

TEEN DATING VIOLENCE PERPETRATION AMONG MIDDLE SCHOOL YOUTH:
THE ROLE OF BULLYING, SEXUAL HARASSMENT, AND GENDER

Stacey Leigh Cutbush

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Approved by:

Vangie Foshee

J. Mike Bowling

Beth Moracco

Jason Williams

Shari Miller

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ABSTRACT

Stacey Leigh Cutbush: Teen Dating Violence Perpetration among Middle School Youth:
The Role of Bullying, Sexual Harassment, and Gender
(Under the direction of Vangie Foshee)

Although teen dating violence (TDV) has been associated with bullying and sexual harassment, the developmental relationship among all three behaviors has rarely been examined, especially by gender. This dissertation used structural equation modeling to investigate the temporal sequence among perpetration of bullying, sexual harassment, and dating violence, and to determine if the sequence varies by gender. Study Aim 1 first determined if the aggression measures were invariant for girls and boys. Study Aim 2a then tested whether sexual harassment perpetration mediates the relationship between bullying perpetration and TDV perpetration, while Study Aim 2b tested moderated mediation by assessing whether the developmental pathway varies by gender among middle school-aged youth.

The data were collected from one cohort of 7th grade middle school students. Students were surveyed every 6 months during 7th and 8th grades for a total of four waves of data collection. Study Aim 1 was assessed using baseline (wave 1) data, whereas Study Aims 2a and 2b were assessed using data from waves 1 through 3.

The first study examined measurement invariance by gender of all aggression measures: perpetration of bullying, sexual harassment, physical TDV, psychological TDV, and electronic TDV. Both the physical and psychological TDV perpetration measures and the sexual harassment measure achieved strict measurement invariance. Bullying perpetration demonstrated

the next most stringent test of measurement invariance by gender, partial strict invariance.

Electronic TDV achieved the next most stringent test of invariance by gender, metric/scalar invariance.

The second study tested whether sexual harassment perpetration mediates the relationship between bullying perpetration and TDV perpetration (2a), and then tested moderated mediation by assessing whether the developmental pathway varies by gender (2b). Results indicate no evidence of mediation. However, in the overall model, bullying and sexual harassment both emerged as significant predictors of TDV at a later time point. Among girls, only bullying significantly predicted TDV at a later time point, and, among boys, only sexual harassment significantly predicted TDV at a later time point.

Prevention programs that target bullying and sexual harassment perpetration may reduce later perpetration of TDV. Further research is needed to disentangle the temporal relationships between these aggressive behaviors among youth.

*To my mother, Hope, whose unwavering support inspired my passion to pursue my education.
To my partner, Hill, whose steadfast belief in me gives me strength.
To my son, Denali, for whom I want to make the world a better place.
And to Bear, whose rendering of unconditional love showed me how to heal lives.*

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CHAPTER 1: STUDY OVERVIEW

Introduction

Teen dating violence (TDV) is a growing public health concern that is garnering increased attention from researchers, practitioners, and policymakers (Break the Cycle, 2008; Library of Congress, 2011). Nationally representative data indicate that about 1 in 10 high school students (9.4%) report being hit, slapped, or physically hurt on purpose by a boyfriend or girlfriend (Centers for Disease Control and Prevention, 2012). Miller and colleagues (2009) found that among 6th-grade youth who are dating, 29% (15% of the total sample) reported perpetrating at least one act of physical violence against their boyfriend/girlfriend. Retrospective data also indicate that approximately 1 in 5 women and 1 in 7 men who were victims of physical violence, rape, or stalking as adults also reported experiencing dating violence between 11 and 17 years of age (Black et al., 2011). Factors associated with TDV include physical injuries, depression, eating disorders, lower academic achievement, increased risk for alcohol and other drug use, and suicide thoughts or attempts (Ackard & Neumark-Sztainer, 2002; Banyard & Cross, 2008; Centers for Disease Control and Prevention, 2006, 2010). A longitudinal study of TDV (Foshee et al., 2013) suggests that victimization by a dating partner may lead to deleterious consequences, including increased substance use for both boys and girls and, for girls who experienced psychological victimization, increased internalizing symptoms. In sum, findings suggest the importance of advancing TDV research.

Knowledge about dating violence is in its infancy relative to other forms of violence. Most existing work relies on cross-sectional data, and studies of middle school-aged youth are particularly scarce (Espelage, 2011). As a result, little information, particularly longitudinal data, exists to describe TDV among middle school students and inform prevention programming efforts. However, prevention science has begun shifting its focus to younger populations, namely middle school-aged youth—in its attempt to trace the etiology of TDV and thereby improve primary TDV prevention programming at an earlier age.

Developmentally, early adolescence is a time characterized by the onset of puberty, changing gender roles, more autonomous relationships with parents, and more mature relationships with peers, including dating interests in same- or opposite-sex peers. The emergence of dating relationships in middle school, therefore, signals an important time to investigate the onset of TDV. To investigate the onset of TDV any earlier—for example, in elementary schools—is unfeasible owing to the exceptionally low prevalence of dating and dating violence developmentally, coupled with resistance from schools and parents for probing young children on such behaviorally sensitive topics. To investigate the onset of dating and dating violence any later—for example, in high schools—misses an important opportunity for primary prevention in light of the high prevalence of dating and dating violence that already exists by later high school years. The middle school years, therefore, present a critical aperture for prevention that is developmentally salient and tolerated by most middle schools and parents.

With a prevention focus, the investigation of TDV during middle school invites an examination of precipitating risk factors for dating violence; this study proposes to investigate the role of other forms of relationship aggression, specifically bullying and sexual harassment, as precipitating risk factors for dating violence. The proposed study is framed within a

developmental lifespan theoretical model that elucidates how aggressive behaviors diversify as children enter adolescence and encounter new age-relevant challenges. Such challenges include emerging sexuality and romantic interests, shifting norms that support aggressive behaviors, mixed-gender peer groups, and heightened gender role expectations, scrutiny, and adherence—each of which are affected by gender. This developmental lifespan theoretical framework thus underscores the interrelationships among bullying, sexual harassment, and dating violence, including how the developmental pathway from one form of aggression to another between girls and boys may be different. Because other types of peer aggression likely precede and/or exist outside of teen dating relationships, this study aims to identify whether and how bullying perpetration and sexual harassment perpetration among peers function as gateway behaviors to TDV behaviors, such as psychological, physical, and electronic TDV perpetration.

Study Aims

The overarching goals of the proposed study are to use longitudinal data to disentangle the temporal sequence among perpetration of bullying, sexual harassment, and dating violence, and to determine if the sequence varies for boys and girls. The overarching goals of the study are accomplished through two study aims. Study Aim 1 will determine if the aggression measures are invariant for girls and boys. Stated differently, this study aim will uncover whether girls and boys respond in different ways to each of the aggression measures by conducting separate measurement models for bullying, sexual harassment, and TDV. Study Aim 2a will then test the developmental pathway among all three forms of aggression (i.e., mediation), while Study Aim 2b will assess whether that pathway differs by gender (i.e., moderated mediation) among middle school-aged youth. Structural equation modeling (SEM) will be used to address these study aims.

Two manuscripts were developed for the dissertation. Manuscript 1 addressed Study Aim 1 and Manuscript 2 addressed Study Aims 2a and 2b.

Approach

SEM is the analytic approach for the longitudinal data analyses in the proposed study. This analytic approach provides tools that can assess measurement invariance across gender for both latent and observed variables (Study Aim 1). SEM also enables testing of models that estimate mediational analyses; mediation, which explains how or why effects hold, will be used to determine whether bullying perpetration predicts TDV perpetration through sexual harassment perpetration (Study Aim 2a). SEM also allows for tests of mediated moderation analyses—or, contrasts of mediated effects—to assess gender differences between girls and boys for the hypothesized developmental pathways (Study Aim 2b).

The sequencing of Study Aim 1 (measurement invariance) followed by Study Aims 2a and 2b (mediation and moderated mediation, respectively) is purposeful in its scaffolding: Study Aim 1 will first test the reliability of measures across groups, while Study Aims 2a and 2b will then conduct longitudinal analyses invoking said measures.

Study Aims will be addressed using a longitudinal dataset collected by RTI International (RTI) as part of an independent evaluation (Principal Investigator Shari Miller) of *Start Strong: Building Healthy Teen Relationships*, a national program of the Robert Wood Johnson Foundation and Blue Shield of California Foundation in collaboration with Futures without Violence. The data were collected from one cohort of 7th grade middle school students enrolled in public school systems of three geographically and racially diverse cities across the country. Students were surveyed every 6 months—beginning in fall of their 7th grade year and concluding in the spring of their 8th grade year—for a total of four waves of data collection during the 2010–

11 and 2011–12 academic school years. Study Aim 1 (addressed in manuscript 1) was assessed using baseline (wave 1) data, whereas Study Aims 2a and 2b (addressed in Manuscript 2) were assessed using data from waves 1 through 3.

Because the primary goal of this study is to examine developmental pathways rather than evaluate program effectiveness, only comparison data will be used from this quasi-experimental evaluation, yielding the following analysis sample from each of the four waves of data collection:

Table 1-1. Comparison Sample Size at Each Wave

N=754	Wave 1	Wave 2	Wave 3	Wave 4
	Fall '10	Spring '11	Fall '11	Spring '12
	(n=754)	(n=724)	(n=653)	(n=639)
Grade	7 th	7 th	8 th	8 th

With the goal of preventing relationship violence, the field of prevention science must focus on intervening in TDV, as well as its immediate behavioral precursors, earlier in the causal chain. This proposed study of TDV among middle school youth provides a unique opportunity to investigate early onset of TDV in light of existing gaps in the literature. Because limited research exists on TDV among middle school youth, prevalence estimates of dating and TDV among middle school youth alone will offer a sound contribution. More importantly, though, the use of a longitudinal dataset will enable an examination of three separate, but interrelated, forms of aggression during early adolescence with the aim of disentangling them and identifying whether and how they sequence, and whether they hold any predictive power for one another. By filling this gap in the literature, program developers will be able to create or adapt existing TDV prevention programs for middle school students with greater precision. The proposed study

results will point to whether, when, and to what extent content on bullying prevention and sexual harassment prevention should be delivered to middle school youth as part of a TDV prevention strategy, or even to elementary school youth in a developmental appropriate way. In addition to advancing the TDV literature, this study will similarly contribute to the fields of bullying and sexual harassment.

The next chapter of this dissertation describes various ways each of the three types of aggression have been defined, including prevalence findings—both overall and by gender. Chapters 3 and 4 follow, which are Manuscripts 1 and 2, respectively. The dissertation concludes with Chapter 5, a summary.

CHAPTER 2: OVERVIEW OF LITERATURE ON AGGRESSION: BULLYING, SEXUAL HARASSMENT, DATING VIOLENCE

Although an upsurge in theoretically and methodologically sound TDV research has occurred during the last few years, relatively few well-designed TDV studies existed until recently (for a review, see Foshee & Matthew, 2007). Consequently, TDV prevention programs—including the *Start Strong* initiative (2008–2012) from which this study’s data are drawn—have been largely informed by cross-sectional data to identify risk factors and appropriate intervention targets. The need for longitudinal research to assess temporality and consequences of TDV remains. In this dissertation, longitudinal data will be used to address two Study Aims: measurement invariance by gender (Study Aim 1), mediation (Study Aim 2a) and moderated mediation by gender (Study Aim 2b).

This chapter (Chapter 2) defines key terms used in the proposed study—specifically, the varying definitions presented in bullying, sexual harassment, and TDV literatures, including how the proposed study will define them, as well as prevalence rates noted in the literature. The chapter then presents empirical evidence examining gender differences in prevalence of the key aggression behaviors.

Definitions of Bullying, Sexual Harassment, and Dating Violence

Definition of Bullying

Bullying is a major public health problem affecting many young people in the United States and worldwide (Nansel et al., 2001; Olweus, 1993). It has been defined as a specific type

of relationship aggression in which (1) the behavior is hostile in intent and intended to harm or disturb, (2) the behavior occurs repeatedly over time, and (3) there is a power imbalance, such that a more powerful person or group is attacking a less powerful one (Nansel et al., 2001; Olweus, 1993; Pepler et al., 2006). The abuse of power may be physical or psychological and characterized by either verbal aggression (e.g., name-calling threats), physical aggression (e.g., hitting), or psychological aggression (e.g., rumors, shunning/exclusion) (Nansel et al., 2001; Olweus, 1993; Pepler et al., 2006). The first nationally representative survey in the United States to focus on bullying, conducted by The National Institute of Child Health and Human Development, found that 30% of 6th through 10th graders reported moderate to frequent involvement in bullying at school (Nansel et al., 2001).

Olweus, in his pioneering work on bullying, noted that bullying can be direct (e.g., open attacks that are physical and verbal) and indirect (e.g., shunning, exclusion). Among researchers in the field, the term bullying has been further delineated in several different ways. Researchers have also coined the term *homophobic bullying*, defined as the negative beliefs, attitudes, stereotypes, and behaviors directed toward gay, lesbian, and bisexual people (Wright, Adams, & Bryant, 1999); homophobia functions as the underlying attitude informing this type of bullying. While this study's bullying measures capture both direct and indirect forms of bullying, the measures do not distinguish whether the bullying was homophobic. The term *sexual bullying* has also been coined and is discussed in the next section.

Espelage and Holt (2001) delineated four categories to describe youth involvement in bullying behaviors: (1) bullies—youth who bully others but are never victims; (2) bully-victims—youth who bully others and also are victimized by other bullies; (3) victims—youth who are victimized but do not resort to bullying others; and (4) those not involved—youth who

have no significant history as bullies or victim. This study focuses on bullying perpetration, so any youth who endorse bullying perpetration—with or without having also experienced bullying victimization—are included in this study.

Bullying is a form of aggression that unfolds in the context of a relationship when one child asserts interpersonal power over another child (Pepler et al., 2006)—either through personal characteristics, such as size, strength, or age (Olweus, 1993) and/or from knowledge of others' vulnerabilities (Sutton, Smith, & Swettenham, 1999). Children also derive power from bullying via position in a social group, either from a high social status (Olweus, 1993) or by membership in a group of peers that support bullying (Salmivalli, Huttunen, & Lagerspetz, 1997). For instance, bullying may be used to renegotiate dominance within newly formed peer groups in middle school (Pelligrini, 2002).

Understanding the phenomenon of bullying is important because it may provide the earliest opportunity to intervene in aggressive behaviors in the lives of youth. The emergence of bullying perpetration may be the first sign of relationship aggression that, if left unchecked, could lead to further maladaptive relationship behaviors, for example, sexual harassment and dating violence.

Definitions of Sexual Harassment

Similarly, sexual harassment may be enacted to gain power and control over others through unwanted sexual attention (Espelage, 2011; Gruber & Fineran, 2008; McMaster et al., 2002) and is a major public health problem. Sexual harassment is pervasive among adolescents (Holt & Espelage, 2007); one national study reported that 58% of students had experienced physical sexual harassment (e.g., having clothing pulled off or down), and that 70% of students

had experienced nonphysical sexual harassment (e.g., sexual rumor spreading) at some point in their lives.

Among researchers in the field, however, there exist noteworthy differences in the way sexual harassment has been defined. The definition of sexual harassment, first delineated by MacKinnon in the 1970s, was originally outlined as a behavior by boys who exercised organizational power or sociocultural privilege to coerce sexual favors from women (MacKinnon, 1979). Since then, the U.S. Department of Education has reshaped and expanded that definition: “Sexual harassment is defined as unwelcome sexual advances, requests for sexual favors, and other verbal, nonverbal, or physical conduct of a sexual nature by an employee, by another student, or by a third party, that is sufficiently severe, persistent, or pervasive to limit a students’ ability to participate in or benefit from an education program or activity, or to create a hostile or abusive educational environment” (U.S. Department of Education, 1997, p. 12038).

Although most researchers have historically defined *sexual harassment* under the aegis of the U.S. Department of Education, others increasingly use and define the term sexual violence (Basile et al., 2009; Espelage, Holt, & Poteat, 2010) as *including* sexual harassment: “Sexual violence encompasses a continuum of acts from unwanted noncontact exposures of a sexual nature (e.g., verbal harassment) to forcible penetration” (Basile & Saltzman, 2002). This recent shift to subsume sexual harassment within sexual violence stems in large part from the Centers for Disease Control and Prevention’s (CDC) efforts to decrease consistent use of terminology and data elements for sexual violence, including in their definition “nonconsensual noncontact acts of a sexual nature such as voyeurism and verbal or behavioral sexual harassment.”

To further extend the variability in definition, some researchers have coined the term *sexual bullying* (Cunningham et al., 2010; Fredland, 2008), positing it as a conceptual link

between bullying and more advanced forms of sexualized violence. This claim is often premised upon Pellegrini's contention (2002) that "bullying in adolescence may take the form of sexual harassment."

Gruber and Fineran (2007, 2008), however, insist on conceptual clarity while leveraging these terms, suggesting that sexual bullying has muddled the definition both of sexual harassment and bullying (Gruber & Fineran, 2008) and that such confusion may be harmful. Specifically, they point out that bullying is not illegal but sexual harassment is, thereby suggesting that students and parents who perceive sexual harassment as a form of bullying may not exercise their rights for schools to take action—as schools are legally mandated to do. Moreover, they submit that when sexually based experiences are couched as bullying and not identified specifically as sexual harassment, victimization stemming from gender or sexuality "may be interpreted as private or interpersonal troubles experienced by unfortunate students who are caught up in difficult situations" (p 2).

Alongside incongruent terminology and definitions, these terms (sexual bullying, sexual harassment, and sexual violence) vary substantially in how they are conceptualized and operationalized across a spectrum of behaviors (Cunningham et al., 2010; Gruber & Fineran, 2007, 2008). Adding still further complexity, some researchers combine sexual harassment and sexual violence measures into a sexual violence scale, justifying the collapse per the notion that sexual harassment is a point on the continuum of sexual violence (Basile et al., 2009; Basile & Saltzman, 2002).

The current study uses Gruber and Fineran's conceptualization of sexual harassment (Gruber & Fineran, 2008), noted above, for two reasons. Foremost, Gruber and Fineran outline a compelling distinction between bullying and sexual harassment. They aptly note that bullying

theory and research focuses on the personal or psychological, as well as situational factors, as the backdrop for the aggression. Their premise is that merely adding the term *sexual* to *bullying* as a means to describe a type of bullying that involves gender and sexuality is insufficient because the concept remains situated within the personal or psychological. The concept fails to account for historical, social, and political relations endemic to the behaviors (see Chapter 3 for a detailed discussion of this framework). Rather, they instead suggest that the concept of “sexual harassment is more directly and clearly related to hegemonic masculinity and therefore taps into potent structural and culturally-sanctioned roles and meanings (masculine-feminine, heterosexual-homosexual) that are central components of social stratification” (p 2).

