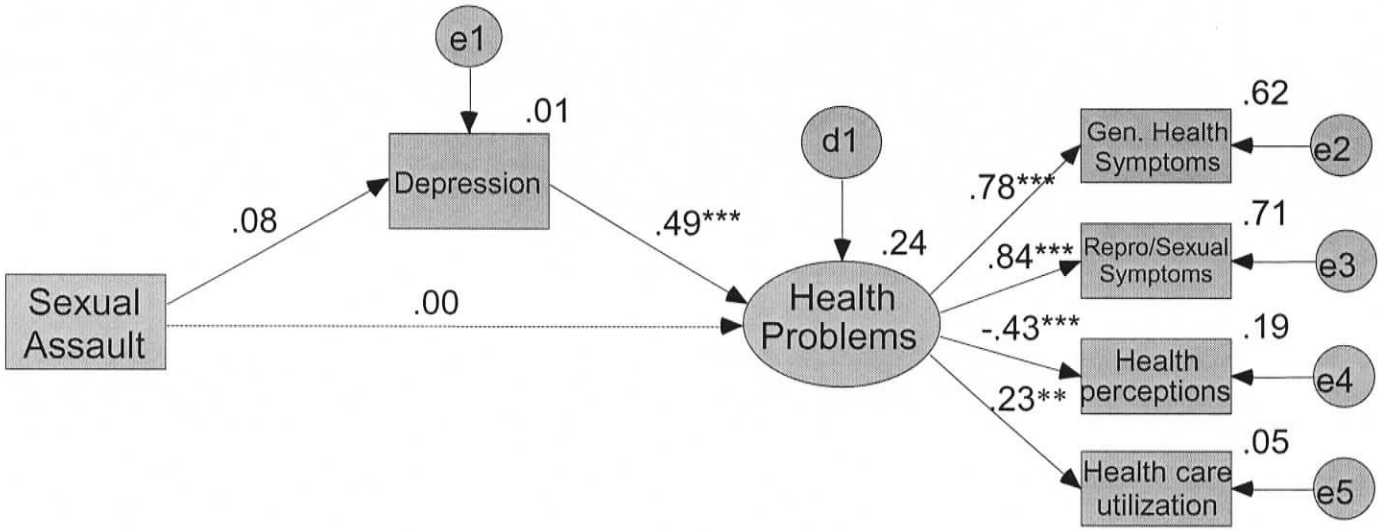

Figure 5. Model 2: Alternative (non-nested) mediation model with depression symptoms as the mediator

V. Research Questions

Two additional research questions were investigated with the use of Multivariate Multiple Regression (MMR). MMR tests the overall prediction of several dependent variables (DVs) from a set of independent variables (IVs). Following a significant overall test of conditionality, univariate regressions that involve the separate prediction of each DV can be examined. A significant multivariate R^2 serves to control for Type I error in the subsequent multiple regression analyses (Stevens, 1996).

Research Question 1. Are PTSD symptom clusters (i.e., reexperiencing, avoidance, and hyperarousal) differentially associated with physical health outcomes? To investigate this question, all four health variables (general health symptoms, reproductive and sexual health concerns, health perceptions, and health care utilization) were simultaneously regressed onto each of the three PTSD symptom clusters (reexperiencing, avoidance, and hyperarousal). The overall test of conditionality was significant, multivariate $R^2 = .32$, $\chi^2(12) = 28.33$, $p < .01$. Results from the univariate regression analyses are presented in Table 11. In particular, each of the four health variables were significantly predicted from the set of PTSD symptom clusters. However, none of the symptom clusters made a unique, significant contribution, relative to the other clusters, in the prediction of general health symptoms and reproductive/sexual health concerns. In contrast, avoidance symptoms significantly predicted health perceptions over and above the contribution of reexperiencing and hyperarousal symptoms ($\beta = -.404$, $p < .05$). Moreover, health care utilization was uniquely predicted by reexperiencing symptoms, but not by the avoidance or hyperarousal clusters ($\beta = .508$, $p < .01$)

Table 10

Summary of Simultaneous Regression Analysis for Prediction of Health Variables from PTSD Symptom Clusters

Variable	F	df	β	SE	η^2
General health symptoms					
Overall model	3.70*	3			.13
Reexperiencing symptoms			0.14	.16	.01
Avoidance symptoms			0.23	.19	.02
Hyperarousal symptoms			0.01	.18	<.01
Reproductive/sexual symptoms					
Overall model	4.39**	3			.15
Reexperiencing symptoms			-0.04	.17	<.01
Avoidance symptoms			0.24	.20	.02
Hyperarousal symptoms			0.23	.19	.02
Health perceptions					
Overall model	3.98*	3			.14
Reexperiencing symptoms			-0.07	.17	<.01
Avoidance symptoms			-0.40*	.20	.05
Hyperarousal symptoms			0.06	.20	<.01
Health care utilization					
Overall model	3.22*	3			.11
Reexperiencing symptoms			0.51**	.19	.09
Avoidance symptoms			-0.02	.22	<.01
Hyperarousal symptoms			-0.16	.22	<.01

Note. N = 80; Multivariate R^2 = 32, $p < .01$.

*$p < .05$. **$p < .01$.

Research Question 2. Are sexual and reproductive health concerns related to history of sexual assault and subsequent PTSS severity in different ways than general health symptoms? Again, multivariate multiple regression was performed in which general health symptoms and reproductive and sexual health symptoms were simultaneously regressed onto PTSS severity and sexual assault (as a continuous variable). The overall test of conditionality was significant, multivariate $R^2 = .22$, $\chi^2(4) = 19.21$, $p = .001$. Specific tests indicate that PTSS severity significantly and uniquely predicts both general health symptoms and reproductive and sexual health concerns, and that the degree of these relationships is similar ($\beta = .300$, $p < .01$ vs. $\beta = .324$, $p < .01$, respectively). Conversely, sexual assault is uniquely related to sexual and reproductive health concerns ($\beta = .252$, $p < .05$), but not to general health concerns ($\beta = .044$, *ns*). Detailed results from the regression analyses are presented in Table 11.

Table 11

Summary of Simultaneous Regression Analysis for Prediction of General and Reproductive/Sexual Health from Sexual Assault and PTSS Severity

Variable	F	df	β	SE	η^2
General health symptoms					
Overall model	4.66*	2			.11
PTSS severity			0.30**	.11	.09
Sexual assault			0.04	.11	<.01
Reproductive/sexual symptoms					
Overall model	9.51***	2			.19
PTSS severity			0.32**	.11	.09
Sexual assault			0.25*	.11	.06

Note. N = 82; Multivariate R^2 = 22, p = .001

*p < .05. **p < .01. ***p < .001

Discussion

The purpose of this study is to examine relationships between trauma exposure, in the form of sexual assault, posttraumatic stress symptoms (PTSS), and physical health outcomes. Specifically, it was hypothesized that PTSS severity would mediate the relationship between women's sexual assault experiences and their physical health status. Through path analysis, it is revealed that PTSS severity partially mediates this association. Furthermore, a model mediated by PTSS severity fits the data well, whereas a model mediated by depression symptoms does not. Upon analyzing the relative contributions of PTSD symptom clusters to the prediction of health variables, it is found that the three symptom clusters (i.e., reexperiencing, avoidance, and hyperarousal) appear to operate together in their prediction of women's health symptoms (both general symptoms and reproductive/sexual symptoms). However, avoidance symptoms are found to have a unique negative association with women's health perceptions, while reexperiencing symptoms are associated with use of health care services above and beyond the impact of other symptom clusters. Finally, it is revealed that the severity of PTSS experienced by women in this study is linked to both their general health symptoms and their reproductive and sexual health concerns, while women's experiences of sexual assault were associated only with reproductive/sexual health symptoms and not with general heath symptoms.

