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Does the Gender Inequality Index Explain the Variation in State Prevalence Rates of Physical Teen Dating Violence Victimization?

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ABSTRACT

LINDSAY A. GRESSARD

Does the Gender Inequality Index Explain the Variation in State Prevalence Rates of Physical Teen Dating Violence Victimization?

Background: Constituting a major public health problem, data from the 2009 Youth Risk Behavior Survey (YRBS) suggest that nearly 1 out of every 10 high school students in the United States is a victim of physical teen dating violence (TDV). When the prevalence of TDV is examined at the state level, however, significant variation exists; the prevalence of physical TDV victimization ranges from as low as 7.4% in Oklahoma and Vermont to as high as 17.8% in Louisiana.

Purpose: Drawing from tenets of feminist theory and social production of disease theory, this study aims to determine whether gender inequality is a contextual risk factor for TDV victimization.

Methods: In this study, the state was used as the unit of analysis. Data measuring the state-representative prevalence of TDV victimization were obtained from the 2009 YRBS. To measure the level of gender inequality in each state, the Gender Inequality Index (GII) was calculated using the procedure described in the United Nations' Human Development Report. The GII consists of five indicators: 1) maternal mortality, 2) adolescent fertility, 3) parliamentary/government representation, 4) educational attainment, and 5) labor force participation. Pearson's correlation coefficients were obtained to determine the association between TDV victimization, the GII, and the GII indicators. Ordinary least squares regression was used to create a model for TDV victimization and gender inequality.

Results: Of the 40 states included in analyses, the GII was significantly associated with the state prevalence of both total TDV victimization ($r=.323$, $p=.042$) and female TDV victimization ($r=.353$, $p=.026$). Subsequent to removal of the outlying case of Oklahoma, the GII was also significantly associated with male TDV victimization ($r=.366$, $p=.022$). Several individual GII indicators were significantly associated with TDV victimization after removing the outlying case.

Conclusion: This is the first study to examine societal level gender inequality as a risk factor for state level TDV victimization using nationally representative data on school youth. As policy-makers implement TDV prevention policy at the state level, further research understanding potential macro-level risk factors is particularly important.

KEY WORDS: adolescent, dating violence, gender inequality, risk factor

DOES THE GENDER INEQUALITY INDEX EXPLAIN THE VARIATION IN
STATE PREVALENCE RATES OF PHYSICAL TEEN DATING VIOLENCE
VICTIMIZATION?

by

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B.S., UNIVERSITY OF GEORGIA

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APPROVAL PAGE

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2. Swahn, M. H. & **Gressard, L.** (in press). Risk and protective factors for suicide and suicidal behaviors in young adults. In M. H. Van Dulmen, R. Bossarte, & M. H. Swahn (Eds.) (Title not yet confirmed). Kent, OH: Kent State University Press.
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Chapter I: Introduction

Background

As evidenced by the recent release of the National Intimate Partner and Sexual Violence Survey by the Centers for Disease Control and Prevention (CDC), intimate partner violence against women remains a persistent and pervasive problem in the United States (Black et al., 2011). This nationally-representative survey demonstrated that one in four adult women has been a victim of severe physical intimate partner violence and that nearly one in five has been raped by an intimate partner. Although men continue to be victimized by intimate partner violence as well, the incidence is substantially lower and the immediate and long-term physical or emotional effects are reported considerably less often (Black et al., 2011). Given these findings, the visibility of recent legislative and public efforts to combat violence against women is unsurprising; Vice President Joe Biden's *I is 2 Many* campaign and the introduction of bipartisan legislation to reauthorize the Violence Against Women Act in 2011 are just two examples (Rosenthal, 2011; The White House, 2012)

Public health research aimed at the prevention of violence against women has also continued to expand. Highlighting the benefit in detecting and preventing unhealthy relationship behaviors earlier in life, researchers have become increasingly interested in understanding the prevalence of violence in adolescent relationships. As studies have emerged, researchers have been alarmed by the frequency with which violence in adolescent relationships occurs (Kerig, 2010; Lewis & Fremouw, 2001); a recent review of the literature suggests that approximately one third of high school students has been involved in a violent relationship (O'Leary & Slep, 2011). These adolescent relationship behaviors, consistently referred to as teen dating violence (TDV), include physical, sexual, and/or emotional/psychological violence, including stalking

(CDC, 2012). Although intimate partner violence is often preceded by TDV (Black et al., 2011), the behaviors characterizing each type of violence can differ. TDV behaviors, for instance, frequently resemble sexual harassment or bullying behavior (Shorey, Cornelius, & Bell, 2008; Wekerle & Wolfe, 1999). The use of technology (i.e., texting, social networking sites) and social embarrassment or shame is also emphasized in adolescent relationships (CDC, 2012; Smith, White, & Moracco, 2009).

In addition to recognizing TDV as a separate and distinguishable type of relationship violence, existing research has linked TDV to a host of negative health outcomes, including depression, substance use, and risky sexual behaviors (Brown et al., 2009; Glass et al., 2003; Silverman, Raj, Mucci, & Hathaway, 2001). Research examining the risk and protective factors specific to TDV is therefore clearly warranted. This information is especially essential as policy makers and research agencies have begun to invest resources in TDV prevention efforts and legislation (Break the Cycle, 2010; CDC, 2011). Nevertheless, significant gaps in the current TDV risk factor research exist. While substantial efforts have been made to identify individual and interpersonal level risk factors, the more distal levels of influence, including community and societal level factors, have been largely ignored (Chung, 2005; Jain, Buka, Subramanian, & Molnar, 2010; Lewis & Fremouw, 2001). Moreover, the studies that do exist typically employ the participants' self-report data to measure characteristics of the contextual environment, likely inducing same source bias (Rothman et al., 2011). Gaining an understanding of these macro-level risk factors for TDV nonetheless remains a necessary goal, especially as states implement prevention programming aimed at societal level change.

Considering the disproportionately high number of adult women who are victims of intimate partner violence, some studies have used feminist theory as rationale to examine societal

level gender inequality as a contextual risk factor for violence against women (Hudson, Bowen, & Nielsen, 2011; Straus, 1994; Yodanis, 2004). Replicating this research within the context of TDV, however, has not yet been attempted. A probable reason for this research gap is the phenomenon of “gender symmetry” in TDV; numerous studies have determined that male and female adolescents often experience TDV perpetration and victimization at nearly the same rates (Archer, 2000; Wekerle & Wolfe, 1999). As such, much of the literature presents TDV from a gender neutral framework, often neglecting to interpret results differently for males and females (Reed, Raj, Miller, & Silverman, 2010). This practice has not been without controversy however (Langhinrichsen-Rohling, 2010; Teten, Ball, Valle, Noonan, & Rosenbluth, 2009). Several researchers contend that the type and severity of TDV perpetrated by males incurs greater injury and more long-lasting emotional consequences for females (Glass et al., 2003; Molidor & Tolman, 1998; Sears & Byers, 2010; Sege, Stigol, Perry, Goldstein, & Spivak, 1996). Supported by the World Health Organization’s assertion that gender is a social construct that permeates all aspects of health (Wamala & Agren, 2002), several researchers now argue that TDV must be considered from a gendered perspective (Chung, 2005; Hickman, Jaycox, & Aronoff, 2004; Lewis & Fremouw, 2001; Reed et al., 2010). Reinforcing this claim is the finding that adolescents with dating norms and attitudes that support traditional gender roles are more likely to be involved in TDV (Foshee et al., 1998).

By gaining an understanding of the influence of societal level gender inequality on the prevalence of TDV in the U.S., several gaps in existing research could be addressed. First, this knowledge could provide insight into the construct of gender within the context of TDV and thus contribute to the debate surrounding gender symmetry. Second, this information could enhance existing TDV risk factor research which lacks an understanding of the community and societal

level contextual factors that play a role in maintaining the current prevalence of TDV. And finally, federal and state level policy makers and researchers could use a study examining societal gender inequality and TDV as a model to determine additional contextual risk factors for TDV, thus providing the means to enhance the comprehensiveness and efficacy of existing TDV prevention programming.

Purpose of the Study

The purpose of this study is to use a nationally representative data set to determine whether gender inequality is a societal level contextual risk factor for TDV among U.S. high school students. More specifically, this study will determine whether a Gender Inequality Index (GII) (United Nations Development Program [UNDP], 2010) and/or individual indicators of gender inequality contribute to the state level variation in physical TDV victimization prevalence rates and whether these relationships vary among males and females. In accomplishing this goal, this study will attempt to answer the following research questions:

1. How does the prevalence of physical TDV victimization vary state-by-state?
2. What is the Gender Inequality Index (GII) for each state?
3. Does the GII contribute to the variation in state level physical TDV victimization prevalence rates and does the relationship vary by gender?
4. Do the individual indicators of the GII correlate with state prevalence rates of physical TDV victimization and do these relationships vary by gender?