Second, although CDC has put forward a viable conceptualization and measurement of sexual harassment as existing within the construct of sexual violence, per Basile and Saltzman’s inclusion of sexual harassment as noncontact sexual abuse (Basile & Saltzman, 2002), this study was unfortunately unable to capitalize on it. Several of the middle schools participating in the current study flatly refused to field any survey instruments containing measures explicitly referencing sexual violence. Therefore, the measure used in the proposed study were derived from the American Association of University Women Educational Foundation (AAUW) Sexual Harassment Survey (2001), also used by Gruber and Fineran (2007, 2008). In sum, for both conceptual and methodological rationales, this proposed study investigates sexual harassment, rather than either sexual bullying or sexual violence.

Definition of Teen Dating Violence

Dating violence is a serious public health concern that is garnering increased attention from researchers, practitioners, and policymakers (Break the Cycle, 2008; Library of Congress, 2011). CDC (2012) defines TDV as “the physical, sexual, or psychological/emotional violence

within a dating relationship, as well as stalking. It can occur *in person* or *electronically* and may occur between a current or former dating partner.” This study uses CDC’s definition of TDV; however, because the instrument in this study did not contain measures of sexual violence or stalking, only measures of physical TDV, psychological TDV, and electronic TDV are addressed. (Refer to Measures sections in Chapters 2 and 3 for more detail.)

Prevalence of Teen Dating Violence

A significant percentage of middle and high school youth experience TDV, as perpetrators and/or victims. Although no nationally representative studies of TDV perpetration exist, nationally representative studies of TDV victimization indicate that about 1 in 10 high school students (9.4%) reported being hit, slapped, or physically hurt on purpose by a boyfriend or girlfriend (Centers for Disease Control and Prevention, 2012). Many nonrepresentative prevalence estimates of TDV perpetration come from local studies, though these estimates vary widely due to inconsistencies in the time frames assessed, the specific behaviors included and measured, and the ages studied, and the sample characteristics (Foshee & Matthew, 2007). Nonetheless, Foshee and Matthew’s review (2007) showed local studies consistently demonstrating high rates of adolescent dating violence perpetration, ranging from 11% to 41% for physical abuse and 14% to 82% for psychological abuse (Foshee & Matthew, 2007).

Most studies of TDV focus on high school-aged youth, though the spotlight has recently been cast on middle school-aged youth by national initiatives funded by the Robert Wood Johnson Foundation (*Start Strong: Building Healthy Teen Relationships*) and CDC (*Dating Matters*). Some local studies also exist, including Miller and colleagues (2009) who found that among dating 6th grade youth, 29% (15% of the total sample) reported perpetrating at least one act of physical violence against their boyfriend/girlfriend in the last three months. Swahn et al.

(2008) found that among 7th graders who had dated in the past year, 23% reported dating violence perpetration, and 30% reported dating violence victimization. Taylor et al. (2010) similarly found that among a sample of 6th and 7th grade students, 21% reported perpetrating at least one act of dating violence in their lifetime. These high prevalence rates suggest that TDV is a problem, presenting significant physical and psychological consequences for victims and perpetrators in middle school.

Health Correlates of Teen Dating Violence

Much TDV research focuses on correlates of TDV rather than consequences of TDV. This section highlights key health-related correlates of TDV. Most cross-sectional TDV studies concentrate findings on the host of risk factors associated with dating violence. Correlates include victims' reduced mental health and posttraumatic stress (Wolitzky-Taylor et al., 2008), lower rates of self-esteem and higher rates of eating disorders (Ackard & Neumark-Sztainer, 2002), higher rates of suicidal thoughts and attempts (Ackard & Neumark-Sztainer, 2002; Howard, Wang, & Yan, 2007; Ramisetty-Mikler et al., 2006) and higher rates of substance use (Champion, Foley, et al., 2008; Ramisetty-Mikler et al., 2006). However, because most of the study designs are cross-sectional, it is impossible to conclude whether the correlates are predictors or consequences.

Health Consequences of Teen Dating Violence

This section draws attention to the numerous and serious health-related consequences of TDV. Although most TDV studies have used cross-sectional study designs and, therefore, have been unable to distinguish predictors from consequences of TDV, several longitudinal studies have pointed to a host of deleterious consequences resulting from TDV. Some TDV research

stresses the physical injuries and even fatalities resultant from TDV, estimating that as many as 25% of male and female abuse victims experience injury (O'Leary et al., 2008). Most studies, however, focus on psychological outcomes and other health indicators. Long-term consequences include increased levels of depressive symptomatology among girls (Exner-Cortens, Eckenrode, & Rothman, 2013; Foshee et al., 2013) and boys (Foshee et al., 2013); antisocial behavior for girls (Exner-Cortens, Eckenrode, & Rothman, 2013; Roberts, Klein, & Fisher, 2003) and boys (Exner-Cortens, Eckenrode, & Rothman, 2013); suicidal ideation for girls (Exner-Cortens, Eckenrode, & Rothman, 2013; Roberts, Klein, & Fisher, 2003) and boys (Exner-Cortens, Eckenrode, & Rothman, 2013); nonillicit substance use for girls (Exner-Cortens, Eckenrode, & Rothman, 2013); illicit substance use for girls and boys (Exner-Cortens, Eckenrode, & Rothman, 2013; Foshee et al., 2013), as well as an increased likelihood of experiencing intimate-partner violence as an adult (Exner-Cortens, Eckenrode, & Rothman, 2013; Smith, White, & Holland, 2003; Wekerle & Wolfe, 1999).

Empirical Evidence Examining Gender Differences Among Key Variables of Interest: Bullying, Sexual Harassment, and Dating Violence

Gender Differences in Prevalence among Behaviors of Interest

This section examines gender differences in prevalence of behaviors of interest. Although gender differences in the prevalence of a behavior do not necessarily indicate differences in the ways boys and girls respond to measures, or in the *relationships between* behaviors, outlining the gender differences in prevalence of the three types of aggression provides a backdrop for further discussion addressed in each study aim.

Bullying and Gender. Research consistently reports boys both bullying and being bullied significantly more than girls in the United States and worldwide (DeSouza & Ribeiro, 2005; Nansel et al., 2001; Pellegrini, 2001; Pellegrini & Bartini, 2001). Some studies indicate twice as many boys as girls report bullying (Charach, Pepler, & Ziegler, 1995; Craig & Pepler, 1997).

Beyond examining differences in bullying by gender, however, research also points to differences in *types* of bullying by gender—i.e., direct and indirect bullying (Archer & Coyne, 2005; Björkqvist, 2001; Feshbach, 1969; Lagerspetz, Björkqvist, & Peltonen, 1988). Direct bullying refers to physical aggression such as hitting, pushing, and tripping, as well as overt verbal aggression, such as name calling, taunting, and threatening. Indirect bullying, on the other hand, includes indirect aggressive behaviors that have been given various labels—including indirect, covert, relational, and social aggression—and that typically converge around a common theme of behaviors that include hurtful manipulation of relationships and that damage the target's social position in ways that often (though not always) avoid direct confrontation. This bifurcation of direct and indirect bullying is often supported by factor-analytic studies indicating two forms of aggressive behavior (Break the Cycle, 2008; Crick & Grotpeter, 1995; Grotpeter & Crick, 1996; Hart et al., 1998; Vaillancourt et al., 2003). Card et al. (2008) conducted a meta-analysis of gender differences in direct and indirect aggression; results regarding overall gender differences were consistent with prior reviews of the literature (Archer & Coyne, 2005): for direct aggression, boys tend to perpetrate more than girls, but for indirect aggression, there is little gender difference (i.e., although girls perpetrate statistically significantly more than boys, the difference was trivial in magnitude).

Sexual Harassment and Gender. Holt and Espelage (2007) found higher prevalence rates (for perpetration) for boys than for girls, with 66% of boys and 52% of girls indicating they have

sexually harassed a peer (American Association of University Women Educational Foundation, 2001). Other studies buttress these findings: specific to sexual forms of aggression, studies consistently point to higher levels of sexual harassment perpetrated by both middle and high school-aged boys than girls and higher levels of victimization for girls (DeSouza & Ribeiro, 2005; Felix & McMahon, 2007; Fineran & Bennett, 1999; Fineran & Bolen, 2006; Fineran & Sacco, 2001; Hand & Sanchez, 2000; McMaster et al., 2002). However, there are two notable exceptions: Pellegrini (2001) and Gruber and Fineran (2008) found no statistically significant differences in sexual harassment experiences between boys and girls.

TDV and Gender. To date, gender remains a highly controversial topic within the dating violence literature; the question of whether the prevalence of dating violence perpetration vary as a function of gender is still unresolved. Much of the research on aggression within adolescent romantic relationships suggests similar rates of dating violence perpetration between girls and boys (Connolly, Pepler, Craig, & Tardash, 2000), with some suggesting slightly higher rates of perpetration among girls than boys (Champion, Wagoner, et al., 2008; McDonell, Ott, & Mitchell, 2010; Rothman et al., 2010; Simon et al., 2010). Across multiple studies (Archer, 2000; Foshee et al., 2001), gender differences are rare, and when they do exist, boys report being victimized by dating partners more than girls.

When investigating *severe* acts of physical dating violence perpetration, however, others (Bennett & Fineran, 1998) found no gender differences in prevalence rates, or that boys reported higher prevalence rates than girls from ages 13 to 19 years (Foshee et al., 2009). A recent systematic review (Chan, 2011) of gender and dating violence concluded that when contexts, motivations, and consequences are excluded from the analysis, prevalence rates of violence perpetration between boys and girls are similar. In general, though, the findings support the

claim that, after taking into account the motives and impacts of the violent incidents, boys initiate and perpetrate more severe dating violence more often than girls.

CHAPTER 3: TEEN DATING VIOLENCE, SEXUAL HARASSMENT, AND BULLYING AMONG MIDDLE SCHOOL YOUTH: EXAMINING MEASUREMENT INVARIANCE BY GENDER (*MANUSCRIPT #1*)

Introduction

Much research has examined gender differences in the prevalence and etiology of three forms of relational aggression among youth: teen dating violence (TDV), sexual harassment, and bullying. Despite copious research examining such gender differences and the practical and theoretical implications of this research, researchers have given only scant attention to determining whether boys and girls perceive the scales used to measure these forms of relational aggression in the same manner. If the scales measuring these constructs do not function the same for both boys and girls, any observed differences in scores (or lack thereof) may be a function of flawed measurement and may not reflect true variability among items by gender. Stated another way, if boys and girls interpret the items comprising scales differently, this variation has implications for the validity of the findings from prior studies that have examined gender differences in the prevalence and etiology of these behaviors. When measurement tools are perceived the same or “mean the same thing” to all respondents in a study, they demonstrate measurement invariance (McDonald, 1999; Millsap & Kwok, 2004; Williams et al., 2010).

The purpose of this study was to test for measurement invariance by gender in scales commonly used to measure TDV, sexual harassment, and bullying. The results will inform future research on gender differences and shed light on how to interpret past research that has examined gender differences using these scales. If these scales prove to be measurement invariant by

gender, future studies can more confidently assert that any gender differences noted are due to actual differences in group means rather than artifacts of poor measurement. If differences are not measurement invariant, findings from past research using them should be interpreted in that light.

Testing Measurement Invariance

Measurement invariance indicates that an instrument measures a construct the same way across populations or groups (McDonald, 1999; Millsap & Kwok, 2004; Widaman & Reise, 1997). When measurement invariance holds, respondents from two groups with the same value on the underlying construct generate the same observed scores (Meredith & Millsap, 1992; Williams et al., 2010). Alternatively, two respondents from different groups may be equal on the underlying construct of interest but may result in different observed values if the measurement tools, or instrument, violate measurement invariance (Williams et al., 2010).

The consequences of violating measurement invariance are serious. Existing studies have assumed measurement invariance across gender. Should commonly used scales fail to achieve measurement invariance by gender, prior and future research findings could be invalidated. Systematic group differences in score items may bias results, and any differences on the items will be confounded by the differences due to the lack of measurement invariance (Millsap, 2011). Researchers must, therefore, carefully consider the measurement properties of the constructs prior to model estimation, because a lack of measurement invariance could seriously bias or alter conclusions (i.e., Type 1 or Type 2 errors) from tests of conceptual models (Williams et al., 2009). A Type 1 error, or *false positive*, occurs when results indicate a difference exists, when in truth there is no actual difference; a Type 2 error, or *false negative*, occurs when results indicate no difference exists, when in truth there is an actual difference.

Measurement invariance is a statistical property of measures that can be tested with confirmatory factor analyses (CFA). CFA involves modeling the latent variable and observed (i.e., measured) variables relationship. CFA models include the following measurement parameters for each specified indicator (item) of a latent variable: factor loadings, intercepts, and unique variances. Factor loadings refer to regression weights when the latent variable or factor is regressed on the observed variables or indicators. Intercept refers to the observed mean of the respective indicators. The residual term of an indicator contains both item-specific unique variance and random measurement error; unique variance is the amount of variance in the item that is not explained by the latent construct or factor.

Several typologies, or degrees, of measurement invariance exist, including configural invariance, metric (or weak) invariance, scalar (or strong) invariance, and strict invariance. CFA can be used to assess these varying types of measurement invariance by determining whether relevant model parameters (i.e., intercepts, loadings, or unique variances) are the same across groups—in this case, boys and girls.

Tests of measurement invariance are typically structured by first testing the weakest form of invariance, followed by successively testing more stringent models, until invariance cannot be achieved. See Table 3-1 for a summary of types of measurement invariance and their respective criteria for achieving invariance.

Table 3-1. Types of Measurement Invariance and Criteria for Concluding Invariance

Type of Measurement Invariance	Criteria for Concluding Invariance
Configural invariance	Requires indicators load on the same factor across groups
Metric invariance	Requires factor loadings be invariant across groups, but not indicator intercepts and unique variances
Scalar invariance	Requires both factor loadings and indicator intercepts be invariant across groups, but not unique variances
Strict invariance	Requires factor loadings, indicator intercepts, and unique variances be invariant across groups

Types and Implications of Measurement Invariance

Configural Invariance

The weakest form of measurement invariance is configural invariance, which involves the nonmetric invariance of the factor pattern across groups (Widaman & Reise, 1997). If a measure demonstrates configural invariance, the indicators load onto the same factor(s), or latent construct(s), across groups (e.g. boys and girls). In other words, the measure has the same configuration of loadings on factors and configural invariance is achieved.

If a measure does not demonstrate configural variance, the problem is serious, suggesting that different latent constructs are being measured in each group (Millsap, 2011). For example, in a study examining gender differences in the amount of TDV perpetrated, failure to achieve configural invariance suggests the scale is not even structured the same for girls and boys—i.e., that items are cross-loading by gender onto different factors or dimensions of the underlying latent construct. Addressing the problem requires reconsidering development or selection of indicators (Milfont & Fischer, 2010; Widaman & Reise, 1997).

Metric Invariance

If configural variance is achieved, the next most stringent form of measurement invariance is tested: metric invariance. Metric invariance requires not only that the same items load on the same factor(s) in the groups (i.e., as is required for configural invariance), but also that the magnitude of the factor loadings for each item be equivalent across groups. This form of invariance, however, does not require that the intercepts and unique variances associated with each indicator be invariant across groups.

Achieving metric invariance suggests that equivalent item-level reliability exists across groups, i.e., that there are equivalent factor loadings or weights—that the items are of equivalent importance for girls and boys. Metric invariance is a requirement for deriving scale scores.

Lack of support of a metric invariance model suggests differential item functioning, meaning that one or more items is behaving differently across groups. In other words, each group is interpreting the item differently. Consequently, the item is not reliable because it is not measuring the same “thing” for each group and may be of different importance, or weight, for each group. For example, in a study examining gender differences in the amount of TDV perpetrated, failure to achieve metric invariance suggests that the importance of any particular item, e.g., “pushed, grabbed, shoved, or kicked them” may exert undue influence on the latent factor, e.g., physical TDV perpetration, in ways that will bias the scale scores.

Because a failure to achieve metric invariance essentially calls into question the conclusions of any analyses invoking such measures, one can either accept the implications of a lack of metric invariance on the findings by recognizing the results are tenuous at best, or one can attempt to identify and delete problematic indicators to try to achieve metric invariance with a subset of the indicators.

Scalar Invariance

If metric invariance is achieved, the next most stringent form of measurement invariance is tested—scalar invariance—which requires that both the magnitude of the factor loadings and the indicator intercepts be invariant across groups. This form of invariance, however, does not require that the unique variances of the indicator be invariant across group. Scalar invariance is a prerequisite to the comparison of latent means; it is necessary for any testing of group mean differences.

Although achieving metric invariance indicates the established loadings are the same, achieving scalar invariance conveys the intercepts are the same—i.e., the function of the factor means will be equivalent across groups. If scalar invariance is achieved, the data suggest that differences between groups at the item level can be explained in terms of differences at the latent factor mean level (Marsh et al., 2011). For example, when scalar invariance is achieved, a physical TDV factor model regressed on gender will yield unbiased effects. Significant differences will be meaningful, real, and valid. For this reason, support for scalar invariance models lends credibility to study results using measures under examination.

Strict Invariance

If scalar invariance is achieved, the next most stringent form of measurement invariance is tested: strict, or full, measurement invariance. Strict measurement invariance holds when there are no group differences in any of the said model parameters (i.e., factor loadings, intercepts, and unique variances). If strict invariance is achieved, the data suggest that groups are equivalent on the underlying latent construct and that the measurement tools accurately capture this equivalence (Widaman & Reise, 1997). Strict invariance implies that any systematic group (e.g., gender) differences in means, covariances or correlations, and regression coefficients are due to

group (e.g., gender) differences on the latent factor itself (e.g., TDV perpetration). It indicates that unique variances—i.e., independent influences that affect each item’s variability—are the same across groups. Because of its exacting requirements, strict invariance is an ideal not often achieved. For this reason, achieving scalar invariance, rather than strict invariance, is typically acceptable for measurement purposes.

In summary, ignoring possible gender differences in measurement models can influence the magnitude of results, if not entirely alter conclusions about model results (Williams et al., 2010); understanding the typology and degree of measurement invariance will have implications for conclusions. If, for example, a TDV perpetration measure achieves scalar or strict measurement invariance by gender, it lends support to the validity of study results from prior studies that have used that measure to examine gender differences. If, however, a TDV perpetration measure achieves only metric, or worse yet, configural, invariance, the results of analyses using that measure should be treated as tenuous. Failure to achieve metric or configural invariance suggests the need for revisions to the TDV perpetration scale and its items to ensure its validity for use in future studies of TDV perpetration and gender.