Prevalence Rates

Trauma Exposure and PTSD

Exposure to traumatic events is quite common, with almost 55% of the women in this sample reporting that they experienced at least one traumatic event thus far in their

lifetime. This rate of exposure is similar to that found in the National Comorbidity Study (NCS; Kessler et al., 1995), where 51% of female participants reported exposure to one or more traumatic events. When compared to rates of trauma exposure in other studies, however, the prevalence rate in the present study appears to be somewhat low. For example, 69% of participants in the National Women's Study (NWS; Resnick et al., 1993), and 67% of a large sample of college students (Bernat et al., 1998) reported exposure to a traumatic event. Yet, some important differences exist between the present sample and the participants used in these studies. The NWS is based on a nationally representative sample of women in the United States, and as such, comprises a broad range of sociodemographic characteristics such as age, ethnicity, and socioeconomic status (SES). Accordingly, the NWS sample includes a considerably greater proportion of women with characteristics that place them a risk for trauma exposure than the present sample of university undergraduate students. (See Breslau et al., 1998 for a discussion of demographic factors that are associated with increased risk of trauma exposure). While the sample in Bernat and colleagues' study is similar to the present sample in that both consist of college students, the reported rate of trauma exposure in the former study combines both male and female participants. Men typically report significantly higher levels of trauma exposure than women (Breslau et al., 1998; Kessler et al., 1995), which may contribute to an increased overall rate of exposure when considering both genders, as compared to an exclusively female sample.

On the basis of responses to self-report questionnaire items, 11.6% of the present sample qualifies for a diagnosis of posttraumatic stress disorder (PTSD). While definite diagnoses are not normally made until a more thorough interview-based assessment is

conducted, questionnaire responses provide an *estimate* of the prevalence of PTSD in this sample. Rates of PTSD among women reported in previous research range from 10 to 13% (Breslau et al., 1991; Kessler et al., 1995; Resnick et al., 1993). Thus, despite a somewhat lower rate of trauma exposure, the estimated prevalence rate of PTSD in this sample is quite consistent with existing literature.

Sexual Assault

Prevalence rates for sexual assault vary according to how this type of victimization is defined and assessed. The relatively inclusive definition of sexual assault used in the current study is not just restricted to experiences of rape and attempted rape, but also includes coerced sexual acts and unwanted sexual contact. This definition is consistent with what is considered to be sexual assault under Canadian law (Department of Justice Canada, 2003b).

In the present study, 53.5% of women report at least one incident of sexual assault. Initially, this prevalence rate appears to be quite high, yet, an analysis of the published literature reveals that this is similar to rates reported in other studies, when sexual assault is similarly defined. For example, Koss and colleagues (1987) report a sexual assault prevalence rate of 54% when using the same measure employed in this study (the Sexual Experiences Survey) to assess sexual assault in their much larger sample of university students (N = 3187 for women). Considering the *most serious* form of sexual victimization reported by each woman, rates of sexual coercion and sexual contact in the present sample (12% and 13%, respectively) are relatively similar to those found in the Koss et al. study (12% and 14%, respectively). In contrast, the prevalence of rape is slightly higher in the current study (19% vs. 15%) and the prevalence of attempted

rape is slightly lower (10% vs. 12%), when compared to the sample of women in the study by Koss and colleagues.

The most recent large-scale report on sexual assault statistics in Canada are from the 1993 Violence Against Women Survey (VAWS; Statistics Canada), a population study that involved phone interviews with 12 300 women. The reported prevalence rate of sexual assault from this survey was 39%. While this rate is somewhat lower than what is found in the current study, VAWS participants were not directly asked about coerced sexual intercourse. Therefore, this rate of almost 4 in 10 Canadian women represents sexual attacks (rape or attempted rape), and unwanted sexual touching.

A similar definition of sexual assault was used in the National Women's Study (NWS), described earlier (Resnick et al., 1993). Twenty-seven percent of women in this large, representative sample indicate that they have experienced sexual assault, with 12.7% reporting rape, and 14.3% reporting other sexual assault experiences (attempted rape and unwanted sexual contact). These rates are comparably lower than what was found in the present study; however, the difference is likely due to the absence of sexually coercive experiences in the NWS definition of sexual assault.

Overall, the prevalence rates for trauma exposure, sexual assault, and PTSD found in this study are relatively consistent with existing literature, providing support for the generalizability of these results to the population from which the present sample was drawn.

Sexual Assault and Physical Health

As hypothesized, results of this study indicate that sexual assault experiences are related to adverse physical health outcomes, even after child victimization experiences

are controlled. In particular, women who have experienced sexual assault report more general health symptoms, more reproductive and sexual health concerns, poorer overall perceptions of health, and increased use of health care services. These results are consistent with previous research conducted with sexual assault survivors (e.g., Golding, 1994; Kimerling & Calhoun, 1994).

The present study used a continuous variable to represent sexual assault, with higher values associated with more severe forms of assault (i.e., ranging from unwanted sexual contact as the least severe to completed rape as the most severe). Consequently, it is also revealed that women who experience more severe types of sexual assault tend to have more physical health problems. A similar association between the severity of trauma exposure and poorer physical health status has been found in previous research (Friedman & Schnurr, 1995; Green & Kimerling, 2004; Wolfe et al., 1994).

PTSS Severity as a Mediator between Sexual Assault and Health

The primary purpose of this study was to assess a model in which PTSS severity mediates the relationship between sexual assault and physical health problems. The results indicate that PTSS severity served to *partially* mediate this association. In other words, the direct relationship between sexual assault experiences and physical health outcomes is in part, but not completely, accounted for by the severity of PTSS.

This finding is consistent with existing research that has investigated the mediating role of PTSS/PTSD in relation to health. In particular, the results of the current study are similar to those found by Friedman and Schnurr (1995), who used path analysis to assess the role of PTSD as a partial mediator in the relationship between combat exposure and self-reported physical health status among a population of female war

veterans. Not unlike the results of the present study, Friedman and Schnurr found that while both the direct and indirect pathways from trauma exposure to current health status were significant, over half of the total effect of the direct pathway was accounted for by PTSD (i.e., the indirect pathway). Similarly, in a study of male and female war veterans, it was found that the impact of combat exposure was mediated, although only partially so, through PTSD (Taft, Stern, King, & King, 1999). Other studies have added PTSD to a multivariate regression model and found that the impact of trauma exposure on health is considerably reduced as a result of the presence of PTSD in the model (Kimerling et al., 2000; Wagner et al., 2000). While previous research has demonstrated the importance of PTSD in models that investigate the link between trauma and health, no study has yet to conclude that PTSD is the *only* mediator of this relationship. Thus, an expectation that posttraumatic stress symptoms would entirely mediate the relationship between sexual assault exposure and physical health outcomes may be unrealistic.

An alternative model in which depression symptoms replaced PTSS severity in the role of mediating the sexual assault – physical health association is also tested in the present study. While the two models are not compared statistically, the model mediated by depression symptoms does not adequately fit the data, while the PTSS-mediated model fits the data well. This suggests that PTSS may be the more appropriate mediator, at least in terms of the relationship between sexual assault and physical health problems. This is also a possible indication that the relationship in question is not simply mediated by general psychological distress, but rather by something specific to PTSS/PTSD.

Related research has shown that the impact of PTSD on physical health remains after controlling for depression as well as other psychological symptoms and diagnoses.

In a sample of adult primary care patients, Weisberg et al. (2002) demonstrated that PTSD was a stronger predictor of medical problems than comorbid depression and that this relationship remained after controlling for other anxiety disorders. Furthermore, the impact of PTSD on physical symptoms has been seen to remain after controlling for mood disorders and substance use disorders in a general adult sample (Andreski et al., 1998), and after controlling for depression and anger in a sample of sexual assault survivors (Zoellner et al., 2000). Nevertheless, these investigations did not explicitly test for mediation. Moreover, the present research was conducted with an exploratory intent; thus, a much more thorough investigation is required, including a direct comparison of a PTSD-mediated model against a depression-mediated model, before definite conclusions can be made.

A number of explanations that account for the role of PTSD in the relationship between trauma exposure and health outcomes have been put forth (see Schnurr & Green, 2004 for a review). While proposed mechanisms that help to explain these relationships are not directly tested in the present study, a few hypothesized explanations are useful in understanding the findings of this study.