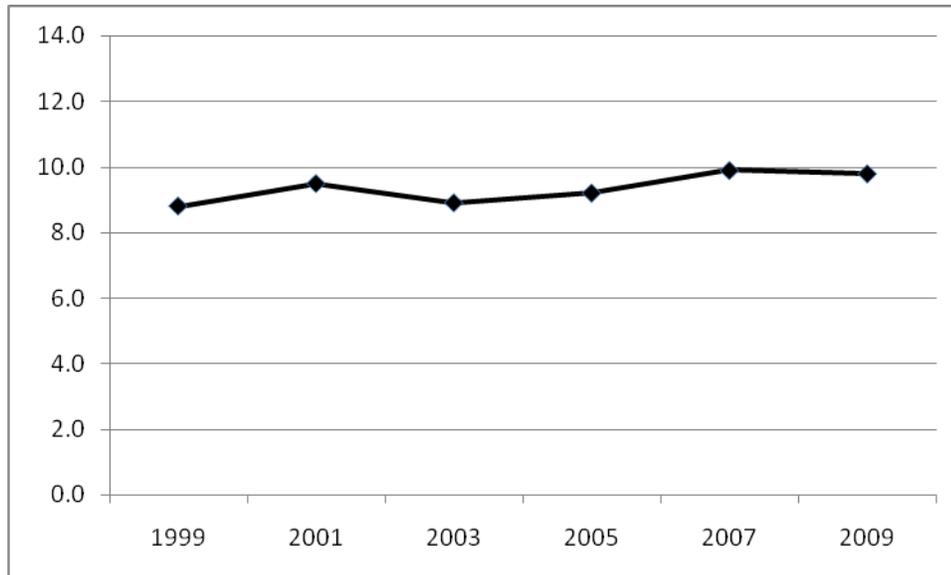
Chapter II: Review of the Literature

Over the past three decades, researchers and practitioners have begun to acknowledge the public health research significance of TDV, recognizing it as a more frequent occurrence than previously believed (Lewis & Fremouw, 2001). Nevertheless, studies examining adult intimate partner violence saturate existing research, while varying definitions of TDV and inconsistent study methodologies continue to hamper researchers' ability to reach conclusive findings concerning adolescents (Glass et al., 2003; Hickman et al., 2004; Shorey et al., 2008; Teten et al., 2009). These methodological issues, including parental consent, the heterogeneity and fluidity of adolescent relationships, and laws concerning the "mandate to report," complicate the validity and reliability of studies (Hickman et al., 2004). Despite these challenges, TDV research remains an essential component in relationship violence prevention, as programmatic efforts among youth show more promise than those directed towards adults. (Foshee et al., 1998; Wolfe et al., 2009). This study thus attempts to present the existing TDV research, however, differing study methodologies and varying definitions of both dating and TDV should be considered when interpreting the results.

Teen Dating Violence Epidemiology and Outcomes

Constituting a significant public health problem, the CDC estimates that nearly one out of every ten U.S. high school students has been a victim of physical TDV in the past year (CDC, 2012). In fact, findings from the Youth Violence Survey indicate that nearly as many teens are involved in TDV victimization and perpetration as those involved in peer violence (Swahn, Simon, et al., 2008). Despite prevention efforts, the national prevalence of physical TDV has remained relatively unchanged over the past decade, with no significant decrease or increase from 1999 to 2009 (see Figure 1-1) (CDC, 2009a).

Figure 1-1. Percent of U.S. high school students reporting physical TDV victimization, 1999-2009



Studies that incorporate measures of psychological and sexual violence in addition to physical violence suggest that the prevalence of TDV may be even higher (Foshee & Matthew, 2007). A sample of inner-city high school students found that approximately half of the participants reported psychological violence victimization or perpetration (Alleyne-Green, Coleman-Cowger, & Henry, 2011). Another study found that up to 90% of college aged women have ever been victims of psychological dating violence (Neufeld, McNamara, & Ertl, 1999). Reports of sexual victimization within a dating relationship have ranged from 2% to 19% (Hickman et al., 2004). Similar to findings regarding criminal behavior, a review of existing literature determined that the risk for involvement in TDV increases as adolescents age, with 17 to 18 year-olds most at risk for exposure to TDV (O'Leary & Slep, 2011).

Involvement in a violent relationship in adolescence is associated with myriad negative health outcomes that surpass the immediate physical harm or injury. An increased risk for mental

health issues, including anxiety, depression, suicidal thoughts, disordered eating, and posttraumatic stress, has been consistently recognized among adolescents exposed to TDV (Ackard & Neumark-Sztainer, 2002; Banyard & Cross, 2008; Brown et al., 2009; Glass et al., 2003; Silverman et al., 2001). Considering the deleterious effects on mental health, the significantly high rate of substance abuse among adolescents in violent relationships is not surprising (Brown et al., 2009; Silverman et al., 2001). Female youth exposed to TDV are also at an increased risk for risky sexual behaviors (Silverman et al., 2001; Wingood, DiClemente, McCree, Harrington, & Davies, 2001); using data from the Massachusetts Youth Risk Behavior Survey, a study by Silverman et al. (2001) determined that female TDV victims were four to six times more likely to have ever been pregnant than girls who were not exposed to TDV. Further complicating the negative health outcomes associated with TDV, youth experiencing TDV are hesitant to seek help resources (Watson, Cascardi, Avery-Leaf, & O'Leary, 2001). Moreover, TDV perpetration and victimization are linked to involvement in other types of violence, including peer violence and suicide attempts, thereby escalating the risk for physical or emotional harm among these youth (Swahn, Simon, et al., 2008).

Recognizing the relatively high prevalence of TDV and the severity of associated health outcomes, substantial research has been devoted to understanding the risk factors and underlying causes of TDV in recent years. Following the model proposed for understanding youth violence by the World Health Organization in the *World Report on Violence and Health* (Krug, Mercy, Dahlberg, & Zwi, 2002), the risk factors for violent behavior are best conceptualized within a social ecological model of health behavior (Bronfenbrenner, 1979; McElroy, Konde-Lule, Neema, & Gitta, 2007). This model purports that health risk behaviors, such as TDV, can be understood within the context of the different levels of social ecology, including the individual,

interpersonal, community, and societal levels. Furthermore, although TDV victimization and perpetration are often co-occurring (Swahn, Simon, et al., 2008), differentiation of the risk factors for each behavior is necessary and differences are noted when appropriate.

Risk Factors for Teen Dating Violence

Existing research examining the risk factors for TDV has focused primarily on the proximal levels of influence that increase one's likelihood for involvement in a violent relationship, namely the individual and interpersonal levels (Chung, 2005). A history of child abuse, previous exposures to family violence, depression, and aggressive behavior have been consistently cited as predisposing factors (Foshee & Matthew, 2007; Glass et al., 2003; Hickman et al., 2004; Lewis & Fremouw, 2001; Malik, Sorenson, & Aneshensel, 1997). Other risk behaviors, such as early alcohol use (Glass et al., 2003; Malik et al., 1997; Swahn, Bossarte, & Sullivent, 2008), access to weapons (Glass et al., 2003), school suspension/expulsion (Glass et al., 2003), and participating in other forms of youth violence (Swahn, Simon, et al., 2008) have also been found to be associated with TDV. This co-occurrence of risk behaviors is not surprising considering the clustering of risk behaviors that frequently occurs in adolescence (Jessor, 1991). At the interpersonal level, the peer influence on TDV is clear; having friends that have been involved in TDV is a significant risk factor for both TDV victimization and perpetration (Foshee, Linder, MacDougall, & Bangdiwala, 2001; Foshee & Matthew, 2007; Glass et al., 2003).

Having attitudes and personal norms that are accepting of TDV is an additional risk factor that is frequently highlighted in TDV research (Ali, Swahn, & Hamburger, 2011; Avery-Leaf, Cascardi, O'Leary, & Cano, 1997; Foshee et al., 2001; Foshee & Matthew, 2007; Henton, Cate, Koval, Lloyd, & Christopher, 1983; Malik et al., 1997; Reeves & Orpinas, 2011). In a

study by Henton et al. (1983) the use of physical dating violence was more commonly reported among males and females who held less negative attitudes towards relationship aggression. Additionally, a study by Malik et al. (1997) concluded that personal norms and gender were the strongest mediating factors in the association between previous exposure to violence and TDV victimization and perpetration among a diverse sample of Los Angeles high school students. More recent research examining the significance of the association between attitudes of TDV acceptance and TDV involvement is also available, especially regarding male TDV perpetration (Ali et al., 2011; Foshee et al., 2001; Reeves & Orpinas, 2011). Ali et al. (2011) found that attitudes supporting both boys hitting girls and girls hitting boys were significantly associated with TDV victimization and perpetration among a sample of high-risk urban youth. Furthermore, longitudinal research seeking to determine a temporal relationship has confirmed that attitudes supporting TDV typically precede acts of TDV among boys, rather than vice versa (Foshee et al., 2001).

Given the potential to be a modifiable factor, personal norms and attitudes are a particularly important area for TDV prevention and intervention. Some researchers are thus calling for a greater understanding of the contextual factors—those at the community and societal level—that perpetuate the norms and attitudes that support TDV (Foshee & Matthew, 2007; Jain et al., 2010; Rothman et al., 2011). However, only five studies in the TDV research were found that determined community (neighborhood) level contextual factors and none were found that examined societal level factors (Champion, Foley, Sigmon-Smith, Sutfin, & DuRant, 2008; Foshee et al., 2011; Jain et al., 2010; Malik et al., 1997; Rothman et al., 2011). Of the five studies investigating neighborhood level risk factors, three of the studies used individual self-reported observations from the adolescent study participants to measure neighborhood

characteristics (Champion et al., 2008; Foshee et al., 2011; Malik et al., 1997). Unfortunately, this methodology is likely subject to same-source bias and may function to detect associations that would not be found through more objective methods of measurement (Rothman et al., 2011). Demonstrating this phenomenon, the study by Rothman et al. (2011) used both adolescent self-report data and aggregated data from adults to measure the levels of collective efficacy, social control, and neighborhood organization in participating neighborhoods. While the results from the adolescent self-report data determined that all three neighborhood characteristics were associated with TDV perpetration, the aggregated data found no such associations. The study by Jain et al. (2010) responded to the need for more objective measures of contextual factors by using aggregated data from the Project on Human Development in Chicago Neighborhoods to measure collective efficacy in neighborhoods. By correlating these data with longitudinal data from 633 urban teens in the same neighborhoods, this study determined that collective efficacy was predictive of TDV victimization in males, but not females. Additional studies are clearly needed to clarify the disparate findings of these studies and to provide further understanding of both the community and societal level risk factors for TDV. This information could potentially provide substantial insight into the contextual factors that perpetuate norms and attitudes supportive of TDV.