Existing Studies of Measurement Invariance among Key Variables of Interest

To date, only two studies have assessed any form of measurement invariance by gender on the key study constructs. Marsh et al. (2011) studied measurement invariance by gender of a bullying measure—the Adolescent Peer Relations Instrument—among a sample of middle and high school students in Australia, concluding support for configural, metric, and scalar invariance; however, results did not support strict invariance because measurement errors of unique variances were systematically larger for boys than girls. Because the measure achieved configural, metric, and scalar invariance, the measure is considered reliable across groups and

results should be interpreted accordingly. It is unclear whether similar findings would hold among a sample of middle school students in the United States.

Nocentini et al. (2011) conducted a study of measurement invariance of the Physical Dating Aggression Scale among high school samples in Canada and Italy. This scale is a revised version of the CTS (Conflict Tactics Scale) Physical Aggression Scale modified to make the items more appropriate for teens (Straus, 1979; Straus et al., 1996; Williams et al., 2008). They examined multiple-group models by testing configural invariance and then metric and scalar invariance. The responses to the items on the scale examined were categorical rather than continuous; having categorical rather than continuous indicators requires special statistical considerations that result in the need to test metric and scalar invariance simultaneously (Muthén & Muthén, 1998–2012). Configural invariance was achieved. On their test of metric/strict invariance, results indicated partial measurement invariance across gender in each of the two countries. Partial measurement invariance exists when some, but not all, parameters are invariant. Their results suggest that one item did not achieve metric invariance: “slapping, kicking or biting;” the factor loadings for that one item differed significantly by gender. They, therefore, used the term partial invariance to suggest that some, but not all, of the items were invariant.

These two measurement studies underscore the need for further investigation. No tests of measurement invariance by gender have been conducted using a sample of middle school students in the United States on any of the key variables of interest presented in the proposed study: bullying perpetration, sexual harassment perpetration, or TDV perpetration.

Current Study

The current study addresses a key issue relevant for research on TDV, sexual harassment, and bullying among youth: comparability of measurement across gender. The overarching goal of the proposed study is to determine whether frequently used measures of sexual harassment, bullying perpetration, and TDV, including measures for assessing physical, psychological, and electronic dating violence, are invariant for middle school girls and boys. CFA using structural equation modeling (SEM) will be used to test all types of invariance. SEM provides tools that can assess measurement invariance across gender for both latent and observed variables. Findings have important implications for the interpretation of past research and will inform future studies.

Methods

Sample and Procedures

RTI International collected the data for this study as part of an independent evaluation of *Start Strong: Building Healthy Teen Relationships*, a national program of the Robert Wood Johnson Foundation and Blue Shield of California Foundation in collaboration with Futures Without Violence. Eleven grantee sites participated in this initiative. Only those grantee sites implementing the *Safe Dates* curricula during the 2010-11 academic school year to seventh graders only were eligible to participate in the student effectiveness evaluation; a total of four intervention schools from three grantee sites subsequently agreed to participate. The quasi-experimental longitudinal evaluation design matched four comparison schools from three geographically and racially diverse cities across the country to the participating intervention schools on the following criteria: school size; percentage of free/reduced lunch; race/ethnicity;

socio-historical and cultural city contexts. Data for this study were derived from baseline data completed in fall 2010 from seventh grade students enrolled in the four comparison schools only.

Prior to baseline survey administration, students were recruited, parental consent was then obtained, and finally students were assented—in that order. Eligibility criteria for student participation included ability to complete the questionnaire in English or Spanish, and not being in a self-contained special education class; students in self-contained classes were not included owing to severe mental and physical handicaps that precluded their ability to complete the instruments in ways that would protect their confidentiality. Several weeks prior to data collection, eligible students were given a letter explaining the study and were asked to deliver the letter to their parent(s). Only those students who provided written parent permission were enrolled in the study.

The data were collected using paper-and-pencil, self-administered questionnaires in either small- or large-group settings, depending on the preference of the school, during regular school hours. Each survey administration had at least two trained field data collectors present. Teachers were asked to remain present when possible to maintain order; however, they were instructed not to circulate or answer questions about the survey. The study and data collection procedures were approved by the Institutional Review Board of RTI International.

A total of 1,516 students from the four comparison schools met the two eligibility criteria. Of these students, parental permission for participation was obtained from a total of 808 students (53% of those eligible), and 754 students (50% of those eligible) completed the baseline survey. The analytic sample includes all students in the four comparison schools who completed the baseline instrument (N = 754). This sample was 49.6% male, and was 27.9% White, 33.3% Black, 26.4% Latino, and 12.5% of another race/ethnicity or of multiple race/ethnicities.

Measures

In this study the students self-reported the measures used, which included perpetration of the following behaviors: physical dating violence, psychological dating violence, electronic dating violence, sexual harassment, and bullying. For this study, response options for each of the key variables of interest were coded dichotomously: never (0), any (1).

TDV Behavioral Measures

Physical TDV perpetration. Students were asked to complete a modified Families for Safe Dates physical dating violence perpetration scale (Foshee et al., 2012). Students were asked to respond to the question, “How many times in the last 6 months have you done these things to a boyfriend or girlfriend? Do not count it if you did it in self-defense.” Five items were used to assess physical dating violence perpetration: “scratched or slapped them;” “physically twisted their arm or bent back their fingers;” “pushed, grabbed, shoved, or kicked them;” “hit them with your fist or with something else hard;” “beat them up.”

Psychological TDV perpetration. Students were asked to complete the Families for Safe Dates (FSD) Psychological Dating Abuse Perpetration Scale (Foshee et al., 2012). Students were asked to respond to the question, “How many times in the last 6 months have you done these things to a boyfriend or girlfriend?” Five items were used to assess psychological TDV perpetration: “said something to hurt their feelings on purpose;” “insulted them in front of others;” “would not let them do things with other people;” “made them describe where they were every minute of the day;” “threatened to hurt them.”

Electronic TDV perpetration. Students were asked to complete a modified Youth Internet Safety Scale (Finkelhor, Mitchell, & Wolak, 2000; Teenage Research Unlimited, 2007). Students were asked to respond to the question, “How many times in the last 6 months have you

done the following things to a boyfriend or girlfriend using a cell phone, email, IM, text messaging, Web chat, a blog, or a networking site like MySpace or Facebook?” Eight items were used to assess electronic dating violence perpetration: “called them names, put them down, or said really mean things to them;” “contacted them when they did not want you to, just make them mad;” “tried to make them afraid;” “spread rumors about them;” “made them afraid to not respond to you because of what you might do;” “showed private or embarrassing pictures/video of them to others;” “threatened to hurt them physically;” “repeatedly checked up on them to see where they were.”

Sexual Harassment Perpetration

Students were asked to complete a modified American Association of University Women Sexual Harassment Survey (AAUW, 2001). Students were asked to respond to the question, “In the last 6 months, how many times have you done any of these things to someone at school?” Six items were used to assess sexual harassment perpetration: “touched, grabbed, or pinched someone in a sexual way;” “spread sexual rumors about them;” “made sexual jokes about someone;” “made sexual gestures or looks at someone;” “showed, gave, or left someone sexual pictures, messages, or notes;” “wrote sexual messages about someone on bathroom walls, locker rooms, or black boards.”

Bullying Perpetration

Students were asked to complete a modified Bullying scale (Espelage & Holt, 2001). Students were asked to respond to the question, “In the last 6 months, how many times have you done the following things to one or more students at school?” Ten items were used to assess bullying perpetration: “upset someone for the fun of it;” “tried to scare someone;” “teased someone;” “picked on someone;” “pushed, shoved, slapped or kicked someone;” “threatened to

hurt or hit someone;” “left someone out from your group of friends;” “made fun of someone;” “called someone names;” “started a physical fight with someone.”

Analysis Strategy

The study aim was addressed by conducting SEM in two stages: tests of measurement models and then tests of measurement invariance.

Measurement Models

In the first stage of analyses, measurement models were identified by conducting CFA on the scales for measuring the following constructs: physical TDV, psychological TDV, electronic TDV, and sexual harassment. The scales measuring these four constructs were designed to be single-factor scales. Thus, CFA was used to confirm that one latent, or underlying factor lay beneath the identified set of indicators for each construct. The bullying measure was also designed to be a single-factor scale. However, instead of first conducting a CFA specifying a single-factor scale, an exploratory factor analyses (EFAs) was first conducted to examine whether the bullying measure yielded a one-factor or two-factor solution by gender. This was done because the bullying scale included items that assessed both direct and indirect bullying, and gender differences have been noted in the perpetration of these types of bullying. Results from meta-analyses (Card et al., 2008) and systematic reviews of the literature (Archer & Coyne, 2005) indicate that boys tend to perpetrate more direct bullying than girls, but there is little gender difference in use of indirect bullying (i.e., although in the meta-analysis by Card et al., 2008, girls perpetrate statistically significantly more than boys, the difference was trivial in magnitude). All models were evaluated using established goodness-of-fit indices (described below).

Measurement Invariance

Following the assessment of measurement models, and only when good model fit was achieved, multiple-group confirmatory factor analysis (MG-CFA) was used to test for measurement invariance by gender in the physical TDV, psychological TDV, electronic TDV, sexual harassment, and bullying measures. Specifically, these MG-CFA analyses tested whether girls and boys perceived items differently. For these analyses, constraints were added to the measurement models to equate various parameters (i.e. factor loadings, intercepts, unique variances) across gender and tested the degree of measurement equivalence in each construct (Williams et al., 2010). Stated differently, invariance constraints were systematically added until either strict invariance was achieved or any further constraints produced lack of model fit, i.e., until the model did not fit the data as indicated by unacceptable goodness-of-fit indices.

Thus, for each MG-CFA, configural invariance (i.e., the unconstrained or base model) was tested first; unconstrained models allow parameters to vary, by gender in this case, whereas constrained models fix or specify parameters to be the same for each gender. The test of configural invariance compared whether the model specifications (i.e., in this case, all parameters were unconstrained) fit the data for girls *and* boys. If achieved, metric and scalar invariance (constrained model) were then tested simultaneously; metric and scalar invariance must be constrained in tandem when treating categorical (i.e., noncontinuous) data (Muthén & Muthén, 1998–2012). To test for metric and scalar invariance, the factor loadings and intercepts were constrained to be equal for boys and girls (unique variances were not), and another MG-CFA model was conducted in MPlus; this test compared whether the model specifications fit the data for girls and boys. Finally, if metric and scalar tests of invariance were achieved, tests of

strict invariance were followed by conducting yet another MG-CFA with all parameters constrained to be equal for boys and girls.

All analyses were conducted in MPlus 6.11 (Muthén & Muthén, 1998–2012). Owing to the binary coding of response options, MPlus employed the mean and variance-adjusted least-squares estimator WLSMV (weighted least squared mean variance). Although delta parameterization is the default using WLSMV estimation, measurement invariance analyses specified theta parameterization precisely because of the binary coding of response options. Using delta parameterization is unsuitable when running multiple-group models that include testing residual variances for the factor indicators because the delta parameters are functions of factor variances, factor loadings, and residual variances. When researchers test for measurement invariance of binary measures across groups, they must use theta parameterization instead because it allows access to the residual variances of the factor indicators as parameters. In other words, it allows specification of and information about the residual variances (unexplained variance in the observed indicators of factors), which is necessary for testing strict invariance (Muthén & Muthén, 1998–2012).

Fit Indices

Fit indices are measures of how well the observed and model-indicated covariance matrices match. Several goodness-of-fit measures were used to evaluate the CFAs in both stages of analyses (Brown, 2006) including the weighted root mean square residual (WRMR), the comparative fit index (CFI; Bentler, 1990), and the root-mean-square error of approximation (RMSEA). Acceptable cutoffs for these indices are: 1.0 or lower for WRMR, 0.95 or higher for CFI, and 0.05 or lower for RMSEA (Browne & Cudeck, 1993; Hu & Bentler, 1999).

Additionally, chi-square ratio tests were calculated by dividing the chi-square by the degrees of freedom (DF); a chi-square ratio under 2 is an acceptable cutoff, and indicates good model fit. Chi-squared difference tests (DIFF test) were used to test differences between nested models in CFA, i.e., models that are identical except that one of the models constrains parameter(s) that the other one does not; significant results indicate a lack of measurement invariance by group, whereas nonsignificant results indicate measurement invariance by group. While the chi-square ratio test may be computed mathematically, MPlus automatically produces the DIFF test results.

Missing Data

MPlus's WLSMV estimation accommodates for missing data using listwise deletion. Listwise deletion removes cases (subjects) if any of the variables included in the analyses has a missing value. Therefore, the N varied across CFA models; the sample size used in models ranged from 526 to 730 depending on missing data on the scale measuring each type of relational aggression: bullying (N=730); sexual harassment (N=726); physical TDV (N=526); psychological TDV (N=519); electronic TDV (N=518). When one is testing for measurement invariance in MPlus using the DIFF test command, multiple imputation is not permissible (Mplus Home, 2006; Muthén & Muthén, 1998–2012).

Results

Measurement Models

Prior to conducting tests of measurement invariance, measurement models were conducted on each of the five scales of interest. CFAs yielded sound goodness-of-fit indices when specifying a one-factor solution for the physical, psychological, and electronic TDV measures

and the sexual harassment measure. As mentioned previously, an EFA was first conducted on the bullying scale, stratifying by gender, to determine if a one- or two-factor solution was a better fit to the data, followed by a CFA. Both the one-factor and two-factor solutions from the EFAs yielded strong goodness-of fit indices for boys and girls. Despite the fact that the chi-square ratio was slightly elevated (RATIO=3.07), taken together, the goodness-of-fit indices suggest the data fit the model well (RMSEA=0.05; CFI=0.98; WRMR=1.11). In addition, in both the boy and girl models, the one-factor models had the largest eigenvalues when compared to the two-factor models. Further, a one-factor solution is more parsimonious than a two-factor solution. The scientific principle of parsimony suggests that “other things being equal, fewer factors are better than many factors” (Goldberg & Velicer, in press). Therefore, owing to strong fit, largest eigenvalues, the principle of parsimony, and also in line with the developer’s intent (Espelage & Holt, 2001), a single-factor model was retained for subsequent analyses (see Table 3-2).

Table 3-2. Results—Measurement Models: Goodness-of-Fit Indices

	N=	Chi-Square (DF)	RATIO	P-Value	RMSEA	CFI	WRMR
Physical TDV Perp	526	1.17 (5)	0.23	0.95	0.00	1.00	0.19
Psychological TDV Perp	519	9.86 (5)	1.97	0.08	0.04	0.99	0.61
Electronic TDV Perp	518	17.430 (20)	0.87	0.63	0.00	1.00	0.49
Sexual Harassment Perp	726	9.77 (9)	1.09	0.37	0.01	0.99	0.51
Bullying Perp	730	107.57 (35)	3.07	0.00	0.05	0.98	1.11

Note: CHI SQ=Chi-Square; DF=Degrees of Freedom; Perp=perpetration; RATIO=Chi-Square ratio test; RMSEA=root mean-square error of approximation; CFI=comparative fit index; TDV=teen dating violence; WRMR=weighted root mean square residual. Goodness of fit is indicated by Ratio < 2; p-value > .05; RMSEA = 0.05 or lower; CFI = 0.95 or higher; WRMR = 1.0 or lower; DIFF TEST criteria = $p < 0.05$

Measurement Invariance

Physical TDV Perpetration (Table 3-3)

The MG-CFA for configural invariance (unconstrained model) across gender was achieved. Overall fit indices (RMSEA= 0.00, CFI=1.00; WRMR=0.18) indicate goodness of fit. These results suggest that an equivalent factor item structure exists for girls and boys. To test metric/scalar invariance, constraints were imposed to factor loadings and intercepts to fix or equate the parameters across groups. The difference test between these nested models (the unconstrained model and the model that constrained the factor loadings and intercepts to be the same for boys and girls) was not significant (Diff= 5.36 (3), $p = 0.15$), indicating that the loadings and intercepts were invariant by gender (metric and scalar invariance). To test for strict invariance, constraints to unique variances were then imposed by fixing or equating them across groups (the unconstrained model and the model that constrained the factor loadings, intercepts, and residuals to be the same for boys and girls); the difference test was nonsignificant (Diff= 1.78 (5), $p = 0.88$), indicating that strict measurement invariance by gender was achieved. This same analytical process was executed for all variables below.

Table 3-3. Results—Tests of Measurement Invariance for Physical TDV Perpetration

	N= girls; boys	CHI SQ (DF)	P- Value	RATIO	DIFF TEST (DF); P-value	RMSEA	CFI	WRMR
Unconstrained	270; 250	2.43 (10)	0.99	0.24	--	0.00	1.00	0.18
Metric/Scalar	270; 250	7.37 (13)	0.88	0.57	5.36 (3), $p=0.15$	0.00	1.00	0.49
Strict	270; 250	9.33 (18)	0.95	0.52	1.78 (5), $p=0.88$	0.00	1.00	0.56

Note: CHI SQ=Chi-Square; DF=Degrees of Freedom; RATIO=Chi-Square ratio test; DIFF TEST= Chi-Square difference tests; RMSEA=root mean-square error of approximation; CFI=comparative fit index; WRMR=weighted root mean square residual. Goodness of fit is indicated by Ratio < 2; p-value > 0.05; RMSEA = 0.05 or lower; CFI = 0.95 or higher; WRMR = 1.0 or lower; DIFF TEST criteria = $p < 0.05$.

Psychological TDV Perpetration (Table 3-4).

The MG-CFA test of configural invariance (unconstrained model) by gender was achieved. The model yielded strong goodness of fit (RMSEA=0.040, CFI=1.00; WRMR=0.73), indicating an equivalent factor structure by gender. The difference test between the unconstrained and constrained model was not significant (Diff=2.68 (3), $p=0.44$), suggesting metric/scalar invariance. Results for the subsequent strict invariance test were also nonsignificant (Diff=2.61 (5) $p=0.76$), indicating the unique variances are also invariant by gender.

Table 3-4. Results—Tests of Measurement Invariance for Psychological TDV Perpetration

	N= girls; boys	CHI SQ (DF)	P-Value	RATIO	DIFF TEST (DF); P- value	RMSEA	CFI	WRMR
Unconstrained	270; 242	13.97 (10)	0.17	1.40	--	0.04	1.00	0.73
Metric/Scalar	270; 242	15.56 (13)	0.27	1.20	2.68 (3), $p=0.44$	0.03	1.00	0.81
Strict	270; 242	17.55 (18)	0.49	0.98	2.61 (5) $p=0.76$	0.00	1.00	0.88

Note: CHI SQ=Chi-Square; DF=Degrees of Freedom; RATIO=Chi-Square ratio test; DIFF test= Chi-Square difference tests; RMSEA=root mean-square error of approximation; CFI=comparative fit index; TDV=teen dating violence; WRMR=weighted root mean square residual. Goodness of fit is indicated by ratio < 2; p-value > .05; RMSEA = .05 or lower; CFI = .95 or higher; WRMR =1.0 or lower; DIFF test criteria = $p<0.05$.