First, several researchers have proposed that specific attentional processes may account for increased symptom reporting in PTSS/PTSD suffers (Kimerling et al., 2000; Pennebaker, 2000; Zoellner et al., 2000). In particular, many of the general health symptoms endorsed by individuals experiencing distress in the aftermath of trauma are similar in nature to the physiological reactions that are a component of posttraumatic symptomatology and related anxiety responses. For example, shortness of breath, increased heart rate, chest tightness, headaches, and sleep difficulties are often reported at

higher rates among individuals with PTSD (Kimerling & Calhoun, 1994; Kimerling et al., 2000; McFarlane et al., 1994), in part because these symptoms are a diagnostic component of the disorder (e.g., exaggerated startle response; physiological reactivity upon exposure to reminders of the trauma). Upon experiencing these physiological changes, individuals may then misinterpret or overemphasize their relevance as an indication of impairment to their physical health, rather than as a component of their psychological distress. An interpretation of these experiences as physical health symptoms may then prompt an individual to seek assessment and treatment from health care professionals and simultaneously lead to the overall perception that one's health is impaired.

A related explanation considers the role of conditioning in the association between posttraumatic experiences and health symptoms. Resnick and colleagues (1997) explain that changes in respiration, heart rate, muscle tension and gastrointestinal functioning are important physiological components of the 'fight or flight' response that become associated with the trauma experience. Cognitive responses that include believing one's life is in danger, and the fear that a personal injury has been sustained, are also unconditioned responses associated with the trauma. Subsequently, cues that remind a survivor of the traumatic event serve as conditioned stimuli that elicit a similar physiological response as well as a cognitive appraisal that medical attention is needed. Moreover, this conditioned association is not easily extinguished, particularly among trauma survivors who avoid exposure to distressing trauma reminders, simply because it is never learned that these relatively innocuous cues do not actually translate into life-threatening experiences. A conditioning explanation has specific relevance for sexual

assault survivors who are troubled by sexual health and functioning problems. As discussed in the introduction, for women who have been sexually assaulted trauma reminders are most likely to occur during healthy sexual interactions experienced after the assault. Conditioned physiological and cognitive responses might then interfere with sexual functioning and result in reported sexual health problems.

Relationships Between PTSD Symptom Clusters and Health

Recent research has suggested that the reexperiencing, avoidance, and hyperarousal components of PTSD may have separate and unique associations with physical health outcomes (Kimerling et al., 2000; Woods & Wineman, 2004; Zoellner et al., 2000). Results of the present study indicate that while health outcomes are significantly associated with PTSD symptom clusters when considered together, no single symptom set emerges as the most important predictor of health symptoms. In particular, none of the PTSD symptom clusters have a unique, significant association with general health symptoms or reproductive/sexual health symptoms, relative to the other symptom clusters. This could be an indication that symptom clusters should be considered together rather than separately in associations with health symptoms. In other words, it appears to be the disorder of PTSD as a whole, rather than individual symptom clusters, that matters most when considering outcomes in terms of general health and reproductive/sexual health symptoms.

In contrast to the absence of unique relationships with specific health symptoms, certain PTSD symptom clusters do appear to be relevant to women's perceptions of their own health and to their use of health care services. Specifically, the avoidance symptom cluster is significantly associated with health perceptions over and above the contribution

of reexperiencing and hyperarousal symptoms. In other words, the more avoidance symptoms a woman experiences (e.g., avoiding thoughts or reminders of the traumatic event), the more negatively she perceives her own health, at least in the present study. Important components of this symptom cluster include a restricted range of affect and the sense of a foreshortened future. Thus, it is understandable that participants with high levels of avoidance symptoms are likely to have less positive subjective perceptions of their physical health, and particularly of their future health.

Furthermore, reexperiencing symptoms such as intrusive thoughts, feelings, and nightmares that serve as reminders of the trauma, are uniquely related to health care utilization, while avoidance and hyperarousal symptom clusters are not. Research indicates that PTSD sufferers are more likely to seek health care from medical settings than from mental health professionals (Kimerling & Calhoun, 1994; Koss et al., 1990; Schnurr & Green, 2004), even when symptoms are of a psychological nature. Thus, it is possible that reexperiencing symptoms, typically the most distressing of the three symptom clusters, are cueing individuals to seek health care from medical professionals rather than mental health care providers. Moreover, the physiological distress and reactivity that is experienced as a component of reliving, or having nightmares about the trauma, may result in physical sensations (e.g., increased heart rate, difficulty breathing), that could be interpreted as physical health problems, and consequently lead to increased visits to medical professionals.

The Importance of Reproductive and Sexual Health Symptoms

In light of research findings that have found sexual and reproductive health symptoms to be important health outcomes following sexual victimization, one final

research question is investigated in this study. Each of the health symptom outcomes – general health symptoms and reproductive/sexual health symptoms – were considered in terms of their potentially unique relationships with sexual assault exposure and PTSS severity. While reproductive and sexual symptoms were significantly predicted by sexual assault experiences and by PTSS severity (both together and separately), general health symptoms were only uniquely predicted by PTSS severity (and not by sexual assault). These results indicate that sexual assault is associated with reproductive and sexual health symptoms, but not physical symptoms of a more general nature (e.g., headaches, backaches, joint pain, etc.) once the contribution of PTSS severity is controlled.

This finding is not surprising considering the results from previous research with sexual assault survivors. While both general health symptoms and reproductive/sexual symptoms have been associated with sexual assault exposure in past research (Campbell & Soeken, 1999; Golding, 1994/1996; Kimerling & Calhoun, 1994), a number of researchers have placed emphasis on those symptoms that are of a reproductive or sexual nature. For example, in her review of the health consequences of violence in intimate relationships, Campbell (2002) states gynecologic problems, a component of reproductive health, is the most significant health factor that distinguishes between women who have and have not been victims of intimate partner violence (IPV). Sexual assault experiences are thought to be an extremely important component of IPV. In fact, in her empirical research Campbell associates reproductive symptoms specifically to sexual assault experiences, rather than to other types of IPV (Campbell & Soeken, 1999; Sharps & Campbell, 1999). Moreover, Koss et al. (1991) reported that gynecologic symptoms were

the most frequent health complaints among female crime victims who had experienced severe sexual assaults, or sexual assaults combined with physical assaults.

A few explanations can account for this unique association between sexual assault and reproductive/sexual health concerns. Specifically, characteristics of the assault itself may lead to long-lasting consequences for reproductive health. For example, the transmission of sexually transmitted infections (STIs), or of microorganisms causing vaginal infections during the assault can result in a variety reproductive and sexual health problems, particularly if not treated properly (Campbell, 2002). Similarly, vaginal and pelvic injuries sustained during the assault may have lingering and long-term implications for reproductive health (Resnick et al., 1997). Moreover, feelings of fear and anxiety that become associated with sexual interactions are likely to interfere with sexual functioning, making it difficult for a woman to engage in and enjoy sexual experiences following the assault (Chapman, 1989).

Study Limitations

Findings from this research investigation should be interpreted in light of specific areas of limitation. First, this study is based on an undergraduate student sample primarily composed of young, single, Caucasian women who are predominantly from middle- and upper-middle class backgrounds. Consequently, results from this investigation may not be generalizable to more diverse populations. It has, however, been suggested that women in their late adolescence and early adulthood (i.e., university-aged), are at a significantly heightened risk of experiencing sexual victimization (Ageton, 1983; Maxwell, Robinson, & Post, 2003). Thus, findings from this study may be of particular relevance to this age group of women. Nevertheless, there is a potential self-selection bias

operating within this sample, in that these women chose to enrol in an undergraduate psychology course, and subsequently chose to volunteer for this particular study. Consequently, this bias may also serve to limit the generalizability of these results.

Similarly, in focusing this investigation exclusively on women, results cannot be generalized to male survivors of sexual assault. Furthermore, health experiences, particularly those related to sexual health, are likely to be quite different among men. Future investigations should be conducted with male participants to provide an understanding of the associations between victimization, PTSS, and health in men.

Second, retrospective self-report measures are used in this study. As previously discussed, self-reports are subject to the inaccuracy of retrospective recall and are often influenced by memory, social desirability, and mood. Self-report scales are best conceptualized as a measure of subjective perceptions, and as such, they may depart from more objective accounts of experiences. Nevertheless, we know that perceptions of traumatic experiences play an important role in the sequelae of traumatic events (Schnurr & Green, 2004). In fact, findings of the present investigation lend support to the idea that subjective psychological experiences contribute to the extent of health problems experienced in the aftermath of trauma.