Gender Inequality as a Societal Level Risk Factor for TDV

The need to specifically examine gender inequality as a societal level risk factor for TDV is supported by the following areas of research: 1) the endorsement of traditional gender roles as a risk factor for TDV, 2) theoretical rationale, and 3) the controversy regarding the phenomenon of gender symmetry in TDV. These topics are discussed in detail below.

Traditional gender roles and TDV. In intimate partner violence research, a particularly salient aspect of the norms and attitudes that support the acceptance of relationship violence is the endorsement of traditional gender roles and gender inequality (World Health Organization [WHO], 2011). Subscribing to these norms is associated with both male intimate partner violence perpetration and female victimization (WHO, 2011). In a meta-analysis examining the effect of masculine ideology on reports of sexual aggression, for example, Murnen, Wright, and Kaluzney (2002) determined that attitudes endorsing “hypermasculinity” were associated with sexual aggression. In recent years, similar findings regarding gender norms have been discovered in the TDV research (Foshee et al., 2008; Foshee, Benefield, Ennett, Bauman, & Suchindran, 2004; Reed et al., 2010). In a cross-sectional study of 275 urban teenage males, maintaining traditional gender norms was associated with a greater likelihood of TDV perpetration (Reed et al., 2010). A multi-wave study by Foshee et al. (2008) determined that the endorsement of traditional gender norms mediated the association between race/ethnicity and TDV among a sample 14 to 20 year-old males.

Extending the findings of these studies to examine the effect of macro-level influences, a recent multinational study by Pradubmook-Sherer and Sherer (2011) examined self-reported attitudes towards TDV among a sample of 9th to 12th grade students from three different cultural groups. The study sample included young people from Thailand and Israel, with the Israeli students consisting of both Arab and Jewish youth. The authors sought to determine whether differing levels of acceptance towards male-perpetrated TDV could be attributed to cultural differences in gender norms. The researchers’ hypothesis that students from the more traditional Thai and Arab cultures would report greater acceptance of male-perpetrated TDV was confirmed. Although less likely than males overall, females in the more traditional cultures were also more

likely to endorse these attitudes (Pradubmook-Sherer & Sherer, 2011). While the influence of cultural gender norms on the individual attitudes of the adolescents in this study can only be inferred, these findings suggest that the social construct of gender within a society may play a role in adolescents' beliefs about the acceptability of TDV. Acknowledging the relationship between gender norms and gender inequality (Glick et al., 2004), these studies highlight the need to examine societal gender inequality as a risk factor for TDV.

Adding to the need to understand the social construct of gender as a risk factor for TDV, longitudinal research has shown that societal norms are particularly influential in the beliefs and attitude of males (Foshee et al., 2001; Jain et al., 2010; Leventhal & Brooks-Gunn, 2000). In the previously described study by Jain et al. (2010), the authors found that males were more likely to be influenced by the neighborhood context than females. Extending this research to dating beliefs and attitudes, Reeves et al. (2011) supported previous findings (Foshee et al., 2001) that male adolescents are more accepting than females of attitudes and norms supportive of both boys hitting girls and girls hitting boys. Together, these studies suggest that contextual factors and societal norms may play an especially important role in the formation of the beliefs and attitudes of male adolescents concerning dating relationships. Societal gender inequality may therefore hold particularly negative implications for female TDV victimization.

Theoretical rationale. The rationale for analyzing gender inequality as a contextual risk factor for TDV draws from two theoretical frameworks: Feminist theory and social production of disease theory. Feminist theory suggests that individual norms supporting traditional gender roles and male perceptions of dominance are largely influenced by gender-based inequities in societal power and economic resources (Dobash, 1992; Dobash & Dobash, 1979). Gender-based inequities exist within three dimensions: political (access to power and government

representation), economic (ability to participate in the production of services and goods), and social (access to education and reproductive rights) (Bradley & Khor, 1993). These inequities establish and maintain an environment of gender conflict and power struggles. As a result, males in societies marked by gender inequality may use violence against women as a means to evoke fear and assert control, thus maintaining their status of superiority (Dobash, 1992; Dobash & Dobash, 1979). Although feminist theory has been primarily used to explain individual relationship dynamics (Shorey et al., 2008; Yodanis, 2004), Yodanis (2004) purports that evaluation of the social constructs inherent in feminist theory necessitates a more macro-level, ecological approach.

This study also borrows from social production of disease theory, which has recently been supported in the social epidemiology literature (Krieger, 2001; Krieger & Zierler, 1996). Social production of disease theory suggests that broad social constructs, such as racism and sexism, contribute to the persistence of health disparities (Link & Phelan, 1995). Accordingly, gender-based inequalities at the societal level have a downstream effect on women's health by withholding important resources, such as equitable finances, help services, and access to health care. Access to help services and resources has been cited as a particularly important aspect of TDV prevention and intervention (Watson et al., 2001). Social production of disease theory has previously been used to explain health disparities among persons of differing socioeconomic status both within and between countries (Krieger, 2001).

Controversy about gender symmetry. Complicating the research examining gender inequality as a risk factor for TDV, the majority of existing research has found that females typically perpetrate TDV as much as, and often times more than, males (Archer, 2000; CDC, 2012; Foshee & Matthew, 2007; Hickman et al., 2004; Lewis & Fremouw, 2001; Teten et al.,

2009). Similarly, male victimization rates are often higher than female victimization rates (O’Leary & Slep, 2011; Shorey et al., 2008). This notion of “gender symmetry” has prompted the relatively widespread uptake of a gender neutral framework for understanding TDV perpetration and victimization (Anderson, 2005; Reed et al., 2010). Illustrating this trend, Reed et al. (2010) performed a PubMed search to access studies published on TDV in 2008 and found that 95% of the studies presented TDV from a gender neutral framework. On the other hand, only 20% of the studies on adult intimate partner violence from that same year were conducted in this manner.

Ignoring the concept of gender in the discussion of TDV, however, has not been without controversy (Foshee & Matthew, 2007; Langhinrichsen-Rohling, 2010; Straus, 2009). A significant body of research has emerged that suggests gender symmetry presents a misleading picture and that consideration of the severity of violence perpetrated by males versus females is imperative (Hickman et al., 2004; Molidor & Tolman, 1998; O’Leary, Smith Slep, Avery-Leaf, & Cascardi, 2008; Reed et al., 2010). Numerous studies have found that boys use more severe forms of TDV than girls (Archer, 2000; Foshee et al., 2011, 2001; Hickman et al., 2004; Molidor & Tolman, 1998) and that girls are more often seriously injured by male-perpetrated acts of violence (Glass et al., 2003; Molidor & Tolman, 1998; Sears & Byers, 2010; Sege et al., 1996). In fact, Sege et al. (1996) estimated that nearly 10% of intentional injuries sustained by female teens are caused by a male dating partner. The disproportionate number of females reporting sexual violence victimization in a dating relationship is an additional concern (Black et al., 2011; Molidor & Tolman, 1998). Noting the interaction between gender and sexual situations, Molidor & Tolman (1998) discovered that 37% of females in a sample of 635 high school students reported being physically victimized subsequent to their partners’ sexual advances, while only

one male reported the same. Female adolescents have also reported being more fearful of TDV than males (Molidor & Tolman, 1998).

Adding to the gender symmetry controversy, some researchers suggest that the difference in social acceptability between males acting violently toward females and females acting violently towards males may cause higher rates of underreporting among males (Pedersen & Thomas, 1992). Moreover, an additional study found that female reports of TDV victimization are particularly influenced by social desirability bias and may thus be underreported (Bell & Naugle, 2007). Recognizing these considerable gaps in the understanding of the construct of gender within the context of TDV, researchers have increasingly emphasized the need to approach TDV from a gendered perspective (Anderson, 2005; Chung, 2005; Hickman et al., 2004; Lewis & Fremouw, 2001; Reed et al., 2010). By examining the impact of gender inequality on TDV, this study will attempt to address this issue.

Existing Research in Intimate Partner Violence

As previously mentioned, existing studies that examine societal level variables, including gender inequality, as risk factors for TDV are lacking. Studies from the intimate partner violence research on adults can thus provide a model and research foundation for determining the influence of gender inequality on relationship violence. The results of these studies, however, should not be applied directly to TDV research, as the behaviors characterizing TDV often differ from those seen in intimate partner violence among adults (Shorey et al., 2008; Wekerle & Wolfe, 1999).

Although to a lesser extent than TDV research, studies measuring the influence of gender inequality on intimate partner violence behaviors are scant; self-reported gender norms of individuals are typically used as a measure of gender inequality in analyses, rather than more

objective aggregate measures (Chung, 2005; Yodanis, 2004). At the time of this study, three ecological studies that used aggregated societal level data as a measure of gender inequality were found (Straus, 1994; Yllo, Kersti, & Straus, 1990; Yodanis, 2004). The first study by Yllo et al. (1990) formulated a gender inequality index for each U.S. state based on measurable political and economic indicators. Using the state as the unit of analysis, the authors then correlated this index with each state's rate of female intimate partner violence victimization, as measured by the National Family Violence Survey (NFVS). Although the methodology proved to be innovative, the data from the NFVS was nearly fifteen years-old and was inadequate to provide reliable state-representative rates of IPV victimization, with some states only reporting 20 to 30 cases of intimate partner violence. Nevertheless, the authors found that states with greater gender inequality reported higher rates of female intimate partner violence victimization. Noting this study's limitations, Straus (1994) extended its findings by using data from the Second NFVS, which had a sample size nearly three times that of the first version (n=6,002). The gender inequality index in this study was comprised of seven indicators of economic status, four indicators of political status, and thirteen indicators of legal status. The author also controlled for state measures of poverty, unemployment, racial/ethnic distribution, the number of young people in the state, and the number of young single males in the state. Following multivariate analyses, the author determined that gender inequality, social disorganization, the number of young single males in the state, and the number of young people in the state were all significantly associated with the state prevalence of wife assault. Of these measures, gender inequality was determined to be most strongly associated with wife assault. Although this study provided additional support for macro-level gender inequality as a risk factor for male perpetrated relationship violence, the small number of cases of wife assault in some states again resulted in high margins

of error and low reliability of the calculated rates. Additionally, four states reported wife assault rates of 0 and were thus eliminated from analysis, potentially skewing the results.