Electronic TDV Perpetration (Table 3-5)

The MG-CFA of configural invariance (unconstrained model) indicated strong goodness of fit (RMSEA=0.00, CFI=1.00; WRMR=0.77), again suggesting equivalence across groups. When constraints were added to factor loadings and intercepts, the difference test between the nested models yielded nonsignificant results (Diff= 5.99 (6), $p = 0.42$); the measure, therefore, achieved

metric/scalar invariance. Constraints to unique variances were then added to the model. The test between the metric/scalar model and strict model, however, indicated a significant difference (Diff= 21.16 (8), $p = 0.01$). Therefore, strict invariance was not achieved; the unique variances are not invariant by gender.

Table 3-5. Results—Tests of Measurement Invariance for Electronic TDV Perpetration

	N= girls; boys	CHI SQ (DF)	P- Value	RATIO O	DIFF TEST (DF); P-value	RMSE A	CFI	WRM R
Unconstrained	265; 240	38.67 (40)	0.53	0.97	--	0.00	1.00	0.77
Metric/Scalar	265; 240	44.23 (46)	0.54	0.96	5.99 (6); $p=0.42$	0.00	1.00	0.86
Strict	265; 240	65.30 (54)	0.14	1.21	21.26 (8), $p=0.01$	0.03	1.00	1.18

Note: CHI SQ=Chi-Square; DF=Degrees of Freedom; RATIO=Chi-Square ratio test; DIFF test= Chi-Square difference tests; RMSEA=root mean-square error of approximation; CFI=comparative fit index; TDV=teen dating violence; WRMR=weighted root mean square residual. Goodness of fit is indicated by ratio < 2; p-value > 0.05; RMSEA = 0.05 or lower; CFI = 0.95 or higher; WRMR =1.0 or lower; DIFF test criteria = $p<0.05$.

Sexual Harassment Perpetration (Table 3-6)

The MG-CFA of configural measurement invariance (unconstrained) was achieved. The model yielded strong goodness of fit (RMSEA=0.00, CFI=1.00; WRMR=0.54). Constraints to factor loadings and intercepts were then added. The difference test between the unconstrained model and constrained (metric/scalar) model was nonsignificant (Diff= 3.34 (4), $p = 0.525$), indicating gender invariance across factor loadings and intercepts. When constraints were added to the unique variances to test for strict invariance, the difference test was also nonsignificant (Diff= 11.99 (6), $p = 0.06$), suggesting the unique variances are the same for girls and boys. The unique variances are invariant by gender, and thus strict invariance was achieved.

Table 3-6. Results—Tests of Measurement Invariance for Sexual Harassment Perpetration

	N= girls; boys	CHI SQ (DF)	P-Value	RATIO	DIFF TEST (DF); P- value	RMSEA A	CFI	WRMR R
Unconstrained	367; 350	11.76 (18)	0.86	0.65	--	0.00	1.00	0.54
Metric/Scalar	367; 350	14.90 (22)	0.87	0.68	3.34 (4); $p=0.525$	0.00	1.00	0.62
Strict	367; 350	29.01 (28)	0.41	1.04	11.99 (6); $p=0.06$	0.01	1.00	0.98

Note: CHI SQ=Chi-Square; DF=Degrees of Freedom; RATIO=Chi-Square ratio test; DIFF test= Chi-Square difference tests; RMSEA=root mean-square error of approximation; CFI=comparative fit index; TDV=teen dating violence; WRMR=weighted root mean square residual. Goodness of fit is indicated by ratio < 2; p-value > 0.05; RMSEA = 0.05 or lower; CFI = 0.95 or higher; WRMR =1.0 or lower; DIFF test criteria = $p<0.05$.

Bullying Perpetration (Table 3-7)

Results from the test for configural invariance (unconstrained model) suggest the groups have equivalent factor structures by gender. Goodness-of-fit indices suggest the one-factor model fit the data well for girls and boys (RMSEA=0.05, CFI=0.98; WRMR=1.27). After constraints were added to test the metric/scalar model, the difference test between the unconstrained and constrained models was nonsignificant (Diff= 5.20 (8), $p = 0.74$). The measure, therefore, achieved metric/scalar invariance by gender. After adding constraints to the unique variances, the strict test for measurement invariance was conducted. Difference tests between the metric/scalar and strict models were significant (Diff= 21.55 (10), $p = 0.02$), suggesting a lack of strict invariance. However, modification indices pointed to one problematic item: “left someone out from your group of friends.” Freeing the residual among boys for that one problematic item and then retesting the difference between the nested models resulted in a nonsignificant finding

(Diff=10.56 (9), $p=0.31$). In sum, this measure achieved partial strict invariance when this one item's residual was unconstrained.

Table 3-7. Results—Tests of Measurement Invariance for Bullying Perpetration

	N= girls; boys	CHI SQ (DF)	P-Value	RATIO	DIFF TEST (DF); P-value	RMSE A	CFI	WRM R
Unconstrained	361; 351	135.60 (70)	0.000	1.99	--	0.05	0.98	1.27
Metric/Scalar	361; 351	138.50 (78)	0.000	1.78	5.20 (8), $p=0.74$	0.05	0.99	1.30
Strict	361; 351	154.92 (88)	0.000	1.75	21.55 (10), $p=0.02$	0.05	0.99	1.52
Strict_Partial (freeing B7 residual among males)	361; 351	137.48 (87)	0.0005	1.58	10.56 (9), $p=0.31$	0.04	0.99	1.40

Note: CHI SQ=Chi-Square; DF=Degrees of Freedom; RATIO=Chi-Square ratio test; DIFF test= Chi-Square difference tests; RMSEA=root mean-square error of approximation; CFI=comparative fit index; TDV=teen dating violence; WRMR=weighted root mean square residual. Goodness of fit is indicated by Ratio < 2; p -value > 0.05; RMSEA = 0.05 or lower; CFI = 0.95 or higher; WRMR = 1.0 or lower; DIFF test criteria = $p < 0.05$.

Discussion

This present study contributes to the literature on the psychometric properties of measures commonly used in the fields of TDV, sexual harassment, and bullying among boys and girls. Despite the accelerated growth of these respective fields, no previous study has investigated measurement invariance on TDV measures, sexual harassment, or bullying measures in the United States.

Both the physical and psychological TDV perpetration measures, as well as the sexual harassment measure, achieved strict measurement invariance. Strict invariance implies that any systematic group (e.g., gender) differences in means, covariances or correlations, and unique

variances are due to group (e.g., gender) differences on the latent factor itself (e.g., physical TDV perpetration). Therefore, a reasonable inference is that all of these measures are performing consistently for girls and for boys, i.e., that girls and boys perceive and respond to the items similarly, with no differences in factor loadings, intercepts, or unique variances attributable to gender.

Bullying perpetration demonstrated the next most stringent test of invariance by gender. The bullying measure achieved partial strict invariance, suggesting scale items performed equivalently for girls and boys with the exception of one item: “left someone out from your group of friends.” However, this one item did achieve metric/scalar invariance, which is acceptable for measurement purposes.

Electronic TDV perpetration, on the other hand, did not achieve strict invariance. Because of the exacting nature that strict invariance’s namesake implies, it is an ideal not often achieved. For this reason, achieving scalar invariance is acceptable for measurement purposes. This measure achieved configural and metric/scalar invariance. Therefore, comparisons and analyses of scores are acceptable and yield meaningful interpretations.

This study has several limitations. The sample is not nationally representative, and thus, findings may not generalize to adolescents across the nation. Also although the sample was drawn from three geographically and racially diverse areas of the country, the low response rate hinders generalizability of the study findings to similar areas. In addition, sample sizes, though sizable for studies of measurement invariance, were reduced owing to listwise deletion, which further limits generalizability of study findings. And finally, the scales that were tested for measurement invariance were modifications of commonly used scales and, therefore, the findings apply only to these specific modified versions.

Despite these limitations, the study contributes to the extremely limited body of research on existing, commonly used measures of TDV, sexual harassment, and bullying perpetration. These findings increase confidence in the validity of gender difference findings from past and future studies using these scales, with the caveat that findings from this study sample may not hold among a different study sample. Future studies of TDV, sexual harassment, and bullying that use these scales should probe measurement invariance among this study's key measures of interest to cross-validate these findings. Further research is needed to enhance the field's understanding as to whether and when gender affects the factor structure and measurement invariance of aggression measures.

CHAPTER 4: TEEN DATING VIOLENCE, SEXUAL HARASSMENT, AND BULLYING AMONG MIDDLE SCHOOL STUDENTS: EXAMINING MEDIATION AND MODERATED MEDIATION BY GENDER (*MANUSCRIPT #2*)

Introduction

Although theoretically and methodologically sound teen dating violence (TDV) research has markedly increased over the last few years, few well-designed longitudinal TDV studies existed until recently (for a review, see Foshee & Matthew, 2007). Consequently, TDV prevention programs—including the Start Strong initiative (2008–2012) from which this study’s data are drawn—have been largely informed by cross-sectional data to identify risk factors and appropriate intervention targets. The need for longitudinal research to assess temporality and consequences of TDV remains. This study uses longitudinal data to investigate the developmental pathway(s) among three forms of aggression: perpetration of bullying, sexual harassment, and dating violence among adolescents in middle school. Specifically, this study seeks to determine whether sexual harassment mediates the relationship between bullying and TDV and whether these relationships vary by gender.

Although this study is not testing mediation as part of a program effectiveness study designed to directly inform a specific program’s refinement and development, this study can advance science in ways that can propel program development. For example, should mediational analyses conducted here conclude sexual harassment as a mediator of the relationship between bullying and TDV, program developers for TDV prevention programs—in addition to including bullying prevention—would be well advised to develop and integrate evidence-informed/-based

sexual harassment prevention programming into existing TDV evidence-based prevention programming to reduce TDV. Examining this developmental pathway, including whether they vary by gender, will better position program developers and practitioners to more precisely target and intervene in peer aggression behaviors predictive of TDV earlier, thereby arresting the developmental pathway leading to TDV itself and also preventing the negative outcomes resulting from TDV.

Conceptual Framework for Examining the Pathway among Bullying, Sexual Harassment, and Dating Violence

An Integrated Approach to Examining Dyadic Aggression

As Ozer et al. (2004) aptly note, research on bullying, sexual harassment, and dating violence among adolescents has largely been conducted in separate literatures. Advancing youth violence prevention requires a more sophisticated reckoning with aggressive behaviors. The question of whether aggressive behavior persists across various relationships and contexts—that is, whether and when certain types of aggressive behaviors (e.g., bullying) overlap with other types of aggressive behaviors (e.g., sexual harassment), as well as whether and when different types of aggressive behaviors share risk factors—is central to understanding aggression among youth. Increasing this understanding will advance the development of effective youth violence prevention programs—which tend to focus on bullying, sexual harassment, or dating violence—by integrating a more sophisticated, integrated approach to youth violence prevention programming.

A Developmental Life Span Perspective on Aggression: Bullying, Sexual Harassment, and Dating Violence. Study Aim 2a investigates the developmental progression from bullying

to sexual harassment to TDV. A developmental lifespan perspective is useful when considering the context of aggressive behavior in early adolescence and to understand the interconnections among bullying, sexual harassment, and dating violence. As children transition into adolescence, aggressive behaviors may transform as young teens are faced with new age-relevant challenges (Pepler et al., 2006). A number of defining social processes shift during the transition to early adolescence, including the composition of peer groups, emerging romantic interests, and changing norms that support problem behaviors (Miller et al., 2013).

Early adolescence and transition to middle school bring major changes in social affiliations. Previously established peer groups become destabilized as children move from fairly structured, small elementary school settings to larger, more impersonal middle school environments (Pellegrini & Bartini, 2001). At the same time, and with the onset of puberty, the gender-segregated childhood peer groups gradually shift to mixed-gender groups (Connolly, Pepler, Craig, & Tardash, 2000). Early dating emerges from these mixed-gender groups as youth explore budding romantic interests. Young adolescents in particular are concerned with how attractive they are and how mixed-gender forays will be perceived by their peers (Jones & Crawford, 2006). Moreover, puberty heightens vulnerability around sexuality and romantic interests.

Also changing in the transition to early adolescence are norms surrounding aggression. As youth enter adolescence, aggressive behaviors are increasingly linked with enhanced social status among peers (Cillessen & Mayeux, 2004). Compared with earlier childhood, aggressive behaviors become a statement of autonomy and a way to prove maturity (Moffitt, 1993). Peer norms also shift from complying with authority figures (e.g., parents, teachers) to emulating peers who challenge authority (Miller-Johnson & Costanzo, 2004). The peer context shifts to

mixed-gender groups where aggressive behaviors are seen as a desired asset that enhances power and status. Young adolescents may view aggression positively as these behaviors serve the function of asserting power and control within social hierarchies.

In this context, bullying, sexual harassment, and TDV can be viewed as developmentally relevant aggression that is tied to pubertal development and social transitions in early adolescence (Pepler et al., 2006). Within a developmental framework, adolescents may first exert power and control during early adolescence by bullying their peers. As they become increasingly engaged in mixed-gender groups and interested in dating, adolescents may generalize “power-over” aggression to other forms of relationship aggression, including sexual harassment and TDV (Pepler et al., 2006).

Consistent with Pepler et al. (2006), the premise of this proposed study is that the combined use of power and aggression inherent in bullying drives other developmentally relevant expressions of aggression that occur in relationships during a lifetime, including sexual harassment, dating violence, workplace harassment, marital aggression, and elder abuse (Pepler, Craig, & Connolly, 1997). Moffitt’s (1993) concept of heterotypicity also lends conceptual backing for said premise, suggesting that the inclination to use myriad *forms* of aggression changes as a function of age-relevant capacities and emergent developmental issues. This study specifically intends to determine whether adolescents’ enactment of different forms of aggression aligns developmentally with the age-relevant challenges outlined above. Specifically, this study will test whether bullying perpetration developmentally predicts sexual harassment perpetration as pubertal changes heighten vulnerability around sexuality and sexual identity, and, in turn, whether sexual harassment then predicts TDV perpetration as youth begin exploring budding romantic and dating relationships.

Examining Aggression at the Intersection of Two Frameworks: A Developmental Life Span Perspective—and Gender, Power, and the Construction of Masculinity. Study Aim 2b investigates whether the developmental progression from bullying to sexual harassment to TDV varies by gender. This proposed study aim is at the intersection of two frameworks: A Developmental Life Span perspective (undergirding Study Aim 2a), then layered by a framework of Gender, Power, and the Construction of Masculinity (detailed in the following section).

A separate but complementary framework—Gender, Power, and the Construction of Masculinity—presents conceptual backing for analyzing gender as a moderator of the hypothesized developmental pathway. This framework also deals with negotiation of power, specifically how masculinity is used to bolster dominance, control, power, and status in gender-relevant relationships. With this framework, both sexual harassment and TDV are viewed as forms of gender-based violence, which also encompasses intimate partner violence (IPV). In the following section, the framework’s premise is outlined within the field of IPV; the framework is then applied to the study of TDV, and more narrowly, this proposed study.

Gender-based framework and IPV. A gender-based framework recognizes widely accepted historical, social, and political realities concerning men’s violence against women and girls across the globe (Reed et al., 2010). The World Health Organization (WHO) and other major health authorities regard male IPV against women and girls as a public health and human rights crisis worldwide, owing to its population-level impacts on the health and freedom of girls and women and, therefore, societies (Amnesty International, 2004; Garcia-Moreno et al., 2006; Rand, 2008; World Health Organization, 2003).

Clear and consistent evidence for examining and addressing IPV as a gender-based phenomenon exists. Sexual violence against women and girls from intimate partners remains a

pervasive and persistent reality (Tjaden & Thoennes, 2000): they are more likely to be killed by male partners than any other type of perpetrator (Tjaden & Thoennes, 2000; U.S. Department of Justice, 2008). Women and girls are more likely to be injured than men and boys due to violence from a partner (Archer, 2000; Tjaden & Thoennes, 2000; U.S. Department of Justice, 2008). These and other patterns of men's violence against women—both domestically and internationally—squarely position IPV as a gender-based phenomenon.

Construction of masculinity. For these reasons, major health authorities, including WHO, describe IPV as a form of gender-based violence; in other words, the social construction of being male bolsters dominance, control, and power (Connell, 2001; Kaufman, 2001)—and the social construction of being female diminishes social, health, and economic status, and subsequent power within intimate partnerships, families, communities, and societies (Anderson, Simpson-Taylor, & Hermann, 2004; Murnen, Wright, & Kaluzny, 2002; Santana et al., 2006).

Women shoulder many public health burdens (Heise & Garcia-Moreno, 2002; Tjaden & Thoennes, 2000; World Health Organization, 2003). However, the very gender norms that promote and secure a system of male dominance and control—and are the foundation for gender-based violence—also, ironically, yield detrimental health outcomes for males (Reed et al., 2010). Many studies have demonstrated that men who perpetrate partner violence and who hold more traditional gender norms and values related to masculinity (Anderson, Simpson-Taylor, & Hermann, 2004; Murnen, Wright, & Kaluzny, 2002; Santana et al., 2006) are more likely to report greater health risk behaviors, including but not limited to sexual risks for HIV (Decker et al., 2009; Raj et al., 2008), and substance and tobacco use (Feingold, Kerr, & Capaldi, 2008; Temple et al., 2008). Thus, the construction of masculinity, while supporting privileges attained from power, does bear attendant risk.

Some recent IPV and TDV public health studies in the United States have dissented from a gender-based violence framework for understanding IPV. Further, there has been resistance to using a gender-based violence framework for developing prevention and intervention programs to address IPV. Researchers have often put forward empirical evidence of mutual aggression or female perpetration of IPV/TDV (Carney, Buttell, & Dutton, 2006; Chan et al., 2008; Molitor & Tolman, 1998; O'Keefe & Treister, 1998; Romans et al., 2007; Straus, 2007; Straus & Ramirez, 2007; Whitaker et al., 2007), as indicators that IPV/TDV is not, or is no longer, a gender-based problem in the United States (Reed et al., 2010). As Reed et al., (2010) contend, however, eschewing a gender-based framework with a gender-neutral or reciprocal-violence framework on such grounds implies the following: 1) “IPV is a non-gendered phenomenon that affects the health and well-being of men/boys and women/girls similarly and at the population level” and 2) “the etiology and nature of the behavior are similar regardless of perpetrator’s gender” (p 349), neither of which are accurate—empirically or pragmatically—as the following evidence demonstrates.