A third limitation of this study involves the method used to control for child victimization variables. Physical, sexual, and psychological abuse in childhood are controlled in this study by statistically partialling them from the adult sexual assault variable. A necessary consequence of this process is that the potential interaction between control variables (child victimization experiences) and the variable of interest (adult sexual assault), is also removed. Because these variables do tend to co-occur in the

general population (Arata, 2002; Arata & Lindman, 2002; Stermac, Reist, Addison, & Millar, 2002), statistically removing child variables may create a somewhat artificial variable of sexual assault. Nevertheless, the purpose of this study was to examine a model of relationships between trauma, PTSS and physical health in which sexual assault is the specific trauma being investigated, rather than a broader variable of general victimization. In order to achieve this goal it is considered necessary to partial out child victimization variables. Moreover, other methods of controlling for variables can also be problematic. For example, one option is to only include participants who have experienced sexual victimization after the age of 14, and have not had any experiences of physical, psychological, or sexual abuse in childhood. Not only would this method compromise the sample size and generalizability of results, but it also risks artificiality in that the subset of individuals who experience victimization in adulthood, but not in childhood may differ on important dimensions from those who do experience abuse at both stages of life.

A further limitation is the possibility that variables not accounted for in this study may operate as confounds. For example, experiences of physical violence in adulthood are not controlled for, nor are other traumatic events that are not considered to be related to sexual assault. However, because a significant proportion of the general population experiences multiple traumas throughout their lifetime (Kessler et al., 1995), it would be extremely difficult and fastidious to try and control for all other traumatic experiences.

Finally, while directional relationships in the path models presented and tested here might appear to imply casual relationships, it is important to note that causality is not explicitly being tested in this study. The direction and ordering of relationships is guided by previous research and theory. Thus, even though the hypothesized model fits

the data well, not all possible alternative models have been ruled out and conclusions of causality should not be assumed.

Clinical Implications

Findings from this study have implications for both medical and mental health professionals. The identified relationships between sexual assault exposure, PTSS, and adverse physical health outcomes suggest that survivors of sexual assault are likely to be confronted with significant psychological distress and physical health problems in the aftermath of their traumatic experience. Moreover, the mediating role of PTSS severity in the link between sexual assault and physical health outcomes, suggests that individuals who develop clinically significant posttraumatic stress symptoms are at a considerably increased risk of also experiencing physical health problems. For mental health professionals, this means that trauma-exposed clients may be presenting with a wide range of physical health concerns. Similarly, medical professionals are likely to encounter patients who are suffering from significant psychological distress in addition to physical ailments.

Research suggests that both sexual assault survivors and PTSD sufferers are more likely to seek treatment in primary care settings than from mental health professionals (Golding, Stein, Siegel, Burnam, & Sorenson, 1988; Koss et al., 1990; Schnurr & Green, 2004). While participant use of primary care services is not compared to visits to mental health professionals in the present study, it is revealed that women in this sample who have experienced sexual assault made more visits to medical services in the preceding six months than women with no sexual assault history, and that this association increases

with the severity of the assault experience as well as the severity of posttraumatic stress symptoms.

Given this pattern of help-seeking behaviour, the identification of trauma histories, and specifically sexual assault histories, in women seeking medical care must be emphasized. Researchers in this domain have recommended that regular screening procedures be implemented in primary care settings to assess for both trauma history and PTSD (e.g., Green & Kimerling, 2004). Screening and identification by medical professionals is a necessary step in the process of providing appropriate psychological and medical treatment.

Of particular relevance to the present research investigation is the importance of screening for sexual assault histories among women who present with reproductive and sexual health problems. Given the extremely personal and sensitive nature of disclosing an incident of sexual assault, and of undergoing reproductive and sexual health exams following such experiences, medical professionals should be provided with appropriate education and training in this area.

Following the identification of trauma survivors in primary care settings, it may be necessary and appropriate to refer these patients to mental health professionals for assessment and treatment of psychological symptoms. Similarly, psychologists, psychiatrists, and other mental health providers, may chose to refer clients who are experiencing physical health concerns to a general physician or other medical specialist for concurrent assessment and treatment. With an increased likelihood of experiencing both psychological and physical symptoms in the aftermath of trauma exposure, survivors of trauma may be required to simultaneously interact with both the primary care and the

mental heath care systems. In the interest of providing the best possible health care to survivors in the aftermath of their traumatic experiences, it is critical that professionals in both medical and mental health systems work together.

Blount (1998) discusses several reasons for integrating medical and mental health care. In particular, physical and psychological components of health are not typically experienced in a separate and delineated manner, the way in which they are often conceptualized and discussed in the literature. Consequently, integrated health care may be the most appropriate way to respond to a woman's somewhat undifferentiated understanding of their own health. This suggestion is particularly relevant to sexual assault survivors presenting with reproductive and sexual health problems in the aftermath of their traumatic experience. Symptoms, such as pain or bleeding during intercourse, are likely to be experienced both physically and psychologically. Thus, while reproductive and sexual health symptoms may require medical attention and treatment, such symptoms are also likely to impact psychological well-being, and should, therefore, also be addressed. Appropriate integration of primary care and mental health systems will better allow for such multifaceted approaches to care.

Finally, as discussed below, future research that explicitly investigates the possible impact of post-trauma and PTSD interventions on physical health problems is highly warranted. The role of PTSD as a mediator of the trauma — health relationship, suggests that psychological distress may temporally precede the development of physical health problems (although this causal relationship was not tested in the present study). Nevertheless, psychologically-based interventions that focus on the reduction of physical

tension and anxiety, such as relaxation training or biofeedback, may serve to prevent or diminish the severity of subsequent health concerns.

Empirical research findings are a crucial element in the development of a complete health care strategy that is appropriate to trauma survivors. Health professionals must have access to accurate and comprehensive knowledge about how trauma exposure and PTSD are associated with physical health problems so that they can adequately and appropriately treat trauma survivors. Findings from the current study add to existing research literature in this area as an informative resource for health care providers.

Future Directions

This study was a preliminary investigation of a model in which PTSS severity mediated the relationship between sexual assault exposure and physical health outcomes. To the author's best knowledge, this study was the first to directly evaluate this specific model. As such, the present research was exploratory and should be replicated before explicit conclusions are formed.

Due to restriction in sample size, and a desire to include subclinical levels of posttraumatic stress symptoms, a continuous variable encompassing PTSS severity was chosen as the mediating variable in this study. Future investigations should evaluate the role of PTSD diagnosis in this model, and examine both similarities and differences between a dichotomous diagnostic variable and a continuous symptom-based variable. In addition, this research should be expanded and replicated with a more diverse sample, and in both a community and clinical settings. Similarly, this, and related investigations that have been primarily limited to North America, should be replicated in an international context and within differing cultural contexts.

Four specific health outcome variables were chosen for inclusion in this study: self-reported general health symptoms and reproductive/sexual health symptoms, health perceptions, and use of medical services. Additional indicators of health include specific medical diagnoses (e.g., hypertension, chronic pain, stomach ulcer), objective accounts of symptoms (i.e., physical exam), functional limitations, and health-related quality of life. Future investigations should assess each of these potential outcome variables as they relate to both sexual assault experiences and PTSS/PTSD.

Aside from the relative impact of PTSD symptom clusters, proposed mechanisms that served to explain the relationship between PTSD and physical health were not directly tested in this research investigation. Thus, not only should research with PTSD symptom clusters be replicated, but studies designed to examine the impact of biological, psychological, behavioural, and attentional mechanisms should be conducted.

Finally, an important consequence of this research is that it has valuable implications for treatment, both of PTSD, and of physical health problems. Research is needed on the relative impact of prevention and treatment interventions for trauma victims and the effect of such interventions on physical health status. Similarly, treatments focused on improving health status should be assessed for their impact on PTSD symptoms. Trauma victims already appear to have a considerable impact on the health care system, at both primary and secondary care levels (Walker, Newman, & Koss, 2004). Specific investigations of this impact will serve to inform health care professionals and administrators on how to best serve this population.