More recently, Yodanis (2004) used a methodology similar to that of the Straus (1994) and Yllo et al. (1990) studies to determine the relationship between an adapted version of Yllo's (1983) Status of Women Index and the levels of violence against women, as well as the levels of fear among women versus men, in 27 European and North American countries. Data for the Index were obtained from United Nations statistical databases and were used to measure the educational, occupational, and political status of women in each country. Measures of the levels of violence and fear in women were obtained from the International Crime Victims Survey. However, the relationship of the victim to the perpetrator was not identified, so distinctions between intimate partner violence and stranger violence could not be made. This study measured two additional variables which were treated as confounding factors in data analyses, gross domestic product and the percentage of the population that consisted of males between the ages of 20 and 34. The results of this study demonstrated that the incidence of sexual violence against women was negatively associated with the status of women in a country. More specifically, the educational status and occupational status indicators were most strongly linked to a higher incidence of sexual violence in these countries. Additionally, the fear of violence was higher among women than men in all countries. The authors concluded that further studies measuring societal-level social constructs are needed to determine the most fundamental causes of disease and injury.

Gaps in Existing Research

The findings of the Yllo et al. (1990), Straus (1994), and Yodanis (2004) studies, in conjunction with feminist theory and social production of disease theory, indicate that gender

inequality or a lower status of women relative to men may be responsible for higher rates of violence against women in some cultures, both within the U.S. and internationally. This research has been supported by the WHO, which has stressed that the pervasiveness of gender in all aspects of health is a function of both biological differences and the social construct of gender in our societies (Wamala & Agren, 2002). Research examining the influence of societal gender inequality on the prevalence of TDV, especially TDV perpetrated against females, clearly warrants attention. A macro-level perspective would supplement existing studies that have attributed individual variations in TDV rates to gender norms by extending these findings to understanding differences in population rates of TDV. Moreover, a study that determines the association between gender inequality and TDV could potentially contribute substantially to emerging research that has attempted to understand the nearly equal rates of TDV perpetration committed by males and females. And finally, the lack of existing literature regarding societal level risk factors for TDV strengthens the need for such research, as prevention efforts are currently lacking this essential component.

The methodology presented by Yllo et al. (1990) and Straus (1994) provides a sufficient model on which to conduct a similar study on TDV. By using the U.S. states as units of analysis, data from national datasets measuring adolescent risk behaviors, such as the Youth Risk Behavior Survey (YRBS), can be correlated with other reliable and representative state data, such as data from the U.S. Census Bureau. Furthermore, recent release of the procedure used to calculate the United Nations Development Program's Gender Inequality Index in the 2010 Human Development Report provides an internationally accepted and validated measure of gender inequality (UNDP, 2010). Correlating TDV prevalence estimates at the state level with a calculated value of the Gender Inequality Index for each state could thus provide potentially

useful information regarding the association between gender inequality and TDV among U.S. adolescents.

Using the 2009 YRBS and U.S. Census Bureau data, this study will build upon the methodologies used in the Yllo et al. (1990), Straus (1994), and Yodanis (2004) studies in several ways. First, data from YRBS is self-reported anonymously in computer-administered or pencil-and-paper surveys, as opposed to telephone surveys, such as those used in the Yllo et al. (1990) and Straus (1994) surveys. By increasing anonymity, the YRBS provides improved self disclosure, which is especially important when measuring a behavior as socially undesirable as relationship violence (Shorey et al., 2008). Second, the YRBS includes victimization rates for both males and females, while Yllo et al. (1990), Straus (1994), and Yodanis (2004) measured only female victimization. Acknowledging the similar rates of male and female TDV perpetration and victimization, information elucidating the risk and protective factors for both sexes is clearly necessary. Third, the 2009 YRBS includes a significantly larger sample size ($n=16,410$) than the aforementioned studies, thereby increasing the reliability of the prevalence rates of TDV found for each participating state. And finally, with increased data availability and information dissemination technology, this study can make use of more recent violence data and can correlate those data with measures from the same, or nearly the same, time frame.

Chapter III: Methods and Procedures

This macro-level study utilized individual U.S. states as the societal unit of analysis. This methodology has been used in previous studies (Straus, 1994; Yllo et al., 1990) and has been substantiated by the recognition of each state's unique political, economic, social, and cultural profile. Regional differences in TDV and gender inequality are also used in descriptive analyses to provide greater ease in interpretation. For the purposes of this study, data were obtained from a variety of national data sets. Each data source and the variable represented by the respective source are described in detail below.

Dependent Variable: Teen Dating Violence

To measure the state prevalence of TDV, this study used data from the CDC's 2009 Youth Risk Behavior Survey (YRBS) (CDC, 2009a). The target population of the 2009 YRBS was all 9th through 12th grade students attending a public, Catholic, or other private school in the 50 states and District of Columbia. From these schools, a random sample of 196 schools was selected. Of the selected schools, 158 schools participated and 88% of the students in the participating schools submitted questionnaires, reaching an overall participation rate of 71% (N=16,410) (CDC, 2009b). The survey measured the prevalence of six types of behaviors that contribute to the leading causes of morbidity and mortality among young people, including violence and unintentional injury. Studies using YRBS data are considered pre-approved for Exempt status by the Georgia State University Institutional Review Board.

For this study, only the 2009 YRBS state-level prevalence data were used in analysis. The YRBS uses a three-stage cluster sample design to ensure representation (CDC, 2009b). Data from states with an overall response rate $\geq 60\%$ are then weighted to adjust for the distribution of students by grade, sex, and race/ethnicity in that state. State-level prevalence data are thus

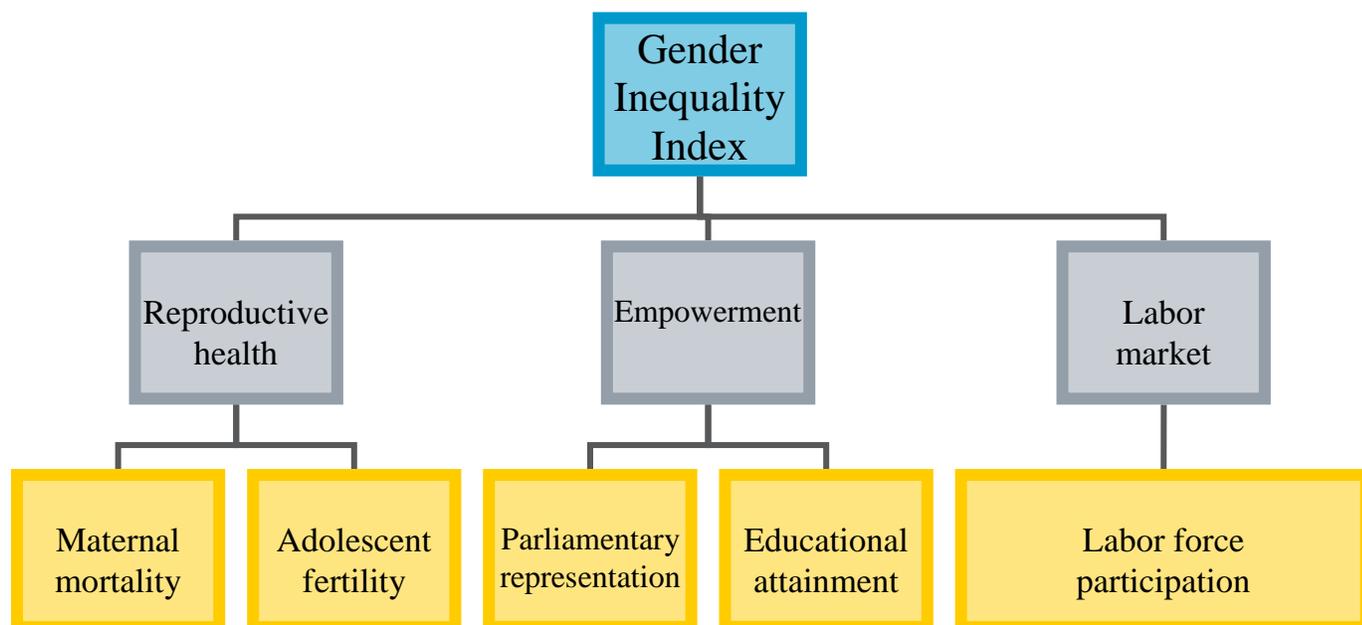
considered representative of the entire state (Brener et al., 2004). By restricting analysis to states with weighted data for the variable of interest in this study, the final sample size was 40.

Physical TDV victimization was measured by a single survey item in the 2009 YRBS. The item asked participants, “In the past 12 months, did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?” Students responded “Yes” or “No,” resulting in a dichotomized measure of physical TDV victimization.