The use of a gender-based framework in IPV/ TDV research—i.e., as opposed to a gender-neutral or reciprocal-violence framework—in no way suggests that both males and females cannot or do not exhibit unhealthy relationship behaviors, including aggression (Hamby, 2009); rather, the use of a gender-based framework allows that such unhealthy relationship behaviors negatively affect males and females alike. This framework suggests that such behaviors likely have differing etiologies, risk factors, and consequences—and that the behaviors are enacted differently *because of gender* (Reed et al., 2010).

Further, the use of a gender-based framework in IPV/TDV contends with

- 1) ubiquitous research demonstrating male-perpetrated violence against female partners as a threat to women’s health (Reed et al., 2010);

- 2) the supposition that male-perpetrated IPV against female partners is likely rooted in gender inequalities (Santana et al., 2006)— i.e., the dominance and status that males shore up by enacting masculinity—while female-perpetrated IPV against male partners may result from self-defense or poor conflict resolution skills in intimate partnerships (Stuart et al., 2006); and
- 3) the importance of the role of gender in any theory of change guiding public health prevention and intervention programs that address IPV/TDV (Reed et al., 2010; Reed et al., 2011).

In sum, a gender-based framework hinges on the supposition that gender (e.g., masculinity) matters in gender-based violence—in the perpetration of sexual harassment and TDV—to boys more than to girls; stated differently, boys may attach greater importance to shoring up power, dominance, and status as a function of masculinity. In the current study, the relationship among all three behaviors is predicted to be stronger for boys than for girls.

Existing Studies: Empirical Evidence Pointing to Interrelationships among Bullying, Sexual Harassment, and Dating Violence

Studies Examining Both Bullying and Sexual Harassment

Pellegrini (2001) asserts that sexual harassment is a form of bullying and should, therefore, be predicted by bullying. Studies also suggest bullying peaks earlier than sexual harassment (Nansel et al., 2001). To date, four studies link bullying and sexual harassment or sexual violence (DeSouza & Ribeiro, 2005; Espelage, 2011; Pellegrini, 2001; Pepler et al., 2006). However, two of them (DeSouza & Ribeiro, 2005; Pepler et al., 2006), outlined below, have cross-sectional study designs, which prohibit causal inference of a developmental behavioral pathway over time. Additional limitations are noted with each study discussed.

DeSouza and Ribeiro (2005) conducted a study of bullying and sexual harassment perpetration among Brazilian high school students. Results suggested a significant association between bullying and peer sexual harassment perpetration. The sample of students, however, was

from another country and from a high school. A second study by Pepler et al. (2006) investigated associations between bullying perpetration and sexual harassment perpetration among elementary and high school students. Results suggest that both boys and girls who reported bullying others were more likely to report sexually harassing same-sex and opposite-sex peers compared to boys and girls who did not bully. Although these two studies share a common weakness (their cross-sectional study designs), findings suggest that further investigation assessing temporality and causation between bullying and sexual harassment is warranted, particularly among middle school as opposed to high school students.

The other two studies used longitudinal designs. In one of two longitudinal studies of bullying and sexual harassment, Pellegrini (2001) reports bullying perpetration as a significant predictor of sexual harassment perpetration among middle school students but notes that this association was mediated by self-reported dating frequency. Espelage (2011) examined bullying perpetration and subsequent sexual violence perpetration, including sexual harassment, among middle school students; results suggest bullying perpetration as a significant predictor of sexual harassment perpetration over time.

The proposed study builds on these two studies in two ways: (1) because limited evidence suggests bullying as a predictor of sexual harassment, establishing yet another temporal relationship fortifies this nascent evidence base, and (2) the proposed study both examines bullying as a predictor of sexual harassment and further extends the line of inquiry to investigate whether bullying perpetration and sexual harassment perpetration predict dating violence perpetration—and whether sexual harassment perpetration mediates the relationship between bullying perpetration and dating violence perpetration. Finally, (3) the proposed study investigates whether the mediated effect varies by gender.

Basile et al. (2009) issued a call for research that moves from cross-sectional research that investigates the relationships between bullying and sexual harassment, and their attendant risk factors, to using longitudinal data to examine bullying as a *predictor* of sexual harassment. The proposed study does just that, while also controlling for potentially confounding variables—sex, race/ethnicity, and alcohol use—to better ensure the associations are not spurious.

Studies Examining Both Bullying and Dating Violence

The power imbalance typified by bullying and sexual harassment behaviors may also extend into dating relationships. Connolly et al. (2000) found that among young adolescents who bully compared with those who do not, dating is more common, and significant associations exist between bullying perpetration and psychological, as well as physical, dating violence perpetration. Pepler et al. (2006) investigated the relationship between bullying perpetration and dating violence perpetration among middle and high school students, concluding significant associations between bullying and psychological and physical dating violence: boys and girls who reported bullying their peers were more likely to report perpetrating both forms of dating violence than those who did not report bully with one exception: among girls, the association between bullying perpetration and psychological dating violence was nonsignificant. However, both of these studies used cross-sectional datasets, thereby prohibiting causal inference of a developmental behavioral pathway over time. Foshee et al. (2014) examined bullying perpetration as a longitudinal predictor of physical dating violence perpetration among middle school students; findings suggest that direct, but not indirect, bullying perpetration in 6th grade predicted physical dating violence perpetration in 8th grade.

Two additional studies present evidence that warrant consideration as a backdrop for the proposed study; however, these two studies measured peer aggression rather than bullying

specifically. Ozer et al. (2004) conducted a longitudinal study of high school youth that examined peer violence, sexual aggression, and dating violence; their person-centered analyses found that boys who perpetrated both peer aggression and sexual aggression at baseline were more likely to perpetrate dating violence at follow-up; parallel analyses could not be calculated among girls owing to the small number of girls who engaged in sexual aggression. O'Donnell et al. (2006), in their longitudinal study examining aggression and IPV, found that perpetration of aggression during middle school predicts perpetrating IPV by young adulthood. However, the study failed to control for baseline perpetration of IPV in any models; therefore, results may be spurious. To date, no other longitudinal studies have examined bullying perpetration as a predictor of TDV.

Studies Examining Both Sexual Harassment and Dating Violence

Chiodo et al. (2009) conducted a longitudinal study examining the effects of sexual harassment victimization on physical dating violence victimization among high school youth, and found that the former was a significant predictor of the latter for both girls and boys. However, the study failed to control for baseline physical dating violence victimization; therefore, the temporality of relationships cannot be determined. Additionally, using the same longitudinal dataset, Chiodo et al. (2012) concluded that, among high school girls who were dating in grade 11, sexual harassment perpetration in 9th grade predicted two dating violence perpetration profiles in 11th grade: perpetration only and mutually violent. Similarly, this study failed to control for baseline dating violence perpetration profiles. To date, these (Chiodo et al., 2012; 2009) are the only longitudinal studies examining sexual harassment perpetration as a predictor of TDV perpetration. The dearth of literature examining these issues, particularly among middle school youth, should be noted.

Studies Examining Bullying, Sexual Harassment, and Dating Violence

In summary, in recent years evidence has identified links between bullying and sexual harassment (DeSouza & Ribeiro, 2005; Gruber & Fineran, 2008; Pellegrini, 2001; Pepler et al., 2006), bullying perpetration and sexual violence perpetration, which includes but is not limited to sexual harassment perpetration (Espelage, Basile, & Hamburger, 2012); bullying perpetration and psychological dating violence perpetration (Pepler et al., 2006); and bullying perpetration and physical dating violence victimization and perpetration (Connolly, Pepler, Craig, & Tardash, 2000; Pepler et al., 2006); peer aggression perpetration and later IPV perpetration (O'Donnell et al., 2006); and peer aggression perpetration and sexual aggression perpetration and later dating violence perpetration (Ozer et al., 2004). Chiodo et al., has also demonstrated a link between sexual harassment victimization and physical dating violence victimization (Chiodo et al., 2009), as well as sexual harassment perpetration and physical dating violence perpetration and victimization (Chiodo et al., 2012). These findings suggest that bullying, sexual harassment, and dating violence are interrelated, and youth who engage in one form are more likely to engage in another (Pepler et al., 2006).

None of these studies investigated the developmental pathway across *multiple behaviors over time using a longitudinal dataset* among middle school youth. More specifically, none of these studies examined whether sexual harassment mediated the association between bullying and TDV. Also, although some of the studies described above that investigated individual pathways examined gender differences in pathways, almost all of those studies (American Association of University Women Educational Foundation, 2001; Bennett & Fineran, 1998; Champion, Foley, et al., 2008; Connolly, Pepler, Craig, & Taradash, 2000; DeSouza & Ribeiro, 2005; Fineran & Bennett, 1999; Fineran & Bolen, 2006; Foshee et al., 2001; Gruber & Fineran,

2008; Hand & Sanchez, 2000; Holt & Espelage, 2007; Library of Congress, 2011; McDonell, Ott, & Mitchell, 2010; McMaster et al., 2002; Nansel et al., 2001; Pellegrini & Bartini, 2001; Rothman et al., 2010; Simon et al., 2010) examined gender differences by stratifying the sample by gender; this approach does not determine if there are *statistically significant* gender differences in associations. Only two (Foshee et al., 2009; Pellegrini, 2001) used approaches, like assessment of interactions with gender, that can determine whether there were statistically significant gender differences in various pathways. It is important to understand this developmental pathway so that scientists and practitioners can more effectively arrest it and the attendant behaviors.

Current Study

Study Aim 2a

Study Aim 2 is predicated upon a conceptual framework suggesting that aggression in both peer relationships and dating relationships are developmentally relevant phenomena. This conceptual framework is derived from Pepler's (2006) contention that bullying, sexual harassment, and dating violence can be viewed as developmentally relevant forms of aggression tied to pubertal development and social transitions in early adolescence. Within this developmental framework, adolescents may first exert power and control during early adolescence—even during childhood—within peer interactions that takes the form of bullying. Studies (Nansel et al., 2001; Pellegrini & Long, 2002; Pepler, Craig, & O'Connell, 1999) suggest that the bullying prevalence rates decline overall during adolescence except during school transitions (Pellegrini et al., 2010), while other aggressive behaviors such as sexual harassment emerge (McMaster et al., 1997). As youth developmentally advance and become aware of gender

norms and pubertal development, they may begin engaging in the next developmentally relevant form of aggression, sexual harassment, in their attempts to attain power and status through regulating adherence to gender norms and conformity to hetero-normative sexual orientation. Further in the developmental pathway, as youth become increasingly engaged in mixed-gender groups and in dating, adolescents may generalize “power-over” aggression to another form of relationship aggression: TDV (Pepler et al., 2006). Therefore, in light of the empirical gap in the literature, coupled with the conceptual justifications delineated above, the hypothesis (Hypothesis 1) for Study Aim 2a is: *Among middle school students, bullying perpetration is expected to predict later sexual harassment perpetration, which in turn is expected to predict later dating violence perpetration, controlling for gender, race/ethnicity, and alcohol use, which have each been shown to be associated with each of the aggression measures under investigation (see Measures section for additional detail).*

Study Aim 2b

Using a longitudinal dataset, this study investigates whether the hypothesized developmental pathway varies by gender. The study is put forth within the *Gender, Power, and the Construction of Masculinity* framework articulated previously, which suggests that, developmentally, boys may attach greater importance to shoring up dominance and social status than girls, specifically for those behaviors that hinge on gender, sex, and/or sexuality: namely here, sexual harassment and TDV. This conceptual framework suggests that the proposed developmental pathway—bullying perpetration to sexual harassment perpetration to dating violence perpetration—will be stronger for boys than for girls, owing to the supposition that boys may attach greater meaning to dominance shored up vis-à-vis gender-related behaviors (Johnson, 1997), whereas girls will not; rather, any dominance that girls may try to shore up will not be

related to gender-related behaviors (Johnson, 1997). In light of the empirical gap in the literature, i.e., that no study has assessed gender differences in the proposed developmental pathway, coupled with the conceptual justifications delineated above, the hypothesis (Hypothesis 2) for Study Aim 2b follows: *The indirect effect from bullying to TDV through sexual harassment will be stronger for boys than girls.*

Methods

Study Design

RTI International collected the data for this study as part of an independent evaluation of *Start Strong: Building Healthy Teen Relationships*, a national program of the Robert Wood Johnson Foundation and Blue Shield of California Foundation in collaboration with Futures Without Violence. Eleven grantee sites participated in this initiative. Only those grantee sites implementing the *Safe Dates* curricula during the 2010–11 academic school year to 7th graders only were eligible to participate in the student effectiveness evaluation; four intervention schools from three grantee sites subsequently agreed to participate. The quasi-experimental longitudinal evaluation design matched four comparison schools to the participating intervention schools on the following criteria: school size; percentage free/reduced lunch; race/ethnicity; socio-historical and cultural city contexts. Only students from comparison schools were included in this study's analyses.

The cohort of students was surveyed every 6 months—beginning in fall of their 7th grade year and concluding in the spring of their 8th grade year—for a total of four waves of data collection during the 2010–11 and 2011–12 academic school years. This study analyzed data from the first three time points because these analyses investigate the progression of three

aggression behaviors over time; the first three (of the four) time points was retained to assess equal intervals of time (i.e., every 6 months).

Procedures

Prior to baseline survey administration, students were recruited, parent consent was then obtained, and finally students were assented—in that order. Eligibility criteria for student participation included ability to complete the questionnaire in English or Spanish, and not being in a self-contained special education class; students in self-contained classes were not included owing to severe mental and physical handicaps that precluded their ability to complete the instruments in ways that would protect their confidentiality. Several weeks prior to data collection, eligible students were given a letter explaining the study and were asked to deliver the letter to their parent(s). Only those students who received written parent permission were enrolled in the study.

The data were collected using paper-and-pencil, self-administered questionnaires in either small- or large-group settings, depending on the preference of the school, during regular school hours. Each survey administration had at least two trained field data collectors present. Teachers were asked to remain present when possible to maintain order; however, they were instructed not to circulate or answer questions about the survey. The study and data collection procedures were approved by the Institutional Review Board of RTI International.

Participants

A total of 1,516 students from the four comparison schools met the two eligibility criteria. Of these students, parental permission for participation was obtained from 808 students (53% of those eligible), and 754 students (50% of those eligible) completed the survey. Attrition was

defined as loss of all follow-ups after being in a previous wave, yielding a 4.0% (724 students) and 9.8% attrition (653 students) rate at Waves 2 and 3, respectively. Most attrition occurred because students withdrew from school (rather than students declined to take the survey). No differences in attrition by gender or race/ethnicity were noted. This sample at baseline was 49.6% male, and was 33.3% Black, 27.9% White, 26.4% Latino, and 12.5% of another race/ethnicity or of multiple race/ethnicities. The analysis sample is composed of 653 adolescents (337 girls, 316 boys) who completed the instrument at Waves 1, 2, and 3.

Measures

Teen Dating Violence Behavioral Measures

The TDV measure consists of three subscales, described below.

Physical Dating Violence Perpetration. Students were asked to complete a modified Families for Safe Dates physical dating violence perpetration scale (Foshee et al., 2012) at each wave of data collection. Students were asked to respond to the question, “How many times in the last 6 months have you done these things to a boyfriend or girlfriend? Do not count it if you did it in self-defense.” Five items were used to assess physical dating violence perpetration: “scratched or slapped them;” “physically twisted their arm or bent back their fingers;” “pushed, grabbed, shoved, or kicked them;” “hit them with your fist or with something else hard;” “beat them up.” The response options were on a four-point scale ranging from zero to three: never (0), 1–3 times (1), 4–9 times (2), 10 or more times (3).

Psychological Dating Violence Perpetration. Students were asked to complete the Families for Safe Dates (FSD) Psychological Dating Abuse Perpetration Scale (Foshee et al., 2012) at each wave of data collection. Students were asked to respond to the question, “How

many times in the last 6 months have you done these things to a boyfriend or girlfriend?” Five items were used to assess psychological dating violence perpetration: “said something to hurt their feelings on purpose;” “insulted them in front of others;” “would not let them do things with other people;” “made them describe where they were every minute of the day;” “threatened to hurt them.” The response options were on a four-point scale ranging from zero to three: never (0), 1–3 times (1), 4–9 times (2), 10 or more times (3).

Electronic Dating Violence Perpetration. Students were asked to complete a modified Youth Internet Safety Scale (Finkelhor, Mitchell, & Wolak, 2000; Teenage Research Unlimited, 2007) at each wave. Students were asked to respond to the question, “How many times in the last 6 months have you done the following things to a boyfriend or girlfriend using a cell phone, email, IM, text messaging, Web chat, a blog, or a networking site like MySpace or Facebook?” Eight items were used to assess electronic dating violence perpetration: “called them names, put them down, or said really mean things to them;” “contacted them when they did not want you to, just make them mad;” “tried to make them afraid;” “spread rumors about them;” “made them afraid to not respond to you because of what you might do;” “showed private or embarrassing pictures/video of them to others;” “threatened to hurt them physically;” “repeatedly checked up on them to see where they were.” The response options were on a four-point scale ranging from zero to three: never (0), 1–3 times (1), 4–9 times (2), 10 or more times (3).

Sexual Harassment Perpetration.

Students were asked to complete a modified American Association of University Women Sexual Harassment Survey (AAUW, 2001). Students were asked to respond to the question, “In the last 6 months, how many times have you done any of these things to someone at school?” Six items were used to assess sexual harassment perpetration: “touched, grabbed, or pinched

someone in a sexual way;” “spread sexual rumors about them;” “made sexual jokes about someone;” “made sexual gestures or looks at someone;” “showed, gave, or left someone sexual pictures, messages, or notes;” “wrote sexual messages about someone on bathroom walls, locker rooms, or black boards.” The response options were on a three-point scale ranging from zero to two: many times (0), a few times (1), or never (2). Response options were subsequently reverse coded (many times (3), a few times (1), or never (0) for analyses.

Bullying Perpetration

Students were asked to complete a modified bullying scale (Espelage & Holt, 2001) at each wave. Students were asked to respond to the question, “In the last 6 months, how many times have you done the following things to one or more students at school?” Ten items were used to assess bullying perpetration: “upset someone for the fun of it;” “tried to scare someone;” “teased someone;” “picked on someone;” “pushed, shoved, slapped or kicked someone;” “threatened to hurt or hit someone;” “left someone out from your group of friends;” “made fun of someone;” “called someone names;” “started a physical fight with someone.” The response options for all items were on a three-point scale ranging from zero to two: many times (0), a few times (1), or never (2). Response options were subsequently reverse coded (many times (3), a few times (1), or never (0) for analyses.