Summary

In summary, this research project helped to clarify pathways between trauma exposure, posttraumatic stress symptoms, and physical health status in the context of sexual assault victimization. With these preliminary findings, the present study demonstrates that PTSS severity does, in fact, partially mediate the association between sexual assault experiences and physical health outcomes. Although, in providing evidence for partial mediation, these results suggest that other variables may play an important role in this model, whether they be other psychological disorders, general psychological distress, or some, thus far, unmeasured variable.

This investigation also helped to further our knowledge of how PTSD symptom clusters may be related to physical health outcomes, thus providing a better understanding of the mechanisms that underlie this mediation model. In particular, results of this study suggest that no specific subset of PTSD symptoms uniquely predicts general health symptoms or reproductive and sexual health concerns, but rather that the symptom clusters operate together in their association with these health outcomes. On the contrary, some preliminary findings suggest that reexperiencing symptoms (e.g., nightmares, flashbacks) may play a unique role in predicting increased utilization of health care services. Similarly, women who engage in emotional numbing or more avoidance or traumatic reminders tend to have poorer perceptions of their overall health. Readers are cautioned, however, that these results are exploratory, and should be replicated before definite conclusions are formed. Finally, this study provided evidence that sexual assault experiences are specifically linked to reproductive and sexual health problems, once the influence of PTSS severity is controlled.

In conclusion, the results of this research study add to a growing body of evidence that supports a model in which PTSS/PTSD partially mediates the relationship between trauma exposure and physical health outcomes, both within a population of sexual assault survivors and among other populations of trauma victims. Furthermore, this research offers a foundation for future investigations to examine similar relationships, in psychology as well as other health-related disciplines.

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Appendix A

Letter of Informed Consent

You are being invited to participate in a study entitled *Women's Sexual Experiences and Physical Health* that is being conducted by **Erin Eadie**, under the supervision of **Dr. Marsha Runtz**. Ms. Eadie is a graduate student in the department of Psychology at the University of Victoria. It is necessary that she conduct this research as part of the requirements for her Master's degree in Clinical Psychology. If you have any further questions, you may contact Erin Eadie at 472-4177 or eeadie@uvic.ca, and Dr. Runtz at 721-7546 or runtz@uvic.ca.

The purpose of this research project is to examine relationships between experiences of interpersonal victimization, and physical and mental health. **If you agree to voluntarily participate in this research, your participation will include** responding to a series of questions related to past experiences, your thoughts, feelings, and behaviours, as well as aspects of your physical health. Your participation involves answering these questions on a self-report questionnaire. Some of these questions are personal and explicit in nature, and may inquire about experiences could have been upsetting or distressing to you.

Research of this type is important because there is currently a lack of research in this field, and because it will improve our knowledge of and ability to help individuals with certain difficult life experiences. **You are being asked to participate in this study because** you are a woman who is currently taking the Introductory Psychology course at the University of Victoria. Your views and experiences are extremely important for research of this sort.

Participation in this study may cause some inconveniences to you, including the time it will take to fill out this questionnaire (approximately 1 hour). **A potential risk to you by participating in this research** is that it is possible you may feel some emotional discomfort in relation to the issues that are raised in this study. **To deal with this risk,** a referral list for psychological services will be made available at the end of this letter, should these services be desired. If immediate services are required please call the Need Crisis Line or the Women's Sexual Assault Centre Crisis and Information Line, both of which are available 24 hours, or contact UVic Counselling services and inform them that you are in need of immediate services. Most participants in the past, however, have not found this type of study to be overly distressing.

The potential benefits of your participation in this research include 1) bonus points toward your grade in Psychology 100, and 2) you will be helping us better understand issues related to women's sexual experiences and health. **As a way to compensate you for any inconvenience related to your participation,** students who are in Psychology 100 will be given bonus points. It is important for you to know that it is unethical to provide undue compensation or inducements to research participants. If you agree to participate in this study, this form of compensation must not be coercive to you. If you would otherwise choose to not participate, had the compensation not been offered, then you should decline to participate at this time.

Your participation in this research must be completely voluntary. If you do withdraw from the study your data will not be used. You may withdraw from the study at any time, and you may refuse to answer any (or all) question(s) without having to explain your reasons for doing so and without consequences. You will still receive your Psychology 100 bonus points for this study whether you complete the questionnaire or if you return a blank or incomplete questionnaire. Whether or not you participate will have no effect on your grades or academic standing and your instructor will not have access to any of the information collected in this study. If, during the course of this study, you change your mind about having your responses used in this research,

please indicate this by writing "*Do not use*" on the reverse side of the cover page of your questionnaire and it will be shredded immediately following the study session. If you turn in a completed or partially completed questionnaire without, writing "do not use" on it, and later decide to withdraw, please be aware that because the questionnaires are anonymous, it will not be possible for us to identify and remove your questionnaire at a later date.

In terms of protecting your anonymity, all of the responses you provide in this study are completely confidential and anonymous; your name will not be linked to your responses in any way. Because you are completing this questionnaire in the presence of others, it is possible that other participants may be aware of your participation in this study. In light of this, we ask that all participants respect the privacy of others by not viewing other individuals' questionnaire responses. Your questionnaire will be identified by code number only, and this code cannot identify you. All of the information collected will be used for group analyses. Questionnaires will not be analyzed individually but will be pooled together with a large number of questionnaires from other participants. Please do not write your name or any other such identifying information on any of the research materials and please do not provide the names of any other individuals that may have been involved in any of the events you disclose in this questionnaire. **If we receive identifying information that leads us to believe that you or any individual who is under 19 years of age is at risk of harm, we are obliged to inform the proper authorities.** If, however, you would like to report a situation of a child at risk or an incidence of child maltreatment, please refer to the contact information for the Ministry of Children and Family Development at the bottom of this letter.

Once you have completed the questionnaire and have handed it into the researchers, we will ensure that your responses remain confidential and anonymous. **Your confidentiality and the confidentiality of the data will be protected** by being stored in a locked filing cabinet in a locked office. Only the researcher and her supervisor will have access to this information. The questionnaires used in this study will be shredded in approximately five years.

It is anticipated that the results of this study will be shared with others in the following ways: in the primary investigator's Master's thesis, in presentations at scholarly meetings, on Dr. Runtz's website, and potentially in a published article.

In addition to being able to contact the researchers you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Associate Vice-President, Research at the University of Victoria (250-472-4545).

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

_____	_____	_____
Name of Participant	*Signature*	*Date*

A copy of this consent will be left with you, and a copy will be taken by the researcher.

THANK YOU FOR YOUR INTEREST AND PARTICIPATION IN THIS STUDY

If any of the questions you answered here made you uncomfortable in any way, or if participating in this study has brought up any issues that are distressing for you, some resources that might be of assistance are provided below:

Campus: University of Victoria Counselling Services: 250-721-8341; www.coun.uvic.ca)
Campus: The Anti-Violence Project: 250-472-4388; www.uvss.uvic.ca/avp)
Community: Women's Sexual Assault Centre: 383-3232; www.vwsac.com)
Community: NEED Crisis and Information Line: 1-866-386-6323; www.needcrisis.bc.ca)
British Columbia Psychological Association (BCPA) Referral Service: 1-800-730-0522; www.psychologists.bc.ca/referral.html
Canadian Register of Health Service Providers in Psychology: http://www.crhspp.ca/findlist.htm
Victoria Ministry of Children and Family Development: 387-4499; www.gov.bc.ca/mcf (information on reporting child maltreatment)

Appendix B

P100 Research Participant Receipt
Student: The researcher will complete, sign, and date this receipt. Retain this receipt in case of record-keeping error s.

Project:
_____

Student's name:
_____

Researcher:
_____
(print name)

_____
(signature)

Credit earned: _____ Date: _____

P100 Anonymous Evaluation of Research Participation
Project code name: _____

Do not put your name on this form. Detach it from your receipt and turn in the completed form to the P100 mail box outside
Cornett A250. Check ONE option for each question.