Independent Variables: Gender Inequality Index and Indicators

In this study, gender inequality in each state was measured by the state’s calculated score of the Gender Inequality Index (GII), as introduced in the 2010 Human Development Report of the UNDP (UNDP, 2010). The GII measures gender-based disadvantage based on the analysis of five indicators: 1) maternal mortality ratio, 2) adolescent birth rate, 3) male versus female parliamentary/government representation, 4) male versus female educational attainment (secondary level and above), and 5) male versus female labor force participation rate. These five indicators are categorized into three dimensions of gender-based inequality: reproductive health, empowerment, and labor market participation. The three dimensions are congruent with the previously mentioned theoretical framework for gender-based inequities proposed by Bradley and Khor (1993). Figure 3-1 illustrates the components of the GII, with the five indicators represented by the yellow boxes and the three dimensions represented by the grey boxes (UNDP, 2011). The relative weight of the indicator or dimension in the calculation of the GII is represented by the size of the box.

Figure 3-1. Components of the GII (adapted from UNDP, 2011).



The final calculated value of the GII ranges from 0 to 1.0, with 0 indicating complete gender equality in the state of interest and 1.0 indicating the highest level of gender inequality possible (UNDP, 2010). The GII is computed using the following method (described in detail in UNDP, 2011):

- 1) Treating zeros and extreme values for the maternal mortality ratio and adolescent fertility rate.

- 2) Aggregating across dimensions within each gender group, using geometric means.

For females, the aggregation formula is:
$$G_F = \sqrt[3]{\left(\frac{10}{MMR} \cdot \frac{1}{AFR}\right)^{\frac{1}{2}} \cdot (PR_F \cdot SE_F)^{\frac{1}{2}} \cdot LFPR_F}$$

For males, the aggregation formula is:
$$G_M = \sqrt[3]{1 \cdot (PR_M \cdot SE_M)^{\frac{1}{2}} \cdot LFPR_M}$$

- 3) Aggregating across gender groups, using a harmonic mean:

$$HARM(G_F, G_M) = \left[\frac{(G_F)^{-1} + (G_M)^{-1}}{2} \right]^{-1}$$

- 4) Calculating the geometric mean of the arithmetic means for each indicator:

$$G_{\overline{E}, \overline{M}} = \sqrt[3]{\overline{Health} \cdot \overline{Empowerment} \cdot \overline{LFPR}}$$

$$\text{where } \overline{Health} = \left(\sqrt{\frac{10}{MMR} \cdot \frac{1}{AFR} + 1} \right) / 2,$$

$$\overline{Empowerment} = \left(\sqrt{PR_F \cdot SE_F} + \sqrt{PR_M \cdot SE_M} \right) / 2, \text{ and}$$

$$\overline{LFPR} = \frac{LFPR_F + LFPR_M}{2}.$$

- 5) Calculating the GII:

$$1 - \frac{HARM(G_F, G_M)}{G_{\overline{E}, \overline{M}}}.$$

Currently, the Human Development Report only reports calculations of the GII at the national level for those countries with sufficiently accurate data (UNDP, 2011). For this study, it was therefore necessary to obtain equivalent state-level data measuring each of the five indicators used in the GII. The sources of this data are described below. After the appropriate indicator data were obtained for each state, a GII was calculated in Excel software using the calculation method described above.

Maternal mortality ratio. As defined by the WHO, the maternal mortality ratio is the number of maternal deaths per 100,000 live births. Under the International Classification of Diseases, the definition of a maternal death is the “death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by pregnancy or its management but not from incidental or accidental causes” (WHO, 2012).

In the U.S., a new standard death certificate was introduced in 2003 which included a checkbox inquiring about the pregnancy status of the decedent (Callaghan, 2012). This change in reporting resulted in an increase of maternal death reports for those states that adopted the new format. As of 2007, only 34 states and the District of Columbia had adopted the revised certificate (Callaghan, 2012). As such, vital statistics reports at the state level differ regarding their validity. Furthermore, the CDC does not recommend calculating the maternal mortality ratio for those states reporting less than 20 maternal deaths (D. Hoyert, personal communication, February 9, 2012).

In light of these limitations, state level maternal mortality data were obtained from a U.S. Department of Health and Human Services report (Singh, 2010), which estimated a range of the maternal mortality ratio for each state based on available data from the National Vital Statistics System (NVSS) for the years 2003-2007. Because a point estimate of the state level maternal mortality ratio was necessary for the data analysis in this study, a mean value of the lower and upper limits of the range assigned to each state was used. For example, the maternal mortality ratio range for Georgia is 12.40-18.53, resulting in a point estimate of 15.47 to be used in the data analysis.

Adolescent fertility rate. As defined by the United Nations, the adolescent fertility rate, also referred to as the adolescent birth rate, is the number of births to women aged 15 to 19 years-old per 1,000 women in that age group (United Nations Department of Economic and Social Affairs, 2011). Equivalent U.S. state level data were obtained from the NVSS for the year 2009 (Martin et al., 2011). These data are based on U.S. standard birth certificates.

Parliamentary/government representation. Country level male and female government representation data for the UNDP's calculation of the GII were obtained from the Inter-

Parliamentary Union and were reported as a percentage for each gender (UNDP, 2011). Because this data source does not include measures of U.S. state-level government representation, an alternative measure was necessary. For this study, each state's male and female government representation was measured as the percentage of total U.S. legislators that was male or female in 2009. This measure of government representation is reported as a percentage and, as such, the formulas used to calculate the GII did not necessitate modification.

Educational attainment at secondary level and above. Country level educational attainment data for the UNDP's calculation of the GII were obtained from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics and were reported as a percentage for each gender (UNDP, 2011). Because U.S. state level data were not available in this data set, data were obtained from the 2007-2009 three-year estimate of the American Community Survey (ACS) (U.S. Census Bureau, 2011a). The ACS is a nationwide survey used to assess demographic, social, economic, and housing data estimates for each year (U.S. Census Bureau, 2009). The survey is administered annually to a sample of three million addresses which are obtained from the Census Bureau's Master Address File. The final sample size is approximately two million. The three-year estimate for 2007-2009 was used in this study due to increased statistical reliability, as compared to the single year estimates, and increased currency of the data, as compared to the five-year estimates (U.S. Census Bureau, 2009).

To estimate the U.S. state level educational attainment for each gender, this study used the percentage of males and females aged 25 years and over that reported attainment of a high school diploma or greater (U.S. Census Bureau, 2011a). As both these data and the UNESCO data were reported as percentages, the formulas used to calculate the GII did not necessitate modification.

Labor force participation rate. Country level labor force participation rate data for the UNDP's calculation of the GII were obtained from the International Labor Organization (ILO) and were reported as a percentage for each gender (UNDP, 2011). Because U.S. state level data were not available in this data set, data for this study were obtained from the U.S. Census Bureau and U.S. Bureau of Labor Statistics 2009 Current Population Survey (CPS) (U.S. Census Bureau, 2011b). The CPS is a nationwide survey that collects data on a variety of economic, employment, and demographic characteristics. The survey is administered monthly to a probability selected sample of approximately 60,000 occupied households and does not include persons aged 15 or younger, persons in the Armed Forces, or institutionalized civilians (U.S. Census Bureau, n.d.).

To estimate the U.S. state level labor force participation rate for each gender, this study used the percentage of males and females aged 16 and over in the non-institutionalized population that is participating in the civilian labor force. The civilian labor force includes both those persons who are "employed" and those who are "unemployed" (for a more detailed description, see U.S. Census Bureau, 2011b). As both these data and the ILO data were reported as percentages, the formulas used to calculate the GII did not necessitate modification.

Data Analysis

All state-level gender inequality indicator data were downloaded into an Excel file where they could be modified using various formula functions. Data were then imported into SPSS version 18 for further analysis.

To determine the state level variation in TDV, descriptive analyses were used to examine the distribution of state prevalence rates of total, male, and female physical TDV victimization. The results of these analyses were then mapped to illustrate any regional trends. Descriptive analyses and mapping were also used to examine variability in state scores of the GII.

To examine associations between the GII and the state prevalence of total, male, and female TDV, Pearson's correlation coefficients were obtained subsequent to confirming the normal distribution of all variables. Significance of these associations was determined using *t*-tests. Ordinary least squares regression was then used to determine the linear relationship between the GII and the prevalence of physical TDV victimization. Next, to determine the association between the individual gender inequality indicators and total, male, and female physical TDV victimization, Pearson's correlation coefficients were again obtained. Regarding the educational attainment indicator, the male to female ratio of educational attainment was used rather than female educational attainment alone in order to control for the overall level of educational attainment in each state. Similarly, the male to female ratio of the labor force participation rate was used instead of the female labor force participation rate alone.

Chapter IV: Results

The state prevalence rates of TDV victimization for all students, male students, and female students are presented in Table 4-1. In the U.S., 9.8% of high school students reported physical TDV victimization. Among states with a reported prevalence, the mean value was 12.0% (SD=2.9). States reporting TDV victimization prevalence rates below 8.6 were in the lowest 10% of states and states reporting prevalence rates above 16.6 were in the highest 10%. In Colorado, Florida, Maine, and Utah, males were more likely than females to report TDV victimization. Females were not more likely to report TDV victimization than males in any state.

Table 4-1. Percentage of high school students reporting physical TDV victimization (2009).