Coding Response Options for Aggression Measures (Above)

At each wave, for each aggression measure, a value of 1 indicated that the act had been perpetrated at least once in the previous 6 months, and a 0 indicated that the act had not been perpetrated in the past 6 months. Responses were then coded so that a value of 1 indicated that any act (1 or more) had been perpetrated in the past 6 months and a value of 0 indicated no acts had been perpetrated in the past 6 months (i.e., 1=ever, 0=never).

Control Variables

As with any longitudinal analysis, including this one, failure to include a confounding variable could possibly cause a spurious relationship. Therefore, one must consider and control for those variables that may confound the relationships under investigation; doing so strengthens the suggestion of causality made possible by temporality inherent in longitudinal analyses.

Therefore, this study controls for the following variables that could confound proposed associations: gender (though this is a moderator too), race/ethnicity, and alcohol use. Gender is a control variable in the mediation analysis and a moderator in the moderated mediation analyses.

Gender was coded such that 1=girls and 2=boys. Race/ethnicity was included as a control variable because studies suggest it is associated with the etiology of bullying, sexual harassment, and TDV (Chiodo et al., 2009; Connolly, Pepler, Craig, & Taradash, 2000; Foshee et al., 2014).

Race/ethnicity was dummy coded so that the three variables created reflected (1) Black/African-American compared to White, (2) Hispanic compared to White, and (3)

Other/Multiple/Unknown compared to White. Among youth, alcohol use has been shown to be associated with bullying (Luk, Wang, & Simons-Morton, 2010; Peleg-Oren et al., 2012; Radliff et al., 2012; Ringwalt & Shamblen, 2012; Swahn et al., 2011; Tharp-Taylor, Haviland, &

D'Amico, 2009), sexual harassment (Fineran & Gruber, 2009; Sinclair et al., 2012), and TDV (Champion, Wagoner, et al., 2008; Epstein-Ngo et al., 2013; Haynie et al., 2013; Lormand et al., 2013; Reyes et al., 2012; Rothman et al., 2012; Silverman et al., 2001; Temple & Freeman,

2011; Temple et al., 2013). Thus, alcohol use was controlled in analyses. Students were asked to complete a question on past-6-month alcohol use: “about how many times have you had 3 or 4 drinks of alcohol in a row?”; response options included the following: “None”, “1–2 times”, “3–5 times”, “6–9 times”, “10 or more times”.

Analysis Strategy

Structural equation modeling (SEM) was conducted to address the study aims, consisting of three stages: measurement models, mediation, and moderated mediation (otherwise known as *Contrast of Mediated Effects*).

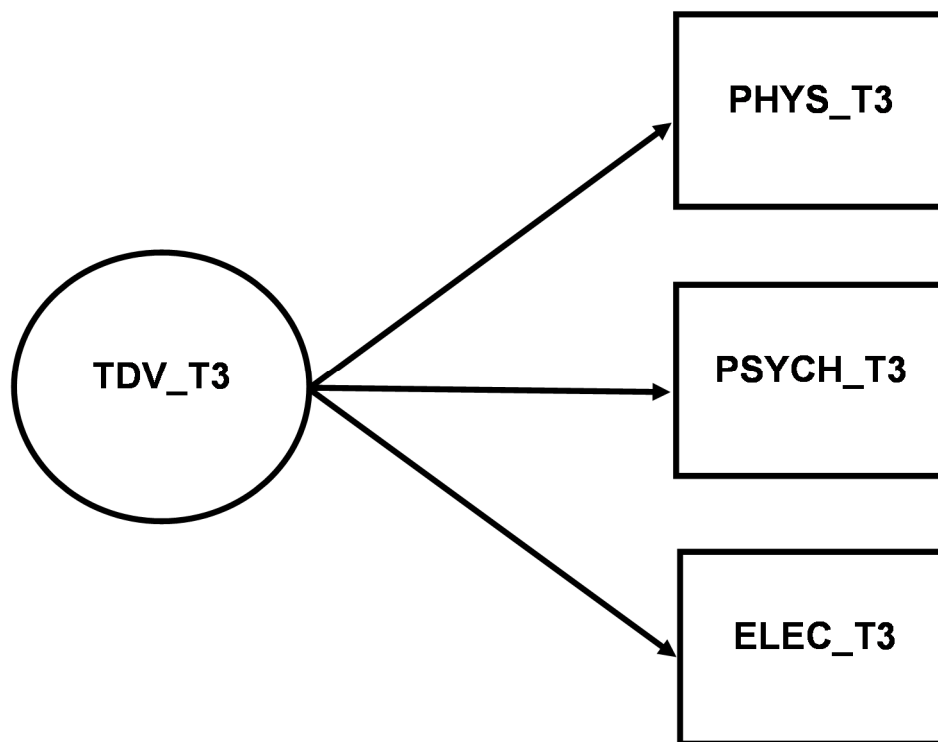
Measurement Models

The first step in the measurement model analyses was to conduct CFA to confirm that, as anticipated, one latent or underlying factor lay beneath each set of indicators for each type of aggression (physical TDV, psychological TDV, electronic TDV, sexual harassment, and bullying). However before conducting the CFAs on the bullying items, an exploratory factor analysis (EFA) was first employed to determine whether the bullying items fit a one-factor or two-factor solution by gender. This step was taken because the literature on bullying and gender suggest the types of bullying boys vs. girls perpetrate may differ: for direct aggression, boys tend to perpetrate more than girls, but for indirect aggression, there is little gender difference (i.e., in the meta-analysis by Card et al., 2008, although girls perpetrate statistically significantly more than boys, the difference was trivial in magnitude) (Archer & Coyne, 2005; Card et al., 2008).

After conducting the first-order CFAs of each of the three TDV factors (physical TDV, psychological TDV, and electronic TDV), analyses were conducted to examine goodness of fit of a second-order TDV factor [Figure 4-1]. The development of factor analysis was motivated by the recognition that a latent variable may underlie many indicators, suggestive of a “first-order” factor (Bollen, 1989); a second-order factor, although less widely acknowledged and practiced, suggests that an even more general latent variable may determine the first-order latent

variables(s) (Bollen, 1989). A second-order factor model has several advantages over a first-order factor: a second-order factor puts a structure on the pattern of covariance between the first-order factors, thereby explaining the covariance in a more parsimonious way and with fewer parameters (Chen, Sousa, & West, 2005; Gustafsson & Balke, 1993; Rindskopf & Rose, 1988). In addition, a second-order factor model simplifies the interpretation of complex, related measurement structures and analyses (Chen, Sousa, & West, 2005).

Figure 4-1. Second-Order TDV Factor Model



After conducting CFAs for the three first-order factors and the second-order TDV factor, goodness-of-fit indices were compared across said measurement models. The purpose of this comparison was to determine if proceeding with the three first-order factors was necessary in subsequent mediation and moderated mediation analyses, or whether proceeding with a second-order factor would be allowable and appropriate. Because the second-order factor model has

several advantages over first-order factor models, the second-order factor model will be retained should the data fit the model well, as evidenced by strong goodness-of-fit indices.

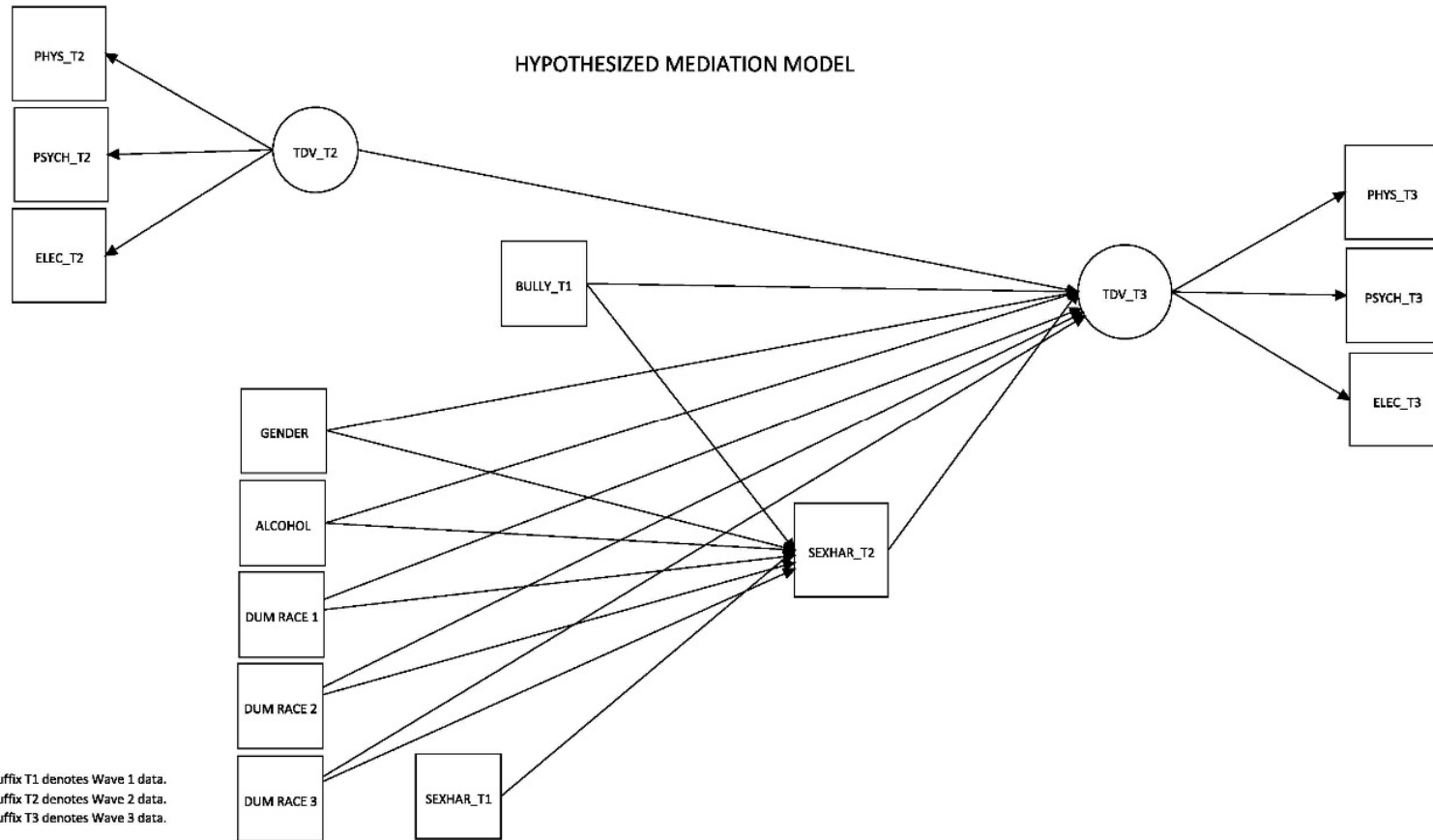
All measurement models were evaluated for goodness of fit using the following established goodness-of-fit indices (Brown, 2006): the weighted root mean square residual (WRMR), the comparative fit index (CFI; Bentler, 1990), and the root-mean-square error of approximation (RMSEA). Acceptable cutoffs for these indices are: 1.0 or lower for WRMR, 0.95 or higher for CFI, and 0.05 or lower for RMSEA (Browne & Cudeck, 1993; Hu & Bentler, 1999). Chi-square values can be inflated with large sample sizes, so it is not typically referred to when determining goodness of fit. Measurement model analyses were conducted in MPlus 7.1 (Mplus Home, 2006; Muthén & Muthén, 1998–2012).

Mediation

The second stage investigated whether sexual harassment mediates the association between bullying and TDV (Figure 4-2). Data were collected at 6-month intervals, and questions asked about past 6-month behaviors. Therefore, in these longitudinal analyses, data from Waves 1, 2, and 3 were invoked to analyze behaviors occurring and reported on over an 18-month period.

The associations (paths) tested in mediation analyses are often designated with the letters c , a , b , and c' . The c path is the total effect of the independent variable (bullying) on the outcome (TDV); the a path is the association between the independent variable (bullying) and the mediator (sexual harassment); the b path is the association between the mediator (sexual harassment) and the outcome variable (TDV), controlling for the independent variable (bullying); and the c' path is the association between the independent variable (bullying) and the outcome variable (TDV), controlling for the mediator (sexual harassment). Each path can be

Figure 4-2. Hypothesized Mediation Model



tested controlling for potential confounders. Using the *product of coefficients* approach to mediation, the indirect effect is determined by multiplying the coefficient associated with the independent variable in the *a* path, times the coefficient associated with the mediator in the *b* path. Whether mediation is present or not can be determined by testing whether the indirect effect is statistically significantly different from zero (MacKinnon, Fairchild, & Fritz, 2007; Williams & MacKinnon, 2008). If the indirect effect ($a \times b$) is significantly different from zero, that is evidence of mediation.

Mediation in this study was tested using SEM with MPlus. Figure 4-2 presents the structural equation model that was specified to test Hypothesis 1. The temporality of the relationship between bullying at T1 and sexual harassment at T2 was controlled by including T1 sexual harassment. The temporality of the relationship between SH at T2 and TDV at T3 was controlled by including TDV at T2. When assessing the association between bullying at T1 and TDV at T3, TDV at T1 was not included as a control variable for the following reasons: the TDV measure most proximal to TDV T3 (i.e., TDV T2) was used as the control item since the correlation between Time 2 and Time 3 TDV should be stronger than the correlation between Time 1 and Time 3 TDV; including TDV T2 is sufficient for addressing autoregressive variance. Further, including Time 1 TDV as an additional control would have changed the structure of the model to a *lag* autoregressive model, which deviates from the explicit aim of this study. Rather, the purpose of this approach was to parse out unique behavior at the time point being modeled (e.g., TDV at Time 3) from behavior present at preceding time point (e.g., TDV at Time 2). The model also includes sex, race/ethnicity, and alcohol use as control variables. These control variables were entered into the model such that they were controlled for in all paths examined.

In MPlus, the indirect effect and its statistical significance are produced using the Model Indirect statement. The default MPlus indirect tests are based on the multivariate delta standard error (Sobel test) (MacKinnon et al., 2002; Mackinnon, Lockwood, & Williams, 2004). However, that approach inaccurately assumes that the ratio of indirect effect to standard error has a normal distribution and, therefore, has lower power (MacKinnon et al., 2002; Mackinnon, Lockwood, & Williams, 2004). MPlus also allows testing of the indirect effect with bootstrapping, accommodates the non-normal distribution of the product, and has higher power (MacKinnon et al., 2002; Mackinnon, Lockwood, & Williams, 2004). As a result, in this study's analyses, the Model Indirect statement includes a bootstrap command (N=500). The appropriate criteria used to determine mediation in this study is having a statistically significant ($p < 0.05$) indirect effect in the MPlus output (Muthén & Muthén, 1998–2012).

Moderated Mediation

The final stage of the analyses included tests of moderated mediation. In SEM, moderated mediation analyses involve conducting contrasts of mediated effects, or multiple group models. MacKinnon (2007) describes this technique, i.e., the contrast of mediated effects, as a statistical test of the equivalence of the mediated effect (or indirect effect) across groups. Multiple group models consist of estimating the same mediation model for each subgroup and then comparing the mediated effect using the DIFF test. The DIFF test determines whether the mediated effect, or indirect effect (i.e., the product of the a path and b path coefficients) significantly differs between subgroups (in this case, boys or girls). Hypothesis 2 will be supported if the DIFF test indicates a statistically significant ($p < 0.05$) difference, and the indirect effect is stronger for boys than girls. Comparing mediated effects is possible because any two effects with the same

outcome variable, e.g., TDV, will be in the same metric (MacKinnon, 2000; Williams & MacKinnon, 2008).

Results

Measurement Models

As mentioned previously, an EFA was first conducted on the bullying scale, stratifying by gender, to determine if a one- or two-factor solution was a better fit to the data, followed by a CFA. Both the one-factor and two-factor solutions from the EFAs yielded strong goodness-of fit indices for boys and girls. The one-factor solution was chosen for the following reasons: despite the fact that the chi-square ratio was slightly elevated (RATIO=3.07), taken together, the goodness-of-fit indices suggest the data fit the one-factor model well (RMSEA=0.05; CFI=0.98; WRMR=1.11). In addition, in both the boy and girl models, the one-factor models had the largest eigenvalues compared with the two-factor models. Further, a one-factor solution is more parsimonious than a two-factor solution. The scientific principle of parsimony suggests that “other things being equal, fewer factors are better than many factors” (Goldberg & Velicer, in press). Therefore, owing to strong fit, largest eigenvalues, the principle of parsimony, and also in line with (Espelage & Holt, 2001), a single-factor model for the bullying measure was retained for subsequent analyses.

Results from the CFA measurement models are presented in Table 4-1. CFAs yielded sound goodness-of-fit indices when specifying a one-factor solution for the physical, psychological, and electronic TDV measures, the sexual harassment measure, and, as noted above, the bullying measure. Although each of the three first-order TDV factors, and the second-order TDV factor had good model fit, the second-order TDV factor—rather than single-order

factors—was ultimately retained for subsequent mediation and moderated mediation analyses for the following three reasons: 1) the measurement model results yielded strong goodness-of-fit indices for the TDV second-order factor, 2) this study's primary aim is to investigate TDV, and the second-order construct captures this more complex latent construct, and 3) results from *modification indices* suggest there is insufficient support for three first-order factors versus a superordinate second-order factor. *Modification indices* can be specified when writing code for an MPlus program, and MPlus will generate output suggesting alternate model specifications, should the data suggest a better-fitting model. Modification indices were specified in the CFA model command statement, and results of the modification indices did *not* suggest the need to use the first-order factors instead of the second-order factor. If the effect of the predictors on the single-order TDV factors (i.e., physical TDV, psychological TDV, and electronic TDV) would have produced more cogent results, the modification indices would have directed the MPlus user accordingly.

After assessing each measurement model to confirm the data fit each model well, analyses were conducted to test measurement invariance by gender of all of the behavioral measures. Measurement invariance indicates that an instrument measures a construct the same way across populations or groups (McDonald, 1999; Millsap & Kwok, 2004; Widaman & Reise, 1997). If the scales measuring these constructs do not function the same for both boys and girls, any observed differences in scores (or lack thereof) may be a function of flawed measurement and may not reflect true variability among items by gender, thereby calling into question the validity of studies invoking such measures. All aggression measures included in this study achieved scalar measurement invariance by gender, suggesting that comparisons of factor loadings, intercepts, and latent means by gender are reliable.

Table 4-1. Fit Indices for all First-order and Second-order Measurement Models

MODEL FIT INDICES	N=	CHI SQ (DF)	P-Value	RATIO	RMSEA	CFI	WRMR
First-order factors							
Bullying	730	107.57 (35)	0.00	3.07	0.05	0.98	1.11
Sexual harassment	726	9.77 (9)	0.37	1.09	0.01	0.99	0.51
Psychological TDV	519	9.86 (5)	0.04	1.97	0.04	1.00	0.61
Physical TDV	526	1.17 (5)	0.95	0.23	0.00	1.00	0.19
Electronic TDV	518	17.43 (20)	0.63	0.87	0.00	1.00	0.49
Second-order factor							
TDV	538	156.91 (132)	0.07	1.19	0.02	0.99	0.75

* The second-order TDV variable is composed of the psychological, physical, and electronic TDV factors.