1. Over all, how do you feel about having participated?
__Positive __So-so __Negative
2. How were you treated by the researcher?
__Respectfully __So-so __Rudely
3. Did you learn anything about psychology from the study?
__Quite a bit __A little __Nothing
4. How good was the explanation given after the study?
__Clear/ thorough __So-so __Inadequate/none

Appendix C

Debriefing Form

Thank you for your interest and participation in this study. Your responses are greatly appreciated, particularly because we realize that many of these questions were personal and perhaps not easy to answer. Please be assured that all of your responses will remain anonymous and confidential. We realize that not everyone who participated in this study will have had the experiences that we inquired about; however, everyone's responses are of equal value to us and form an important part of this study.

As mentioned in the Informed Consent Letter, the purpose of this research project is to investigate relationships between experiences of interpersonal victimization (particularly sexual assault and other unwanted sexual experiences), and physical and mental health. Specifically, we are interested in finding out if women who have experienced sexual assault differ from women who have not, in terms of their mental and physical health. There is evidence to suggest that experiencing sexual assault is associated with later physical health problems, and that mental disorders such as posttraumatic stress disorder (PTSD) may play an important role in the development of such health problems. In addition, sexual assault experiences have been linked to specific concerns in the area of sexual and reproductive health. While this research will not answer every question about the relationships between sexual assault and health, our intention is to address some of the issues that may be of greatest importance to women.

Results from studies such as this one will benefit psychologists and other health professionals who work with women who have experienced sexual assault by providing information to develop better treatment and intervention methods. In addition, this study will help us to more clearly understand how the experience of sexual assault impacts later physical and mental health.

We greatly appreciate your participation in this study, and hope that this has been an educational experience for you. If you have any questions or concerns about this study, please contact Erin Eadie (472-4177) or Dr. Marsha Runtz (721-7546). We will be happy to respond to any questions that you may have about this research.

For further information about sexual assault, or sexual and reproductive health, please talk to a health professional or consult the following resources:

Victoria Women's Sexual Assault Centre
www.vwsac.com

Project Respect:
www.yesmeansyes.com

BC Ministry of Community Services: Stopping the Violence
www.mcaws.gov.bc.ca/womens_services/stopping-violence/index.htm

Planned Parenthood Federation of Canada:
www.stdresource.com

Island Sexual Health Society:
www.bcclinic.ca

BC Centre for Disease Control – Sexually Transmitted Diseases
www.bccdc.org/category.php?item=4

Appendix D

Demographic Questions

Please tell us about yourself by answering the following demographic questions:

1. How old are you? (*age in years*) _____

2. What is your current marital status? (*check*)
   _____ Single, never married
   _____ Married
   _____ Living with partner (i.e., common-law)
   _____ Separated
   _____ Divorced
   _____ Widowed

3. What is your current citizenship? (*check*)
   _____ Canadian
   _____ Other (*specify*): _____

4. Which of the following best describes your racial affiliation/background? (*check*)
   _____ Aboriginal / First Nations
   _____ African-Canadian / African-American / Black
   _____ Asian
   _____ Caucasian / White
   _____ Other (*specify*): _____

5. What language is your "mother-tongue" (i.e., the first language that you spoke, that you still understand)?
   _____ English
   _____ French
   _____ Other (*specify*): _____

6. What is your sexual orientation?
   _____ Heterosexual
   _____ Homosexual
   _____ Bisexual
   _____ Other (*specify*): _____

7. What is the *highest* level of education you have obtained so far?
   _____ Some high school
   _____ Completed high school
   _____ Technical school or trade diploma
   _____ Some college or university courses (undergraduate level)
   _____ Completed university undergraduate degree (e.g., B.A.)
   _____ Some graduate level courses
   _____ Completed graduate degree (e.g., M.A. or Ph.D.)
   _____ Other professional degree (e.g., doctor, lawyer)

8. What is your current employment status?
   _____ Full-time student
   _____ Part-time student
   _____ Employed full time
   _____ Employed part time
   _____ Homemaker
   _____ Unemployed

_____ Disabled
_____ Retired
_____ Other (*specify*): _____

9. What is the *highest* level of education your father has obtained?
_____ Some high school
_____ Completed high school
_____ Technical school or trade diploma
_____ Some college or university courses (undergraduate level)
_____ Completed university undergraduate degree (e.g., B.A.)
_____ Some graduate level courses
_____ Completed graduate degree (e.g., M.A. or Ph.D.)
_____ Other professional degree (e.g., doctor, lawyer)

10. What is your father's current occupation?
_____

11. What is the *highest* level of education your mother has obtained?
_____ Some high school
_____ Completed high school
_____ Technical school or trade diploma
_____ Some college or university courses (undergraduate level)
_____ Completed university undergraduate degree (e.g., B.A.)
_____ Some graduate level courses
_____ Completed graduate degree (e.g., M.A. or Ph.D.)
_____ Other professional degree (e.g., doctor, lawyer)

12. What is your mother's current occupation?
_____

13. Estimate your own individual yearly gross income before taxes (from all sources, including student loans and bursaries):
_____ Less than $10,000
_____ $10,000-$19,999
_____ $20,000-$29,999
_____ $30,000-$39,999
_____ $40,000-$49,999
_____ $50,000-$59,000
_____ $60,000-$69,999
_____ $70,000-$79,999
_____ $80,000 or more

14. What was your family of origin's estimated yearly gross income, before taxes, when you were 18 (if you are not yet 18, state your family's current yearly gross income)?
_____ Less than $10,000
_____ $10,000-$19,999
_____ $20,000-$29,999
_____ $30,000-$39,999
_____ $40,000-$49,999
_____ $50,000-$59,000
_____ $60,000-$69,999
_____ $70,000-$79,999
_____ $80,000 or more

Appendix E

Center for Epidemiologic Studies – Depressed Mood Scale (CES-D)
(Radloff, 1977)

Using the scale below, indicate the number which best describes how often you felt or behaved this way **during the past week**.

1 = rarely or none of the time (less than 1 day)
2 = some or a little of the time (1-2 days)
3 = occasionally or a moderate amount of time (3-4 days)
4 = most or all of the time (5-7 days)

DURING THE PAST WEEK:

___ 1. I was bothered by things that usually don't bother me.

___ 2. I did not feel like eating; my appetite was poor.

___ 3. I felt that I could not shake off the blues even with help from my family or friends.

___ 4. I felt that I was just as good as other people.

___ 5. I had trouble keeping my mind on what I was doing.

___ 6. I felt depressed.

___ 7. I felt that everything I did was an effort.

___ 8. I felt hopeful about the future.

___ 9. I thought my life had been a failure.

___ 10. I felt fearful.

___ 11. My sleep was restless.

___ 12. I was happy.

___ 13. I talked less than usual.

___ 14. I felt lonely.

___ 15. People were unfriendly.

___ 16. I enjoyed life

___ 17. I had crying spells.

___ 18. I felt sad.

___ 19. I felt that people disliked me.

___ 20. I could not get "going."

Appendix F

Sexual Experiences Survey (SES)
(Koss & Oros, 1982)

This next section is inquiring about *unwanted sexual behaviors* that may have occurred to you **from the age of 14 to the present time**. That is, events that occurred for the first time when you were **14 years of age or older**

Circle **YES** or **NO** to the following statements as accurately as you can

FROM THE AGE OF 14 TO THE PRESENT TIME:

1. Have you ever given in to sex play (fondling, kissing, or petting, but not intercourse) when you didn't want to because you were overwhelmed by a man's continual arguments and pressure?

YES **NO**

2. Have you ever had sex play (fondling, kissing, or petting, but not intercourse) when you didn't want to because a man used his position of authority (boss, teacher, camp counsellor, supervisor) to make you?

YES **NO**

3. Have you ever had sex play (fondling, kissing, or petting, but not intercourse) when you didn't want to because a man threatened or used some degree of physical force (twisting your arm, holding you down, etc.) to make you?

YES **NO**

4. Have you ever had a man attempt sexual intercourse (get on top of you, attempt to insert his penis) when you didn't want to by threatening or using some degree of force (twisting your arm, holding you down, etc.), but intercourse *did not* occur?

YES **NO**

5. Have you ever had a man attempt sexual intercourse (get on top of you, attempt to insert his penis) when you didn't want to by giving you alcohol or drugs, but intercourse *did not* occur?