State	Total (%)	Female (%)	Male (%)	State	Total (%)	Female (%)	Male (%)
United States	9.8	9.3	10.3	Montana	9.6	8.0	10.9
Alabama	16.8	15.3	18	Nebraska	nd	nd	nd
Alaska	13.3	12.1	14.2	Nevada	11.4	10.8	12
Arizona	11.8	11.0	12.3	New Hampshire	9.6	8.0	11.1
Arkansas	16.7	16.5	17	New Jersey	nd	nd	nd
California	nd	nd	nd	New Mexico	9.8	9.5	10.0
Colorado	9.1	6.9	11.2*	New York	10.6	9.6	11.3
Connecticut	9.9	9.1	10.7	North Carolina	12.6	12.2	13.0
Delaware	9.1	8.4	9.4	North Dakota	8.5	8.3	8.6
Florida	11.0	10.0	11.9*	Ohio	nd	nd	nd
Georgia	16.0	15.6	16.3	Oklahoma	7.4	6.2	8.6
Hawaii	13.0	11.6	14.1	Oregon	nd	nd	nd
Idaho	10.6	10.6	10.5	Pennsylvania	9.6	10.8	8.2
Illinois	13.8	13.6	13.7	Rhode Island	10.8	10.8	10.8
Indiana	12.1	13.7	10.5	South Carolina	16.1	16.6	15.5
Iowa	nd	nd	nd	South Dakota	11.3	10.4	12.2
Kansas	9.1	8.7	9.5	Tennessee	9.9	10.0	9.8
Kentucky	15.5	15.6	15.3	Texas	9.5	10.3	8.8
Louisiana	17.8	17.5	18.1	Utah	10.9	8.9	12.5*
Maine	15.4	13.9	16.6*	Vermont	7.4	6.7	8.0
Maryland	16.9	18.6	15.2	Virginia	nd	nd	nd
Massachusetts	nd	nd	nd	Washington	nd	nd	nd
Michigan	15.2	15.1	15.4	West Virginia	13.8	12	15.5

Minnesota	nd	nd	nd	Wisconsin	8.4	8.0	8.8
Mississippi	14.2	15.0	13.2	Wyoming	15.0	13.7	16.0
Missouri	10.7	10.2	11.3				

nd = No data

*Males more likely to report victimization than females ($p < .05$)

Table 4-2 shows the ranking of the states according to reported level of physical TDV victimization for all students. High school students in Louisiana reported the highest prevalence of TDV victimization (17.8%) and students in Oklahoma and Vermont reported the lowest prevalence (7.4% for both).

Table 4-2. Ranking of U.S. states by prevalence rate of physical TDV victimization (2009).

Rank	State	Total TDV (%)	Rank	State	Total TDV (%)
1	Louisiana	17.8	26	New York	10.6
2	Maryland	16.9	27	Connecticut	9.9
3	Alabama	16.8	28	Tennessee	9.9
4	Arkansas	16.7	29	New Mexico	9.8
5	South Carolina	16.1	30	Montana	9.6
6	Georgia	16	31	New Hampshire	9.6
7	Kentucky	15.5	32	Pennsylvania	9.6
8	Maine	15.4	33	Texas	9.5
9	Michigan	15.2	34	Colorado	9.1
10	Wyoming	15	35	Delaware	9.1
11	Mississippi	14.2	36	Kansas	9.1
12	Illinois	13.8	37	North Dakota	8.5
13	West Virginia	13.8	38	Wisconsin	8.4
14	Alaska	13.3	39	Oklahoma	7.4
15	Hawaii	13	40	Vermont	7.4
16	North Carolina	12.6	-	California	nd
17	Indiana	12.1	-	Iowa	nd
18	Arizona	11.8	-	Massachusetts	nd
19	Nevada	11.4	-	Minnesota	nd
20	South Dakota	11.3	-	Nebraska	nd
21	Florida	11	-	New Jersey	nd
22	Utah	10.9	-	Ohio	nd
23	Rhode Island	10.8	-	Oregon	nd
24	Missouri	10.7	-	Virginia	nd
25	Idaho	10.6	-	Washington	nd

gender inequality (closer to 1.00) to least gender inequality (closer to 0). Oklahoma reported the greatest gender inequality and Vermont reported the least gender inequality. The mean value of the GII was 0.219 (SD=.071).

Table 4-3. Ranking of U.S. States by the Gender Inequality Index.

Rank	State	GII	Rank	State	GII
1	Oklahoma	0.370	26	Wisconsin	0.221
2	Mississippi	0.359	27	South Dakota	0.221
3	Louisiana	0.340	28	Virginia	0.220
4	Wyoming	0.330	29	Utah	0.216
5	New Mexico	0.313	30	Nebraska	0.213
6	South Carolina	0.313	31	Delaware	0.209
7	Idaho	0.294	32	Montana	0.207
8	Texas	0.282	33	Nevada	0.204
9	Arkansas	0.277	34	Kansas	0.194
10	Alabama	0.277	35	Oregon	0.184
11	Georgia	0.275	36	Iowa	0.183
12	Michigan	0.274	37	Colorado	0.179
13	Maryland	0.258	38	Washington	0.167
14	Missouri	0.255	39	Alaska	0.154
15	New York	0.255	40	Indiana	0.153
16	Pennsylvania	0.253	41	Arizona	0.153
17	Kentucky	0.248	42	Connecticut	0.139
18	Florida	0.247	43	North Dakota	0.138
19	New Jersey	0.241	44	New Hampshire	0.135
20	West Virginia	0.240	45	Illinois	0.129
21	Tennessee	0.239	46	Rhode Island	0.121
22	California	0.232	47	Maine	0.100
23	North Carolina	0.226	48	Minnesota	0.093
24	Hawaii	0.226	49	Massachusetts	0.091
25	Ohio	0.222	50	Vermont	0.072

Figure 4-2 depicts a visual representation of the state-by-state variation in GII scores. States with higher GII scores are primarily concentrated in the southern region of the U.S., while states with lower GII scores are primarily concentrated in the northeastern region of the U.S.

Figure 4-2. U.S. map of GII scores by state.

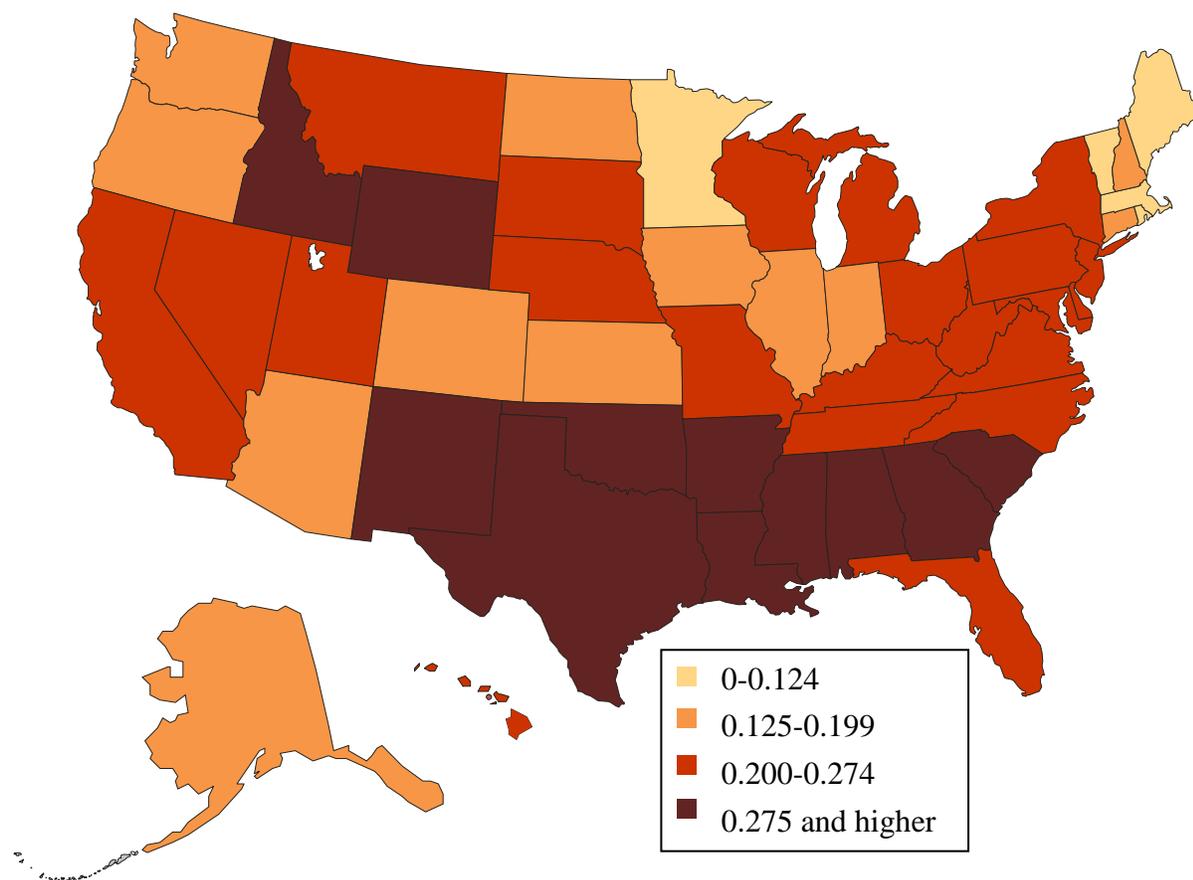


Table 4-4 represents the correlation matrix for total, male, and female TDV victimization and the GII. The GII was significantly correlated with total TDV victimization ($r=.323$, $p=.042$) and female TDV victimization ($r=.353$, $p=.026$), but not male TDV victimization.

Table 4-4. Correlation matrix of total, male, and female physical TDV victimization and the GII.

		1	2	3	4
1. Total TDV in 2009	Pearson Correlation	--	.959**	.956**	.323**
	p-value		.000	.000	.042
2. Female TDV in 2009	Pearson Correlation	.959**	--	.834**	.353**
	p-value	.000		.000	.026
3. Male TDV in 2009	Pearson Correlation	.956**	.834**	--	.271
	p-value	.000	.000		.091

4. Gender Inequality Index	Pearson Correlation	.323**	.353**	.271	--
	p-value	.042	.026	.091	

**Correlation is significant at the 0.05 level (2-tailed)

Table 4-5 shows the unstandardized and standardized regression coefficients of the GII for both total TDV victimization and female TDV victimization. Linear regression was not performed for male TDV victimization due to lack of significance of Pearson's correlation coefficient. Prior to regression, all of the variables were examined for the assumptions of linear regression and it was determined that no violations of the assumptions were present.