Note: CHI SQ=Chi-Square; DF=Degrees of Freedom; RATIO=Chi-Square ratio test; DIFF test=Chi-Square difference tests; RMSEA=root mean-square error of approximation; CFI=comparative fit index; TDV=teen dating violence; WRMR=weighted root mean square residual. Goodness of fit is indicated by ratio < 2; *p*-value > 0.05; RMSEA=0.05 or lower; CFI=0.95 or higher; WRMR =1.0 or lower.

Mediation

Figure 4-3 depicts the results of the tested mediation model. The model fit the data well; goodness-of-fit indices are presented in Table 4-2. Although the WRMR was slightly above the typical cutoff of 1.0, and the *p* value for the chi-square test < 0.00, good model fit is reflected in the RMSEA (0.05) and CFI (0.94). Overall, these fit indices suggest an acceptable degree of congruence between the model presented in Figure 4-3 and the data.

Table 4-2. Fit Indices for Mediation Model—Overall Sample

Model Fit Indices	N=	CHI SQ (DF)	P-Value	RATIO	RMSEA	CFI	WRMR
Figure 2	612 (322 girls, 290 boys)	114.89 (49)	0.00	2.34	0.05	0.94	1.06

Table 4-3 identifies descriptive statistics, namely proportions of students (overall sample) endorsing key outcomes of interest for each endogenous (i.e., dependent) variable depicted in Figure 3. SEM does not produce proportions on exogenous, or independent variables; thus, bullying (Time 1) and sexual harassment (Time 2) are not reflected in the table.

Table 4-3. Descriptive Statistics: Proportions of Key Outcomes of Interest for Mediation Model

Parameter Estimates	Proportion Overall (Endorsement=Yes)	Proportion Girls (Endorsement=Yes)	Proportion Boys (Endorsement=Yes)
Physical TDV (Time 2)	0.133	0.178	0.081
Psychological TDV (Time 2)	0.193	0.229	0.152
Electronic TDV (Time 2)	0.171	0.196	0.142
Sexual harassment (Time 2)	0.256	0.207	0.310
Physical TDV (Time 3)	0.096	0.091	0.102
Psychological TDV (Time 3)	0.165	0.188	0.140
Electronic TDV (Time 3)	0.141	0.150	0.132

Proportions are noted for each endogenous variable at each wave included in the tested model.

Table 4-4 denotes path coefficients associated with the tested mediation model in Figure 4-3. Significant associations are boldfaced in Figure 3. As hypothesized, bullying perpetration at Time 1 predicted TDV perpetration at Time 3 ($\beta=0.22$; $SE=0.09$; $p=0.01$) when controlling for

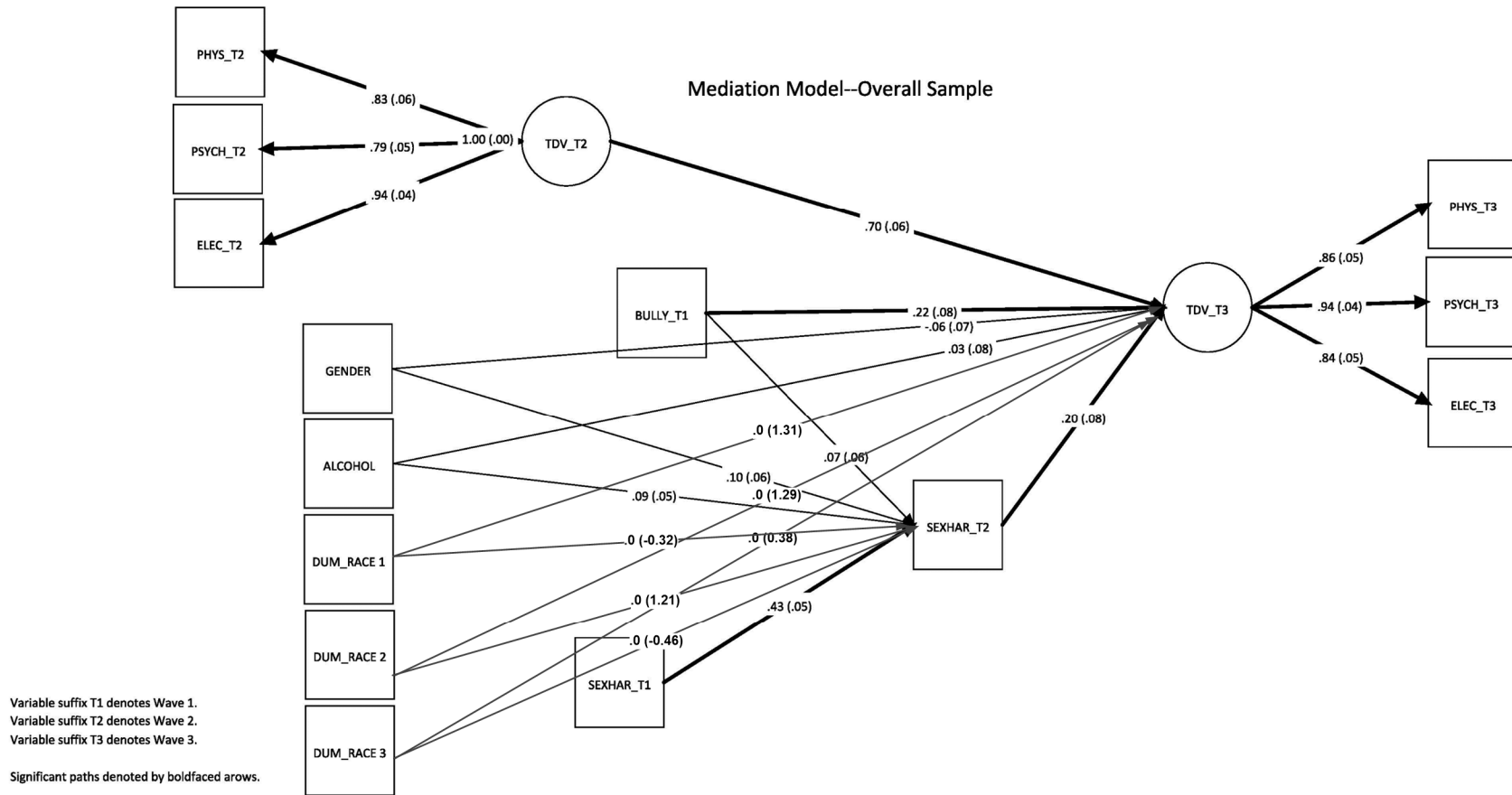
TDV at Time 2. Sexual harassment perpetration at Time 2 also predicted TDV perpetration at Time 3 ($\beta=0.02$; $SE=0.08$; $p=0.02$) when controlling for TDV perpetration at Time 2. However, bullying perpetration at Time 1 was not a significant predictor of sexual harassment perpetration at Time 2 ($\beta=0.07$; $SE=0.06$; $p=0.30$).

Table 4-4. Path Coefficients for Mediation Model—Overall

Parameter Estimates	Path Coefficients (SE)	P-value
TDV perpetration (Time 3)	--	--
Bully perpetration (Time 1)	0.22 (0.09)	0.01**
Sexual harassment perpetration (Time 2)	0.20 (0.08)	0.02*
TDV perpetration (Time 2)	0.71 (0.07)	0.000***
Sexual harassment perpetration (Time 2)	--	--
Bully perpetration (Time 1)	0.07 (0.06)	0.30
Sexual harassment perpetration (Time 1)	0.43 (0.05)	0.000***

Note: * $p<.05$ ** $p<.01$ *** $p<.001$

Figure 4-3. Results from Test of Mediation with Overall Sample



Note: The denotation for the numbers in the figures is β (SE)

As expected, all autoregressive relationships, i.e. those between the same aggression variables across time points, were significant: TDV perpetration at Time 2 was a significant predictor of TDV perpetration at T3 ($\beta=0.70$; $SE=0.06$; $p=0.00$). Similarly, sexual harassment perpetration at Time 1 was a significant predictor of sexual harassment perpetration at Time 2 ($\beta=0.43$; $SE=0.05$; $p=0.00$). Also as expected, all factor loadings were significant for the TDV perpetration factor at Time 2 and Time 3 (Table 4-5).

Table 4-5. Factor Loadings on TDV for Mediation Model

Parameter Estimates	Factor Loadings (SE)	P-value
TDV perpetration (Time 2)	--	--
Physical TDV perpetration (Time 2)	0.83 (0.06)	0.000
Psychological TDV perpetration (Time 2)	0.79 (0.05)	0.000
Electronic TDV perpetration (Time 2)	0.94 (0.04)	0.000
TDV perpetration (Time 3)	--	--
Physical TDV perpetration (Time 3)	0.86 (0.05)	0.000
Psychological TDV perpetration (Time 3)	0.94 (0.04)	0.000
Electronic TDV perpetration (Time 3)	0.84 (0.05)	0.000

The indirect, or mediated effect, was nonsignificant (indirect effect=0.01; $SE=0.01$; $CI= -0.02, 0.41$; $p=0.35$). In sum, although some of the coefficients associated with the proposed relationships were statistically significant, the nonsignificant indirect effect suggests that sexual harassment is not a mediator of the association between bullying and TDV.

Moderated Mediation

To conduct contrasts of mediated effects, the hypothesized mediation model (Figure 4-2) was tested first with girls and then with boys; the results for girls are presented in Figure 4-4; the results for boys are presented in Figure 4-5.

Results for Girls

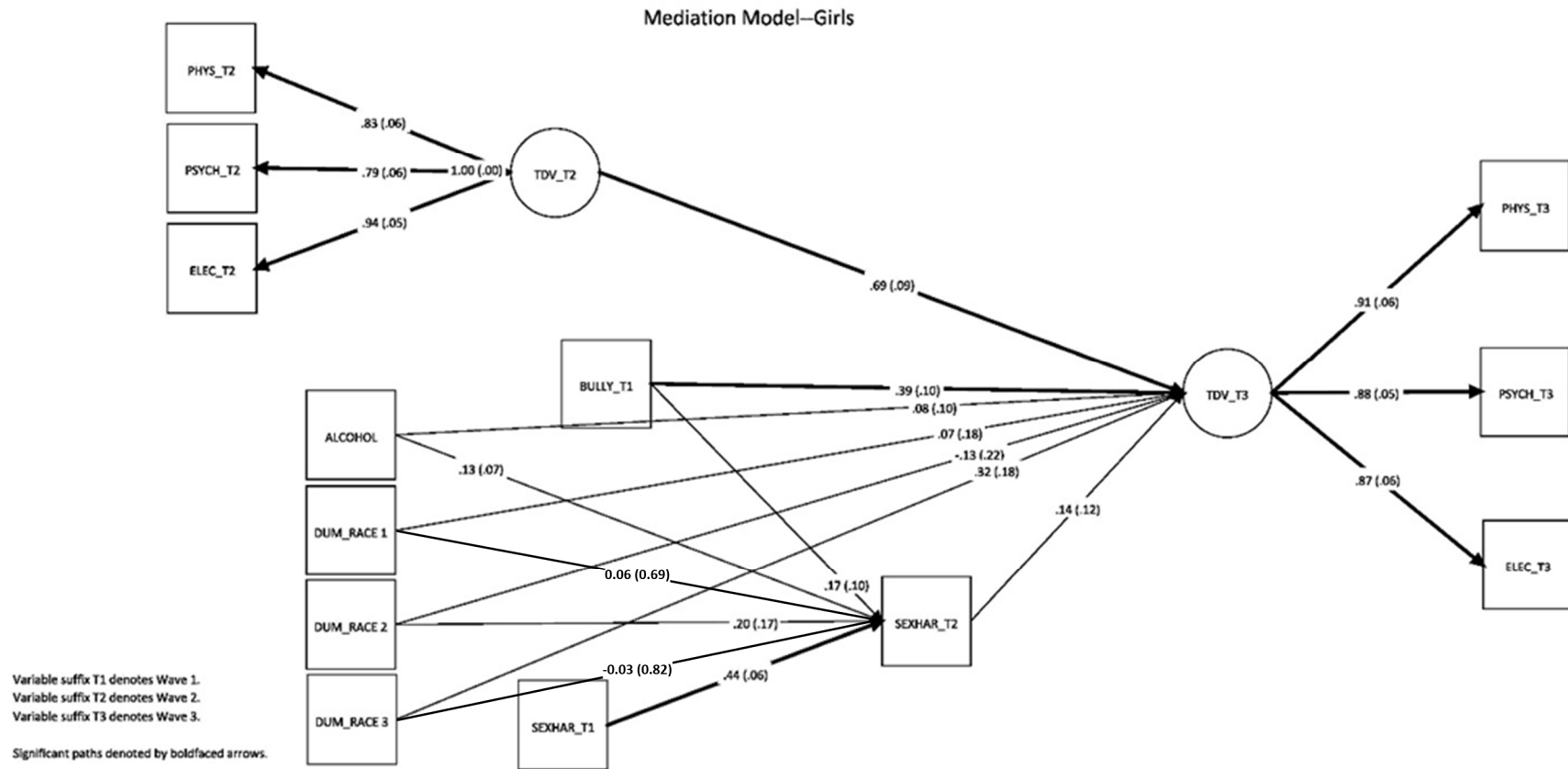
Figure 4-4 depicts the results of the tested mediation model for girls, with significant associations boldfaced, and Table 4-6 denotes path coefficients associated with the mediation model for girls. Bullying perpetration at Time 1 was not a significant predictor of sexual harassment perpetration at Time 2 ($\beta=0.17$; $SE=0.10$; $p=0.083$), and sexual harassment perpetration at Time 2 did not predict TDV perpetration at Time 3 ($\beta=0.14$; $SE=0.12$; $p=0.231$). However, bullying perpetration at Time 1 was a highly significant predictor of TDV perpetration at Time 3 ($\beta=0.39$; $SE=0.10$; $p<0.001$).

Table 4-6. Path Coefficients for Moderated Mediation—Girls

Parameter Estimates	Path Coefficients (SE)	P-value
TDV perpetration (Time 3)	--	--
Sexual harassment perpetration (Time 2)	0.14 (0.12)	0.231
Bully perpetration (T1)	0.39 (0.10)	0.000***
TDV perpetration (Time 2)	0.69 (0.09)	0.000***
Sexual harassment perpetration (Time 2)	--	--
Bully perpetration (T1)	0.17 (0.10)	0.083
Sexual harassment perpetration (Time 2)	0.45 (0.06)	0.000***

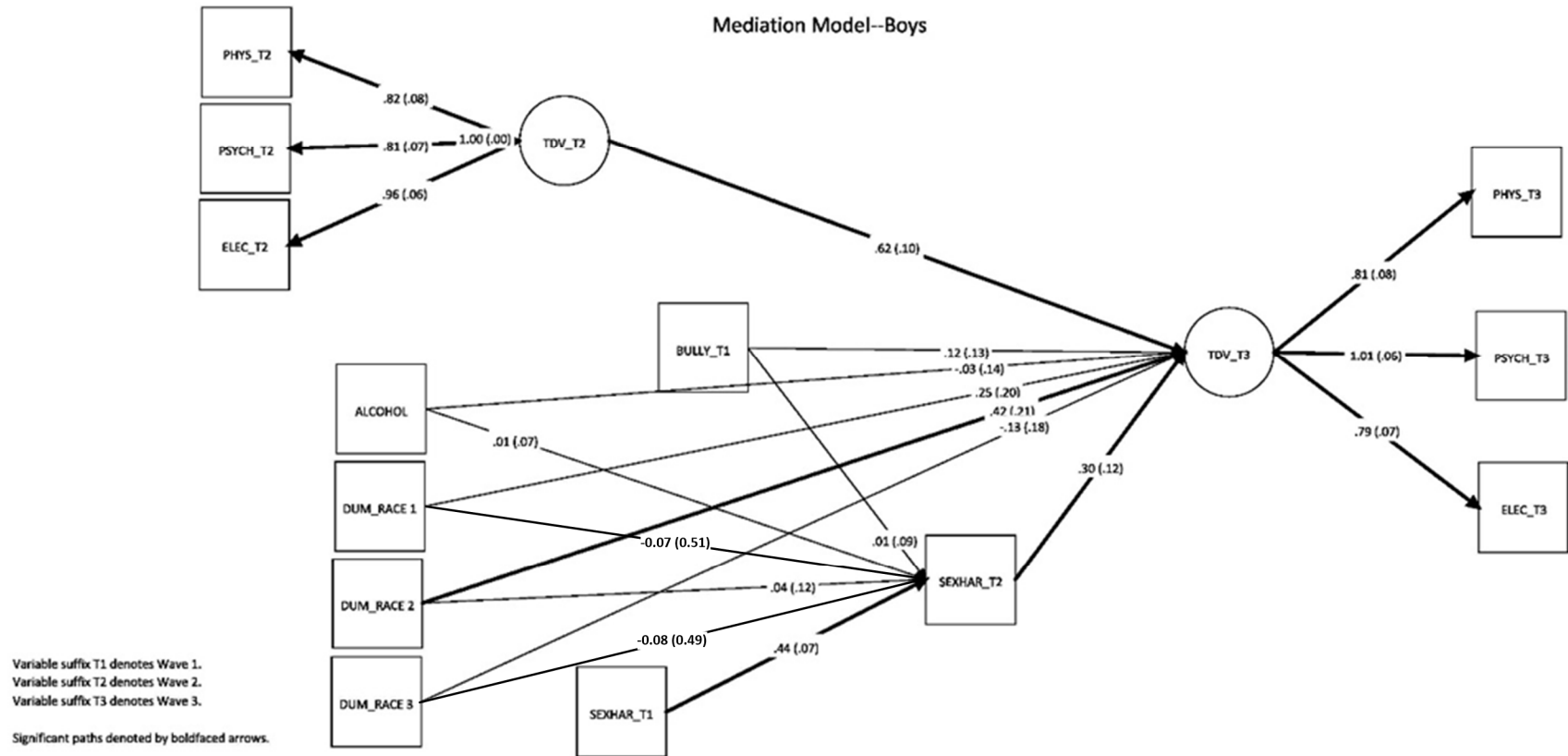
Note: * $p<.05$ ** $p<.01$ *** $p<.001$

Figure 4-4. Results from Test of Moderated Mediation for Girls



Note: The denotation for the numbers in the figures is β (SE)

Figure 4-5. Results from Test of Moderated Mediation for Boys



Note: The denotation for the numbers in the figures is β (SE).