YES **NO**

6. Have you ever given in to sexual intercourse when you didn't want to because you were overwhelmed by a man's continual arguments and pressure?

YES **NO**

7. Have you ever had sexual intercourse when you didn't want to because a man used his position of authority (boss, teacher, camp counsellor, supervisor) to make you?

YES **NO**

8. Have you ever had sexual intercourse when you didn't want to because a man gave you alcohol or drugs?

YES **NO**

9. Have you had sexual intercourse when you didn't want to because a man threatened or used some degree of physical force (twisting your arm, holding you down, etc.) to make you?

YES **NO**

10. Have you had sex acts (anal or oral intercourse or penetration by objects other than the penis) when you didn't want to because a man threatened or used some degree of physical force (twisting your arm, holding you down, etc.) to make you?

YES **NO**

Appendix G

Childhood Sexual Experiences (CSE)
(Runtz, 2002a)

Quite often people have had sexual experiences while growing up that may have involved other children, adolescents, or even adults or family members. For the following questions, please consider any such sexual experiences that you may have had **prior to age 14** that occurred with someone who was either an adult (*18 years of age or older*), an older child or adolescent (*at least 5 years older than you*), or someone closer in age if that experience was nonconsensual (i.e., you *did not want* the sexual activity to occur).

Before you turned 14, did another person engage in any of the following types of sexual activities with you? Answer for each of the three columns below, using the following scale (circle the appropriate letter -- or zero if it never occurred):

0	A	B	C	D	E
never	once or twice	3 to 5 times	6 to 10 times	11 to 20 times	more than 20 times

Sexual activities before you were 14 years old	**I. Other person was an adult (18 years of age or older)**	**II. Other person was an older child or adolescent and was 5 or more years older than you**	**III. Other person was less than 5 years older than you and you did not want the sexual activity to occur or you did not consent to it**
a. kissed you or touched your body in a sexual way	0 --- A – B – C – D – E	0 --- A – B – C – D – E	0 --- A – B – C – D – E
b. touched the sexual or private parts of your body (e.g., breasts, genitals, buttocks)	0 --- A – B – C – D – E	0 --- A – B – C – D – E	0 --- A – B – C – D – E
c. got you to kiss or touch their body in a sexual way	0 --- A – B – C – D – E	0 --- A – B – C – D – E	0 --- A – B – C – D – E
d. got you to touch the sexual or private parts of their body (e.g., breasts, genitals, buttocks)	0 --- A – B – C – D – E	0 --- A – B – C – D – E	0 --- A – B – C – D – E
e. physically attempted to have sexual intercourse (vaginal or anal) with you (but did not succeed)	0 --- A – B – C – D – E	0 --- A – B – C – D – E	0 --- A – B – C – D – E
f. engaged in sexual intercourse with you (vaginal or anal)	0 --- A – B – C – D – E	0 --- A – B – C – D – E	0 --- A – B – C – D – E
g. performed oral sex on you (contact between their mouth and your genitals)	0 --- A – B – C – D – E	0 --- A – B – C – D – E	0 --- A – B – C – D – E
h. got you to perform oral sex on them (contact between your mouth and their genitals)	0 --- A – B – C – D – E	0 --- A – B – C – D – E	0 --- A – B – C – D – E
i. sexually penetrated your body (vagina or anus) with a finger or other object (not a penis)	0 --- A – B – C – D – E	0 --- A – B – C – D – E	0 --- A – B – C – D – E

Appendix H

Psychological Maltreatment Subscale
Childhood Maltreatment Interview Schedule Short Form
(Briere, 1992)

Children and adolescents can experience a wide range of events in their families and with others while growing up. Some of these may have been upsetting and some of them may have been less upsetting. There are no right or wrong answers for any of these items as everyone's childhood experiences are unique. Please be as honest as you can in your responses.

Think back to your childhood and early adolescence and indicate how often the following happened to you in the average year, **before you were 14 years old.** Answer for your parents, stepparents, foster-parents, or other adult in charge of you as a child:

	Frequency						
	never	**once a year**	**twice a year**	**3-5 times a year**	**6-10 times a year**	**11-20 times a year**	**20+ times a year**
1. Yell at you	0	1	2	3	4	5	6
2. Insult you	0	1	2	3	4	5	6
3. Criticize you	0	1	2	3	4	5	6
4. Try to make you feel guilty	0	1	2	3	4	5	6
5. Ridicule or humiliate you	0	1	2	3	4	5	6
6. Embarrass you in front of others	0	1	2	3	4	5	6
7. Make you feel like you were a bad person	0	1	2	3	4	5	6

Appendix I

Physical Abuse Questionnaire (PAQ)
(Demaré, 1995)

On the following scale, please indicate how often, **before you were 18 years old**, an adult or parental figure did the following:

	Frequency				
	Never	**Rarely**	**Sometimes**	**Often**	**Very Often**
1. Spank you hard enough to cause bruising, swelling, or bleeding	1	2	3	4	5
2. Twist, yank, or bend your leg, arm, or finger in a painful manner	1	2	3	4	5
3. Push, throw, or knock you down, or into an object, such as a wall or a piece of furniture	1	2	3	4	5
4. Hit or punch you with a closed fist	1	2	3	4	5
5. Burn or scald you on purpose	1	2	3	4	5
6. Harm you physically with a weapon or other dangerous object	1	2	3	4	5
7. Break your bone(s) or teeth when they were being rough or violent with you	1	2	3	4	5
8. Beat you up	1	2	3	4	5
9. Hit or slap you with an open hand (not including spanking)	1	2	3	4	5
10. Kick you with their foot, or strike you hard with a knee or elbow	1	2	3	4	5
11. Throw some household object at you (e.g., vase, ashtray, lamp) that caused you to be hurt physically	1	2	3	4	5
12. Pull your hair or ear in a painful manner	1	2	3	4	5
13. Choke you	1	2	3	4	5
14. Hit you with an object such as a belt, cord, kitchen utensil, board, or stick	1	2	3	4	5
15. Torture you physically	1	2	3	4	5
16. Try to kill you	1	2	3	4	5

Appendix J

Health Symptom Checklist (HSC)
(Runtz, 2002b)

Below is a list of physical complaints that women sometimes have. Please mark the symptoms which you have experienced *in the past six months*, indicating how often you experience each of them, by using the scale below. **Also indicate if you have seen a health professional (e.g., a physician) for these difficulties *in the past six months*.**

0 = never
1 = occasionally in the last six months
2 = occurs about once a month
3 = occurs about once a week
4 = occurs several times a week
5 = occurs daily

	Frequency						Sought Health Care	
1. Abdominal pain	0	1	2	3	4	5	Y	N
2. Allergies	0	1	2	3	4	5	Y	N
3. Genital pain	0	1	2	3	4	5	Y	N
4. Eczema	0	1	2	3	4	5	Y	N
5. Pain in inner thighs	0	1	2	3	4	5	Y	N
6. Gastric ulcer	0	1	2	3	4	5	Y	N
7. Painful urination	0	1	2	3	4	5	Y	N
8. Convulsions	0	1	2	3	4	5	Y	N
9. Chest pain/tightness	0	1	2	3	4	5	Y	N
10. Blurred vision	0	1	2	3	4	5	Y	N
11. Abdominal swelling	0	1	2	3	4	5	Y	N
12. Heart palpitations	0	1	2	3	4	5	Y	N
13. Temporary paralysis	0	1	2	3	4	5	Y	N
14. Vaginal discharge	0	1	2	3	4	5	Y	N
15. Numbing of body parts	0	1	2	3	4	5	Y	N
16. Asthma (i.e., wheezing/shortness of breath)	0	1	2	3	4	5	Y	N
17. Cold hands	0	1	2	3	4	5	Y	N
18. High blood pressure	0	1	2	3	4	5	Y	N
19. Painful bowel movements	0	1	2	3	4	5	Y	N
20. Fainting	0	1	2	3	4	5	Y	N
21. Diarrhoea	0	1	2	3	4	5	Y	N
22. Stomach flu	0	1	2	3	4	5	Y	N
23. Pelvic pain	0	1	2	3	4	5	Y	N
24. Muscle weakness	0	1	2	3	4	5	Y	N
25. Stomach aches	0	1	2	3	4	5	Y	N