Table 4-5. Linear regression of the GII and physical TDV victimization.

	β_0	SE	β_1	SE	Stand. β_1	p-value	r	r^2
Total TDV victimization	9.04	1.48	13.06	6.21	.32	.042	.323	.104
Female TDV victimization	7.94	1.60	15.62	6.72	.35	.026	.353	.124

During analysis, the state of Oklahoma was noted as a substantial outlier. Although Oklahoma, along with Vermont, had the lowest state prevalence of total physical TDV victimization, the GII score was highest in this state. Analyses were thus repeated subsequent to removal of this variable. Table 4-6 depicts the correlation matrix for total, male, and female physical TDV victimization and the GII, with Oklahoma omitted. Total and female TDV victimization remained significantly associated with the GII ($r=.442$, $p=.005$ and $r=.480$, $p=.002$, respectively). Male TDV victimization was also significant ($r=.366$, $p=.022$) and was thus included in subsequent linear regression analysis. The results of the linear regression analyses are shown in Table 4-7.

Table 4-6. Correlation matrix of total, male, and female physical TDV victimization and the GII—Oklahoma omitted.

		Total TDV in 2009	Female TDV in 2009	Male TDV in 2009	Gender Inequality Index
Total TDV in 2009	Pearson Correlation	--	.956**	.954**	.442**
	p-value		.000	.000	.005
Female TDV in 2009	Pearson Correlation	.956**	--	.826**	.480**
	Sig. (2-tailed)	.000		.000	.002
Male TDV in 2009	Pearson Correlation	.954**	.826**	--	.366**
	Sig. (2-tailed)	.000	.000		.022
Gender Inequality Index	Pearson Correlation	.442**	.480**	.366**	--
	Sig. (2-tailed)	.005	.002	.022	

** Correlation is significant at the 0.05 level (2-tailed).

Table 4-7. Linear regression of the GII and physical TDV victimization—Oklahoma omitted.

	β_0	SE	β_1	SE	Stand. β_1	p-value	r	r^2
Total TDV victimization	8.05	1.42	18.22	6.08	.44	.005	.442	.195
Female TDV victimization	6.79	1.52	21.62	6.49	.48	.002	.480	.231
Male TDV victimization	9.12	1.48	15.10	6.32	.37	.022	.366	.134

Indicators of Gender Inequality

To determine whether the individual indicators of the GII were associated independently with total, male, and/or female physical TDV victimization, Pearson's correlation coefficients were obtained. In the initial correlation analyses, the only significant association detected was between female TDV victimization and female government representation ($r=-.352$, $p=.026$). However, when Oklahoma was removed from analyses, several significant associations were found among the variables. Table 4-8 displays the correlation matrix for the total, male, and female physical TDV victimization and the individual indicators of gender inequality, with Oklahoma removed. Total physical TDV victimization was significantly associated with the

adolescent birth rate, female government representation, and the male to female labor force participation ratio. Female physical TDV victimization was significantly associated with the maternal mortality rate, the adolescent birth rate, and female government representation. Male TDV victimization was significantly associated with the adolescent birth rate and the male to female labor force participation ratio. Several of the indicators of gender inequality were significantly correlated with each other, particularly the adolescent birth rate.

Table 4-8. Correlation matrix: Total, male, and female physical TDV victimization and gender inequality indicators—Oklahoma omitted.

		1	2	3	4	5	6	7	8
1. Total TDV in 2009	Pearson Correlation	--	.956**	.954**	.303	.373**	-.408**	-.268	.317**
	p-value		.000	.000	.061	.019	.010	.099	.049
2. Female TDV in 2009	Pearson Correlation	.956**	--	.826**	.348**	.399**	-.460**	-.299	.275
	p-value	.000		.000	.030	.012	.003	.065	.090
3. Male TDV in 2009	Pearson Correlation	.954**	.826**	--	.230	.316**	-.314	-.224	.330**
	p-value	.000	.000		.159	.050	.051	.170	.040
4. Maternal mortality rate, 2003-2007	Pearson Correlation	.303	.348**	.230	--	.215	-.156	.008	.287**
	p-value	.061	.030	.159		.138	.286	.958	.046
5. Adolescent birth rate, 15- 19 yo, 2009 (per 1,000)	Pearson Correlation	.373**	.399**	.316**	.215	--	-.393**	-.314**	.552**
	p-value	.019	.012	.050	.138		.005	.028	.000
6. Percentage female govt representation, 2009	Pearson Correlation	-.408**	-.460**	-.314	-.156	-.393**	--	.260	-.214
	p-value	.010	.003	.051	.286	.005		.071	.139
7. Male/Female HS grad+, >25 yos, 2009	Pearson Correlation	-.268	-.299	-.224	.008	-.314**	.260	--	-.118
	p-value	.099	.065	.170	.958	.028	.071		.419
8. Male/Female labor participation, 2009	Pearson Correlation	.317**	.275	.330**	.287**	.552**	-.214	-.118	--
	p-value	.049	.090	.040	.046	.000	.139	.419	

**Correlation is significant at the 0.05 level (2-tailed)

Listwise N=40

Chapter V: Discussion and Conclusion

Drawing from the tenets of macro-level feminist theory and social production of disease theory, this study sought to determine whether the state-by-state variation in the prevalence of TDV victimization in the U.S. could be attributed to an index measure of gender inequality. State prevalence data obtained from the 2009 YRBS determined that the state-by-state variation in TDV victimization is substantial, with Louisiana reporting a prevalence of 17.8% and Oklahoma and Vermont reporting a prevalence of 7.4%. Regional variation also exists; states with higher levels of TDV victimization are concentrated in the southeastern portion of the United States. Using the formulas and procedures outlined in UNDP's Human Development Report, a GII was calculated for each state (UNDP, 2011). According to this measure, gender inequality is lowest in Vermont and highest in Oklahoma. Similar to the prevalence of TDV victimization, regional patterns in the scores of the GII suggest that states in the southern portion of the U.S. are more likely to have greater gender inequality.

The results of the correlation analyses presented in this study indicate that states with higher scores on the GII have higher levels of physical TDV victimization, particularly among females. The linear regression model theorizes that increasing a state's score on the GII from 0 (gender equality) to 1.0 (highest level of gender inequality) would increase the female TDV victimization prevalence from 7.94% (SE=1.60) to 15.62% (SE: 6.72). Offering a possible explanation for the association between the GII and female TDV victimization, intimate partner violence researchers have suggested that females in communities or societies with greater gender inequality may be more likely to accept violence perpetrated against them and stay in violent relationships (Anderson, 2005). Additionally, although the relationship between female victimization and male perpetration can only be inferred, these findings may suggest that males

in states with higher levels of gender inequality are more likely to perpetrate dating violence against females. As previous research has shown, norms and attitudes that support traditional gender roles are associated with TDV perpetration and victimization at the individual level (Foshee et al., 2008, 2004; Reed et al., 2010). This study suggests that states with greater gender inequality may provide the context in which these traditional gender roles can be maintained. Supporting this hypothesis further, previous research implies that young males are particularly susceptible to the influence of community norms and attitudes on dating behavior (Foshee et al., 2001; Jain et al., 2010; Leventhal & Brooks-Gunn, 2000).

Although the state prevalence of male TDV victimization was not found to be significantly associated with the GII in initial analyses, the association reached significance subsequent to removal of one outlying case. While this association was not as strong as that found for female TDV victimization, this finding expands previous intimate partner violence research that has only examined the association between gender inequality and female victimization (Straus, 1994; Yllo et al., 1990; Yodanis, 2004). The ecological nature of this study is not sufficient to provide understanding of this association, however, previous research suggests that TDV is often reciprocal (Gray & Foshee, 1997; Swahn, Alemdar, & Whitaker, 2010); violence perpetrated against a female in a relationship may thus be followed by violence perpetrated against the male, either as a reactionary behavior or as self-defense. As such, the association between state-level gender inequality and male TDV victimization may be mediated by the level of female TDV victimization. Further research is clearly needed to better understand this association.

Regarding the individual indicators of the GII, the only significant association found in initial analyses was between the percentage of female government representation and female

physical TDV victimization. This finding suggests that a higher percentage of female representation is linked to a lower level of female TDV victimization in the state. A possible explanation for this relationship is that the number of females represented in the state government may positively influence the enactment of TDV prevention policies or policies that prevent violence against women. Alternatively, these states may have more accessible resources to help female teens and women leave violent relationships. Additional significant associations between state level TDV victimization and the individual GII indicators emerged following removal of the outlying case of Oklahoma. The state prevalence of female TDV victimization was significantly correlated with both the state adolescent birth rate and the maternal mortality rate, suggesting that reproductive health may be an especially important dimension of state-level gender inequality with regards to female TDV victimization. This finding contributes to existing literature, as previous studies have calculated an index of gender inequality using only political and economic indicators of inequality (Straus, 1994; Yllo et al., 1990; Yodanis, 2004). Regarding male TDV victimization, a greater state prevalence was associated with both a higher adolescent birth rate and a higher male to female labor force participation ratio. Although both of these indicators have implications for the ability of women to seek employment, additional research is needed to better understand the relationship between these variables.