As expected of all autoregressive relationships, TDV perpetration at Time 2 was a significant predictor of TDV perpetration at Time 3 ($\beta=0.69$; $SE=0.09$; $p=0.00$) (Table 4-6). Similarly, sexual harassment perpetration at Time 1 was a significant predictor of sexual harassment perpetration at Time 2 ($\beta=0.14$; $SE=0.12$; $p=0.00$). Also as expected, all factor loadings were significant for the TDV perpetration factor at Time 2 and Time 3 (Table 4-7).

Table 4-7. Factor Loadings on TDV for Moderated Mediation—Girls

Parameter Estimates	Factor Loadings (SE)	P-value
TDV perpetration (Time 2)	--	--
Physical TDV perpetration (Time 2)	0.83 (0.06)	0.000
Psychological TDV perpetration (Time 2)	0.79 (0.05)	0.000
Electronic TDV perpetration (Time 2)	0.94 (0.06)	0.000
TDV perpetration (Time 3)	--	--
Physical TDV perpetration (Time 3)	0.91 (0.06)	0.000
Psychological TDV perpetration (Time 3)	0.88 (0.06)	0.000
Electronic TDV perpetration (Time 3)	0.87 (0.05)	0.000

The indirect effect for girls was not statistically significant (indirect effect=0.02; $SE=0.02$; $CI= -0.01, 0.60$; $p=0.331$). Thus, as in the total sample, sexual harassment did not mediate the association between bullying and TDV by girls.

Results for Boys

Figure 4-5 depicts the results of the tested mediation model for boys, with significant associations boldfaced, and Table 4-8 denotes path coefficients associated with the mediation model for boys. Sexual harassment perpetration at Time 2 predicted TDV perpetration at Time 3

($p=0.009$). However, bullying perpetration at Time 1 was not a significant predictor of sexual harassment perpetration at Time 2 ($p=0.867$) or of TDV perpetration at Time 3 ($p=0.342$).

Table 4-8. Path Coefficients for Moderated Mediation—Boys

Parameter Estimates	Path Coefficients (SE)	<i>P</i> -value
TDV perpetration (Time 3)	--	--
Sexual harassment perpetration (Time 2)	0.30 (0.11)	0.009**
Bully perpetration (T1)	0.12 (0.13)	0.342
TDV perpetration (Time 2)	0.62 (0.10)	0.000***
Sexual harassment perpetration (Time 2)	--	--
Bully perpetration (T1)	0.01 (0.09)	0.867
Sexual harassment perpetration (Time 1)	0.44 (0.07)	0.000***

Note: * $p<.05$ ** $p<.01$ *** $p<.001$

As expected of all autoregressive relationships, TDV perpetration at Time 2 was a significant predictor of TDV perpetration at Time 3 ($\beta=0.62$; $SE=0.10$; $p=0.00$). Similarly, sexual harassment perpetration at Time 1 was a significant predictor of sexual harassment perpetration at Time 2 ($\beta=0.44$; $SE=0.07$; $p=0.00$). Also as expected, all factor loadings were significant for the TDV perpetration factor at Time 2 and Time 3 (Table 4-9).

The indirect effect was not statistically significant (indirect effect=0.00; $SE=0.03$; $CI= -0.23, 0.39$; $p=0.868$). Thus, as in the total sample, sexual harassment did not mediate the association between bullying and TDV by boys.

Table 4-9. Factor Loadings on TDV for Moderated Mediation—Boys

Parameter Estimates	Factor Loadings (SE)	P-value
TDV perpetration (Time 2)	--	--
Physical TDV perpetration (Time 2)	0.82 (0.08)	0.000
Psychological TDV perpetration (Time 2)	0.81 (0.07)	0.000
Electronic TDV perpetration (Time 2)	0.96 (0.07)	0.000
TDV perpetration (Time 3)	--	--
Physical TDV perpetration (Time 3)	0.81 (0.08)	0.000
Psychological TDV perpetration (Time 3)	1.01 (0.06)	0.000
Electronic TDV perpetration (Time 3)	0.79 (0.07)	0.000

Contrast of Mediated Effects

The DIFF test statistic was not statistically significant (DIFF = 0.10; SE = 0.19; CI = -0.34, 0.41; $p=0.58$). Thus, there was no significant difference in the magnitude of the indirect effect between boys and girls. As described above, the indirect effect was nonsignificant for both boys and girls (see Table 4-10).

Table 4-10. DIFF Test Results

Mediation Effects	DIFF	P-value
DIFF test (tests between boys and girls)	0.10 (0.19)	0.580

Note: * $p<.05$ ** $p<.01$ *** $p<.0001$

Discussion

This present study contributes to the literature on bullying, sexual harassment, and TDV. Despite the accelerated growth of these respective fields, no previous study has investigated the relationships among this constellation of behaviors, let alone by gender, over time, *or* among

middle school students. Hypothesis 1 was that *bullying perpetration would predict later sexual harassment perpetration, which in turn would predict later TDV perpetration, after controlling for gender, race/ethnicity, alcohol use*. Hypothesis 2 was that *the indirect effect from bullying to TDV through sexual harassment will be stronger for boys than girls, after controlling for gender, race/ethnicity, alcohol use*. Neither hypothesis was supported. However important relationships were found that contribute to the literature and have implications for practice.

The prevalence of TDV and sexual harassment for the overall sample was high. Rates of physical TDV perpetration (past 6-months) were 13.3% (T2) and 9.6% (T3). Although no nationally representative studies of TDV perpetration exist, nationally representative studies of TDV victimization indicate that about 1 in 10 high school students (9.4%) reported being hit, slapped, or physically hurt on purpose by a boyfriend or girlfriend (Centers for Disease Control and Prevention, 2012). Psychological TDV perpetration was reported by 19.3% (T2) and 16.5% (T3) of students. Similarly, Foshee and Matthew's review (2007) showed local studies consistently demonstrating high rates (14% to 82%) for psychological abuse (Foshee & Matthew, 2007). Electronic TDV perpetration was reported by 17.1% (T2) and 14.1% (T3) of students; these rates are slightly lower than another study of electronic TDV perpetration (Cutbush et al., 2010) showing 29.4% of high school students reporting electronic TDV perpetration; however, that study assessed lifetime prevalence, whereas the current study assessed past 6-months prevalence. Also, it's possible the high school sample has greater access to social media and platforms than a middle school sample. Sexual harassment (T2) was reported by 25.6% of students. One national study (Holt & Espelage, 2007) reported that 58% of students had experienced physical sexual harassment (e.g., having clothing pulled off or down), and that 70% of students had experienced nonphysical sexual harassment (e.g., sexual rumor

spreading); rates in that study may have been higher because it assessed lifetime prevalence, whereas the current study assessed past-6 months prevalence. Taken together, these high rates of perpetration among middle school youth signal a serious public health problem.

Results in the overall sample indicate bullying at Time 1 as a significant predictor of TDV at Time 3, controlling for TDV at Time 2, gender, race/ethnicity, and alcohol use. This finding fills an important gap in the literature. It is consistent with recent research pointing to direct bullying as a longitudinal predictor of physical dating violence (Foshee et al., 2014). It is also consistent with Connolly et al., (2000) and Pepler's (2006) cross-sectional studies demonstrating a relationship between bullying perpetration, on the one hand, and physical and psychological TDV perpetration, on the other hand. However, results from the current study extend prior research by documenting the temporal sequence of bullying perpetration as predicting TDV perpetration at a later time point, since appropriate controls have been entered into the model, and since a latent second-order TDV factor was examined. Connolly et al. (2000) and Pepler's (2006) cross-sectional studies do not model electronic TDV, and Foshee et al. (2014) do not model psychological or electronic TDV.

Of interest, for girls—and consistent with findings from the overall sample—bullying at Time 1 predicts TDV at Time 3, controlling for TDV at Time 2, gender, race/ethnicity, and alcohol use. However, this relationship between bullying (Time 1) as a predictor of TDV (Time 3) was nonsignificant for boys. This discrepant finding between girls and boys warrants further consideration of how gender roles and norms affect the relationship between bullying and TDV. It's possible that, for boys, the very enactment of aggression may be predicated upon their masculinity, such that perpetration of aggression only holds in relationships hinging on gender-based forms of aggression (e.g., sexual harassment and TDV as opposed to bullying and TDV),

whereas for girls, the enactment of aggression may be more loosely connected to their gender identities. Regardless, the significant finding suggests that girls' engagement in bullying behaviors in middle school may be a red flag for engagement in TDV perpetration in later adolescence. These results signal a need for early bullying prevention programming, especially for girls, as it may offset their engagement in later TDV perpetration. In addition, this finding underscores the need for effectiveness studies that investigate the impact of bullying prevention efforts on later TDV behaviors, especially among girls. Future research should continue to probe these associations, though, including whether they vary by gender; although findings here did not support gender as a moderator of the hypothesized mediation pathway, it's possible that the discrete pathways (i.e., bullying as a predictor of sexual harassment) do vary by gender. Additional studies are needed to establish a clear evidence base.

Although bullying and TDV demonstrated a significant association for girls, there was no evidence that sexual harassment mediated that relationship. Bullying perpetration as a predictor of sexual harassment perpetration was nonsignificant among girls, and sexual harassment perpetration as a predictor of TDV perpetration was also nonsignificant. The mediation hypothesis (Hypothesis 1) was premised upon a developmental lifespan perspective (Pepler et al., 2006), suggesting that myriad aggressive behaviors may manifest and persist across a variety of developmental contexts and relationships during adolescence. For girls, it's possible that sexual harassment may function differently than other types of aggression (e.g., bullying and TDV). For example, a girl may enact sexual harassment against another girl (e.g., spread sexual rumors about another girl to shame her) to marginalize the girl and thereby leverage her own social status. In other words, the motivation underlying this type of aggression (e.g., sexual harassment) may not transfer to other types of aggression (e.g., TDV) in other age-relevant

developmental contexts (i.e., dating a boy). The instrument used in this study did not capture data regarding same- as opposed to opposite-sex sexual harassment. It is worth noting that this latter finding—sexual harassment does not predict TDV for girls—diverges from prior research from Chiodo et al. (2012) suggesting a relationship between sexual harassment perpetration in 9th grade and TDV perpetration in 11th grade for girls. Of note, however, that study failed to control for baseline (i.e., prior) dating violence perpetration profiles, so their finding was possibly altogether spurious; the sample also consisted of high school, rather than middle school students. Clearly, there is need for additional studies exploring both the meaning of and relationships between these behaviors among girls.

For boys, the relationship between sexual harassment perpetration (T2) and TDV (T3) emerged as the only significant finding in the gender-stratified model for boys. In sum, this particular finding among boys suggests that bullying perpetration may function independently of other aggressive behaviors (e.g., sexual harassment and TDV). The framework delineated previously—Gender, Power, and the Construction of Masculinity—addresses how masculinity is used to bolster dominance, control, power, and status in gender-relevant relationships. The discrepant finding between boys and girls here may also be attributable to the idea that gender—in this case, masculinity—is more relevant to expressions of aggression where gender plays a more obvious role, such as sexual harassment and TDV. This finding extends Ozer et al.’s person-centered, longitudinal analyses (Ozer et al., 2004) that found, among high school boys, those who perpetrated both peer aggression and sexual aggression at baseline were more likely to perpetrate TDV at a later time. Sexual harassment perpetration (T2) and TDV (T3) was also found to be significant among the overall sample. This finding is an important contribution to the literature and fills a gap that currently exists. Although Chiodo et al. (2009) reported a

significant relationship between sexual harassment victimization and TDV victimization, their particular study did not report on perpetration, as the current study does. Further, because TDV was not controlled for at a preceding time point in that study, the temporality of the association cannot be determined; it is possible that TDV victimization preceded sexual harassment victimization.

The nonsignificant relationship between bullying and later sexual harassment among the overall sample adds complexity to prior research documenting a relationship between bullying and sexual harassment among an *overall* sample (DeSouza & Ribeiro, 2005; Gruber & Fineran, 2008; Pellegrini, 2001; Pepler et al., 2006), as well as research pointing to bullying perpetration and sexual violence perpetration among an *overall* sample, which includes but is not limited to sexual harassment perpetration (Espelage, Basile, & Hamburger, 2012). It is possible that the current study's divergent findings may be partially attributable to its focus on a middle school sample, as opposed to a high school sample (DeSouza & Ribeiro, 2005; Gruber & Fineran, 2008; Pellegrini, 2001; Pepler et al., 2006). DeSouza & Ribeiro's (2005) sample was also Brazilian. Although the other two studies focused on middle school samples (Espelage, Basile, & Hamburger, 2012; Pellegrini, 2001), neither study include alcohol use as a control variable. Pellegrini (2001) also employed different bullying measures than this current study, and it is unclear whether that study included baseline sexual harassment as a control variable. Future studies should continue to probe this relationship, ideally with congruent measures and methodologies.

Ultimately, the hypotheses tested were not supported by this study. Perhaps the proposed conceptual frameworks underpinning this study are more appropriate for older samples of teens (e.g., high school-aged) than middle school-aged youth, possibly because of middle school-aged

youths' emergent pubertal development, and because their gender identities are changing rapidly and intensely. Clearly, more qualitative and quantitative research is needed to examine and understand developmental experiences with aggression among girls and boys throughout adolescence.

This study has several limitations. The sample is not nationally representative, and thus, findings may not generalize to other groups. Additionally, the low response rate tempers generalizability of study findings to areas similar to the geographic areas in which the study was conducted. Data are limited to self-reported behaviors; given the sensitivity of reporting perpetrating aggression, boys and girls may possibly have underreported behaviors. In addition, although several control variables were entered into the model, it was not possible to control for all potential shared risk factors, partly because there is little evidence appropriately investigating such relationships, and partly because of limitations inherent in the instrument. Nonetheless, this omission could have produced spurious findings within this study. Further, the measures used in this study, specifically the sexual harassment perpetration measure, may be outdated in light of recent technological advances; for example, one item includes the stem, "wrote sexual messages about someone on bathroom walls, locker rooms, or blackboards." Such items may fail to capture more common experiences of sexual harassment (e.g., posted sexual messages about someone on a social networking site). In addition, the measures did not capture data on the gender of the victim, and its salience for the relationship under study. It is possible that this matters, per the prior suggestion regarding same- as opposed to opposite-sex sexual harassment.

Despite these limitations, the study contributes to the extremely limited body of research investigating the relationships among TDV, sexual harassment, and bullying, especially among middle school students. Key strengths of this study are its longitudinal design and an analysis

strategy aimed at appropriately controlling for temporality. In addition, all aggression measures used in mediation and moderated mediation analyses demonstrated appropriate measurement invariance by gender, thereby increasing confidence in the validity of study results. The findings highlight a complicated set of behaviors that must be sorted out in order to dovetail prevention programming efforts aimed at ameliorating aggressive behaviors among youth. Future studies within TDV, sexual harassment, and bullying fields should continue to probe this set of relationships under investigation—either to cross-validate these findings or refute them. The results have important public health implications for prevention programming and underscore the need for cross-pollination among these respective fields.

CHAPTER 5: SUMMARY

This dissertation investigated commonly used measures in the fields of bullying, sexual harassment, and TDV (Study Aim 1). Then, using those measures, this dissertation investigated the developmental pathways between bullying perpetration, sexual harassment perpetration, and TDV perpetration (Study Aim 2)—including whether that pathway varied by gender (Study Aim 2a)—among middle school students.

In Study Aim 1, using SEM, a combination of EFAs and CFAs were conducted to test measurement invariance by gender for each of the aggression measures under investigation. Both the physical and psychological TDV and sexual harassment perpetration measures achieved strict measurement invariance, and the bullying perpetration measure achieved partial strict invariance. The electronic TDV perpetration measure achieved metric/scalar invariance. In summary, although varying levels of measurement invariance by gender were achieved, all measures under investigation achieved adequate levels of measurement invariance. As such, subsequent analyses invoking said measures will yield valid results with meaningful contributions. This particular study (Study Aim 1) contributes to the literature on the psychometric properties of measures commonly used in the fields of TDV, sexual harassment, and bullying among boys and girls. Despite the accelerated growth of these respective fields, no previous study has investigated measurement invariance on TDV measures, sexual harassment, or bullying measures in the United States.

Using longitudinal data, Study Aim 2a examined whether sexual harassment perpetration mediated the relationship between bullying perpetration and TDV perpetration among middle

school students. Although the hypothesis (Hypothesis 1)—*bullying perpetration would predict later sexual harassment perpetration, which in turn would predict later TDV perpetration, after accounting for, gender, race/ethnicity, alcohol use*—was not supported, findings from the overall sample indicate that both bullying perpetration (Time 1) and sexual harassment perpetration (Time 2) significantly predict TDV perpetration at a later time point (Time 3), controlling for gender, race/ethnicity, and alcohol use, among the overall sample. Study Aim 2b extended this line of inquiry by testing for moderated mediation, that is, whether the hypothesized pathway differed for girls and boys. This hypothesis (Hypothesis 2)—that the indirect effect from bullying to TDV through sexual harassment will be stronger for boys than girls—also was not supported. Nonetheless, important findings also surfaced from these analyses: for girls, bullying perpetration (Time 1) significantly predicted TDV perpetration (Time 3), after controlling for TDV at Time 2 and control variables, whereas for boys, sexual harassment perpetration (Time 2) significantly predicted TDV perpetration (Time 3), controlling for TDV at Time 2 and control variables in each model. This particular study (Study Aims 2a and 2b) contributes to the literature on bullying, sexual harassment, and TDV by advancing the extremely limited body of research examining relationships among these three behaviors among middle school youth. Despite the accelerated growth of these respective fields, no previous study has investigated the relationships among this constellation of behaviors, let alone by gender, over time, *or* among middle school students.

The fields of bullying, sexual harassment, and TDV would benefit from more cross-pollination. Findings from Study Aim 1 (measurement invariance by gender) validate prior and future studies using these same measures among similar populations of middle school students. However, future research should increase attention to measurement development, refinement,

and testing across all three aggression-related fields (i.e., bullying, sexual harassment, and TDV prevention), and also among middle school compared to high school samples. Both intra- and inter-field consensus-building around key construct definitions and measures could increase the fields' collective availabilities to capture and temporally disentangle these co-occurring forms of aggression among youth. This tactic not only enables cross-validation of findings, it also amasses a body of conjoined literatures capable of more readily responding to more sophisticated research questions, and generating more sophisticated prevention programs. Findings from Study Aim 2 clearly suggest that TDV prevention programs should consider ways to integrate bullying prevention and sexual harassment prevention components. Future research should continue to explore the temporal relationships among this constellation of behaviors among mixed and gender-stratified samples. The goal is to understand the most effective ways to prevent and to decrease the risks of bullying, sexual harassment, and dating violence perpetration.

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