0 = never
1 = experienced occasionally in the last six months
2 = occurs about once a month
3 = occurs about once a week
4 = occurs several times a week
5 = occurs daily

	Frequency						Sought Health Care	
26. Muscle stiffness	0	1	2	3	4	5	Y	N
27. Constipation	0	1	2	3	4	5	Y	N
28. Tunnel vision	0	1	2	3	4	5	Y	N
29. Vaginal pain	0	1	2	3	4	5	Y	N
30. Loss of voice	0	1	2	3	4	5	Y	N
31. Backaches	0	1	2	3	4	5	Y	N
32. Spastic colitis	0	1	2	3	4	5	Y	N
33. Skin rashes	0	1	2	3	4	5	Y	N
34. Vaginal dryness	0	1	2	3	4	5	Y	N
35. Headaches	0	1	2	3	4	5	Y	N
36. Abdominal cramps	0	1	2	3	4	5	Y	N
37. Pain in hips	0	1	2	3	4	5	Y	N
38. Fatigue	0	1	2	3	4	5	Y	N
39. Pain behind navel	0	1	2	3	4	5	Y	N
40. Bloating	0	1	2	3	4	5	Y	N
41. Temporary blindness	0	1	2	3	4	5	Y	N
42. Bleeding between menstrual periods	0	1	2	3	4	5	Y	N
43. Pain in the small of your back	0	1	2	3	4	5	Y	N
44. Face pain	0	1	2	3	4	5	Y	N
45. Eye pain associated with reading	0	1	2	3	4	5	Y	N
46. Difficulty swallowing	0	1	2	3	4	5	Y	N
47. Burning sensation in sexual organs or rectum	0	1	2	3	4	5	Y	N
48. Sore throat	0	1	2	3	4	5	Y	N
49. Weakness	0	1	2	3	4	5	Y	N
50. Double vision	0	1	2	3	4	5	Y	N
51. Pain in arms or legs	0	1	2	3	4	5	Y	N
52. Nausea	0	1	2	3	4	5	Y	N
53. Joint pain	0	1	2	3	4	5	Y	N
54. Get sick from different kinds of foods	0	1	2	3	4	5	Y	N
55. Other (briefly describe):	0	1	2	3	4	5	Y	N

Appendix K

Reproductive Health Questionnaire (RHQ)

Below is a list of symptoms and complaints that women sometimes report regarding their *reproductive health*. Please circle the letter that best describes how often you have experienced these symptoms *in the past six months*. **Also indicate if you have seen a health professional (e.g., a physician) for these symptoms *in the past six months*.**

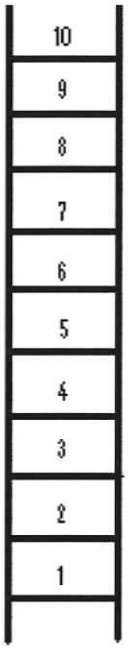
	Frequency				**Sought Health Care**	
	Never	**Rarely**	**Sometimes**	**Often**	**Yes**	**No**
1. Painful menstruation	N	R	S	O	Y	N
2. Irregular menstrual periods	N	R	S	O	Y	N
3. Spotting or bleeding between menstrual periods	N	R	S	O	Y	N
4. Abdominal cramps prior to or during menstruation	N	R	S	O	Y	N
5. Abdominal cramps *not* associated with menstrual cycle	N	R	S	O	Y	N
6. Excessive menstrual bleeding	N	R	S	O	Y	N
7. Menstrual bleeding accompanied by a fever	N	R	S	O	Y	N
8. Fatigue associated with menstrual cycle	N	R	S	O	Y	N
9. Nausea associated with menstrual cycle	N	R	S	O	Y	N
10. Headaches associated with menstrual cycle	N	R	S	O	Y	N
11. Pelvic pain	N	R	S	O	Y	N
12. Abdominal pain (not cramping)	N	R	S	O	Y	N
13. Abdominal pain accompanied by a fever	N	R	S	O	Y	N
14. Abdominal bloating	N	R	S	O	Y	N
15. Swelling or puffiness in arms or legs that is associated with menstrual cycle	N	R	S	O	Y	N
16. Pain or tenderness in breasts	N	R	S	O	Y	N
17. Swelling of the breasts	N	R	S	O	Y	N
18. Hot flashes	N	R	S	O	Y	N
19. Missed at least two periods without being pregnant	N	R	S	O	Y	N
20. Vaginal discharge	N	R	S	O	Y	N
21. Vaginal dryness	N	R	S	O	Y	N

	Frequency					Sought Health Care	
	Never	**Rarely**	**Sometimes**	**Often**		**Yes**	**No**
22. Genital pain	N	R	S	O		Y	N
23. Genital irritation	N	R	S	O		Y	N
24. Genital itching	N	R	S	O		Y	N
25. Pain during intercourse	N	R	S	O	N/A	Y	N
26. Bleeding associated with intercourse	N	R	S	O	N/A	Y	N
27. Painful urination	N	R	S	O		Y	N
28. Burning sensation during urination	N	R	S	O		Y	N
29. Frequent or urgent need to urinate	N	R	S	O		Y	N
30. Urinary incontinence (i.e. leaking)	N	R	S	O		Y	N
31. Yeast infection	N	R	S	O		Y	N
32. Urinary tract infection (UTI) or bladder infection	N	R	S	O		Y	N
33. Sexually transmitted infections (e.g., HPV, Herpes, Clamydia, etc.)	N	R	S	O		Y	N
34. Lack of interest in sex	N	R	S	O	N/A	Y	N
35. Lack of sexual pleasure	N	R	S	O	N/A	Y	N
36. Afraid of having sex	N	R	S	O	N/A	Y	N
37. Unable to become sexually aroused	N	R	S	O	N/A	Y	N
38. Unable to stay sexually aroused	N	R	S	O	N/A	Y	N
39. Unable to have an orgasm	N	R	S	O	N/A	Y	N
40. Feeling dissatisfied following sex	N	R	S	O	N/A	Y	N

41. Are you currently taking the birth control pill?	Yes	No
42. Do you currently have your period?	Yes	No
43. Are you currently pregnant?	Yes	No

Appendix L

The Cantril Self-Anchoring Ladder
(Cantril, 1965)



Here is a ladder. At the top of the ladder is the best possible health you can imagine. At the bottom of the ladder is the worst possible health you can imagine. Please choose a number on the ladder for each of the following, and write the numbers in the blank spaces provided.

1. Your current health ___
2. Your health in the past ___
3. Your health in the future ___
4. The best your health has ever been ___

Appendix M

Health Care Utilization Assessment
(adapted from Women's Health and Relationships Study, Runtz, 2003)

1. Do you have a regular doctor? **Yes ___ No ___**

2. Using the following scale, please indicate the number of visits you have made to the following health services in the *past six months*:

0 = none	**4 = 6-10 times**
1 = once	**5 = 11-20 times**
2 = twice	**6 = 20+ times**
3 = 3-5 times	

My regular doctor ____
Consultation with a specialist (M.D.) ____
Walk-in clinic ____
Hospital emergency ward ____
Chiropractor ____
Physiotherapist ____
Psychologist ____ Psychiatrist ____ Other Mental Health Practitioner ____
Naturopath ____
Other (specify) _____ # of times ____

Appendix N

Medical Conditions Checklist

Please check if you have ever had, or currently have, any of the following medical conditions:

__ Allergies
__ Arthritis
__ Asthma
__ Cancer (any type)
__ Chronic Pain
__ Diabetes
__ Congestive heart failure
__ Coronary artery disease
__ Epilepsy
__ Eye disease (e.g., glaucoma)
__ Gastrointestinal problems
__ High blood cholesterol
__ Hypertension
__ HIV/AIDS
__ Liver disease (e.g., hepatitis)
__ Lung disease (e.g., emphysema, obstructive pulmonary disease)
__ Migraine headaches
__ Osteoporosis
__ Skin disease (e.g., psoriasis, eczema)
__ Stroke
__ Thyroid disease
__ Tuberculosis
__ Ulcer