The only indicator that was not significantly associated with TDV victimization for either gender was educational attainment. It is possible that secondary educational attainment is not a useful indicator of gender inequality in the U.S., as both the state-by-state and gender variation in high school graduation rates is low, thereby affecting statistical analyzability (Cohen, Cohen, West, & Aiken, 2003). This indicator may provide more valuable information when comparing lower income countries that lack comprehensive public education systems.

As previously mentioned, the state of Oklahoma was a substantial outlier in this study. While Oklahoma and Vermont had the lowest prevalence of physical TDV victimization, Oklahoma also had the highest score on the GII, indicating the greatest level of gender inequality among all 50 U.S. states. These findings present the opportunity for a potentially informative case study in TDV prevention. While the lower rate of TDV may simply be an anomaly, it is possible that Oklahoma has instituted TDV prevention programming or policy that mitigates the effect of gender inequality. Supporting this hypothesis, Oklahoma was recently one of only six states to receive a top grade of “A” in the 2010 State Law Report Cards released by Break the Cycle, a national non-profit organization dedicated to addressing and preventing teen dating violence. These report cards rate states based on a variety of criteria that indicate young persons’ abilities to seek help services and to access legal protection from a violent relationship through civil protection orders (Break the Cycle, 2010). Supporting the protective effect of policy, adult intimate partner violence research has shown that greater gender equity in family law is associated with lower rates of violence against women (Hudson et al., 2011). Complicating this hypothesis however, in the other states that received an “A” grade and had TDV prevalence data available, the prevalence of TDV victimization was substantially higher, ranging from 9.6% to 13.8%. Future research providing a comparison analysis of state TDV prevention programming and funding, in addition to policy, could offer much-needed insight into this finding.

In addition to superior TDV policies or programming, there may be other protective factors inherent in the social structures of Oklahoma that play a role in the low prevalence of physical TDV victimization. For instance, the type of cultural norms supported by the gender inequality inherent in social structures may differ from state to state; benevolent sexism (i.e., chivalry), as opposed to hostile sexism (i.e., thinking women are lesser), may be more prevalent

(Glick et al., 2004; Glick & Fiske, 1997). Examining the individual indicators of the GII in Oklahoma could also provide additional information, especially if one specific indicator contributes disproportionately to the score. However, when the states were ranked according to their data for each indicator, no single indicator was responsible for the high GII score; Oklahoma is among the five poorest-faring states regarding maternal mortality, adolescent birth rate, and percentage of female government representation. Clearly, further examination of the factors mediating the relationship between gender inequality and TDV prevalence in Oklahoma is necessary.

Limitations

The interpretation of the findings presented in this study is subject to several limitations. First, as this study used the U.S. state as the unit of analysis, interpretation of the results should avoid committing “ecological fallacy” (Piantadosi, Byar, & Green, 2006). The association between gender inequality and TDV victimization at the state level should not be assumed to exist at the individual or relationship level. However, evidence examining individual level risk factors does suggest that subscribing to norms and attitudes that support traditional gender roles may put an individual at greater risk for exposure to TDV (Foshee et al., 2008, 2004; Reed et al., 2010). Second, this study was subject to the limitations of the YRBS data. The YRBS is administered to youth attending school and thus lacks important information regarding teens that have withdrawn or dropped out of school. The data is also self-reported and may be subject to reporting bias, especially for socially undesirable behaviors, such as TDV (Shorey et al., 2008). Additionally, the YRBS only asks participants to report physical TDV victimization, thereby omitting the occurrence of both psychological/emotional violence and sexual violence in a dating relationship. Although the YRBS does ask participants whether they have ever been forced to

have sexual intercourse, the survey item does not ask participants to specify whether the perpetrator was a dating partner or of another relationship (friend, relative, etc.). When considering TDV from a gendered perspective, information regarding sexual violence is especially important and could provide significant insight into the association between gender inequality and TDV victimization. Also, the YRBS only asks youth whether they have been physically harmed by a dating partner and, as such, perpetration rates must be inferred from victimization rates.

Another limitation of this study is the consideration of TDV from a heterosexual-centric perspective. Although the majority of teen relationships are heterosexual and it can be assumed that the majority of physical TDV incidents were perpetrated by a member of the opposite sex, more research is needed to determine the rates of TDV in same-sex couples and how gender dynamics may affect those rates. And a final limitation of this study is the absence of statistical control for potentially significant confounding factors. The relatively low number of states participating in this particular survey item of the YRBS (N=40) limits the number of variables that could be analyzed using linear regression and negatively affects statistical power (Cohen et al., 2003). Moreover, variables that would be useful to examine as potential confounders, such as the quality of TDV policies or underage drinking laws, may be only qualitative in nature or are not collected consistently from state to state.

Strengths

Despite the noted limitations, this is the first known study to examine gender inequality as a societal level risk factor for state level TDV victimization. By using aggregated data from national data sets, such as the YRBS and the U.S. Census Bureau, this study also eliminates the potential for same-source bias found in studies that use self-report data from individuals to

measure characteristics of the contextual environment (Rothman et al., 2011). Furthermore, by incorporating a dimension of reproductive health, the GII used in this study also extends the findings of previous studies that have used only political and economic indicators of gender inequality (Straus, 1994; Yllo et al., 1990; Yodanis, 2004). Considering the significant associations that were detected between the reproductive health indicators and TDV, this study suggests that this added dimension may be especially important in future measures of gender inequality. And finally, this study provides a methodological model that can be used to identify additional societal level risk factors for TDV, especially those that are modifiable through state policy. Research in other public health disciplines may also use this methodology to determine potential risk factors for other health behaviors.

Public Health Implications

In light of controversy surrounding the notion of gender symmetry in physical TDV victimization and perpetration (Langhinrichsen-Rohling, 2010), this study sought to determine whether societal level gender inequality contributes to state level variation in rates of TDV victimization. Although the results of this study are merely preliminary, the significantly positive association between gender inequality and TDV victimization, particularly among females, supports researchers' claims that TDV is not a gender neutral phenomenon (Anderson, 2005; Chung, 2005; Hickman et al., 2004; Lewis & Fremouw, 2001; Reed et al., 2010; Smith et al., 2009). Similar prevalence rates of physical TDV perpetration among females and males should neither be interpreted as proof that the reasons for male and female TDV perpetration are congruent nor that males and females are equally affected by TDV. Supporting this claim, qualitative data from urban adolescent focus groups demonstrated that males frequently use violence in relationships to gain and maintain power, while females interpret violence as a sign

of love and commitment (Johnson et al., 2005). Moreover, these youth continually emphasized the considerable role that gender-based violence plays in their lives, thus further highlighting the need to be aware of the differing motives for male and female TDV perpetration. Future research should seek to understand whether societal level gender inequality may contribute to higher levels of TDV victimization by maintaining these gender-based violence norms and attitudes or through some other means.

Adolescence has been recognized as a particularly important point of intervention for relationship violence prevention programming, as the high level of interaction with peers, parents, and school staff offers several opportunities for disclosure and monitoring (Jain et al., 2010). Additionally, TDV prevention and intervention efforts are often free from the complications of violent adult relationships, such as shared housing and economic resources (Lewis & Fremouw, 2001). The use of existing TDV research to advance TDV prevention programs is therefore essential. Although interpretation of these findings is limited, this study presents several implications and questions for TDV prevention programming. First, although common practice suggests that TDV prevention programs should be administered to both genders simultaneously, further research is needed to determine whether existing practices are equally effective for reducing TDV for both genders. The results of this study indicate that higher levels of TDV victimization may occur within a context of gender inequality. Whether this dynamic supports same-sex or heterogeneous prevention programming remains to be understood. Despite this gap in knowledge, this study seemingly supports evidence-based programs, such as *Safe Dates* (Foshee et al., 1998), that address gender stereotyping and the endorsement of traditional gender roles as a risk factor for TDV. As Connolly, Friedlander, Pepler, Craig, and Laporte (2010) suggests, media literacy may be a particularly effective tool in encouraging young people to

critically evaluate the gender roles and social norms that our society and popular culture propagates.

In addition to examining gender roles, this study implies that TDV prevention programs may also benefit from addressing broader societal gender inequities. By increasing adolescents' awareness of the inequitable access to power and economic stability, prevention programs could better equip young people to overcome social and political barriers to resources and to take action in reducing social disparities. Similarly, Smith et al. (2009) calls for TDV prevention programs to challenge youth to shift their perception of power from one of authority and masculinity to one that encompasses femininity as well as compassion and respect for others. The importance of recognizing the value of feminine attributes in TDV prevention and other public health efforts has been supported by other researchers (Underwood & Rosen, 2009; Wamala & Agren, 2002). For example, TDV prevention programs that incorporate discussions about the social and communication differences between males and females, while simultaneously acknowledging the value and worth that each brings to a relationship, have also been recommended (Underwood & Rosen, 2009). Considering the breadth of programmatic recommendations presented here and elsewhere, future TDV research must attempt to delineate those program components that are most effective in reducing the onset of TDV, especially within the context of societal gender inequality.

Conclusion

As demonstrated by the findings of this study, physical TDV victimization is a relatively common experience for U.S. high school students. The observation that substantial variability exists in the state prevalence rates of TDV victimization, however, cannot be ignored; public health practitioners and policy makers need to be made aware of those community and societal

level risk factors that perpetuate the occurrence of TDV. In addition to gender inequality, other macro-level variables, such as poverty, gang activity, urbanization, etc., should be examined. The interactions among these societal level variables must also be considered. As Foshee et al. (2001) note, many prevention strategies are based on risk factors that have little foundation in empirical research. Clearly, further research on contextual factors is necessary to accurately inform federal and state policy makers in their efforts to reduce teen TDV and other health risk behaviors. Without understanding these distal levels of influence on behavior, TDV prevention programming will likely fall short of both comprehensiveness and efficacy.

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