Intimate Partner Violence Perpetration in the Transition to Young Adulthood: Variability Across Relationships, Individuals, and Schools

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ABSTRACT

Although theoretical models suggest substantial heterogeneity across an individual's relationships in partner violence risk (Capaldi & Kim, 2007), most studies in adolescence/early adulthood assess violence at a single time point summarized across relationships. Data from Waves I and III of the National Longitudinal Study of Adolescent Health were utilized. At Wave III (2001), 11,063 persons reported intimate partner violence experiences about 19,327 relationships that had occurred since 1995. Partner, respondent and Wave I school characteristics were examined as predictors of relationship violence perpetration using items from the Conflict Tactics Scale 2 (minor physical, moderate physical, sexual, and injury). Three-level models with random intercepts for individuals and schools were run. Over half the variability in dating violence perpetration was due to relationship level factors, although a higher proportion of such variability was at the relationship level for females compared to males. Across violence types and perpetrator gender, the most consistent significant predictors of perpetration were same-sex relationship (protective for females, risk factor for males), childhood maltreatment history, perceived partner infidelity, and type of relationship (i.e., increased risk for cohabiting and married couples compared to dating). Relatively little of the individual-level variability in perpetration was explained by examined variables, suggesting that important determinants of perpetration were not included. Future research should explore reasons behind the gender difference in the amount of perpetration variability at the individual versus partnership level, as well as the reasons behind the differences in perpetration risk according to same-sex relationship status.

BACKGROUND

Violence in adolescent and young adult dating relationships is a serious public health issue. Adolescent physical dating violence perpetration in the U.S. is estimated to range from 26 to 46% (Hickman, Jaycox, & Aronoff, 2004; Renner & Whitney, 2012). Sexual violence is also prevalent, with perpetration estimates ranging from 3-12% (Hickman et al., 2004). There are numerous negative sequelae associated with relationship violence (RV). Depression, posttraumatic stress disorder, and substance use are among the mental health issues that are linked with the experience of RV (Adam et al., 2011; Banyard & Cross, 2008; Campbell, 2002; Kilpatrick et al., 2003; Vaeth, Ramisetty-Mikler, & Caetano, 2010). Further, RV is associated with numerous indicators of poor physical health, including increased number of physical symptoms (Campbell, 2002; Woods, Hall, Campbell, & Angott, 2008), sexually transmitted infections, reproductive health symptoms, injury, mortality, and the risk for additional victimization (Schollenberger et al., 2003). The breadth of deleterious health outcomes associated with RV heightens the importance of understanding the etiology of RV in order to design efficacious interventions.

Relationship Violence Perpetration across Demographic Groups

A number of demographic factors have been linked with an elevated likelihood of experiencing RV. Studies indicate that relationship violence increases with age during adolescence (Halpern, Oslak, Young, Martin, & Kupper, 2001; Halpern, Spriggs, Martin, & Kupper, 2009a). Although women have been found to initiate violence more frequently than men in the late teen years, men and women reciprocate aggression at similar rates (Capaldi, Kim, & Shortt, 2007). Minority populations, specifically African Americans, may be particularly at risk for dating violence (Henry & Zeytinoglu, 2012), with rates of dating violence reported as high as 40%, although this has not been consistent across adolescent samples (Amstadter et al., 2011; Renner & Whitney, 2010), and some research suggests this may be due to socioeconomic variables (Henry & Zeytinoglu, 2012; Rennison & Planty, 2003). Low educational attainment has been associated with an elevated risk of RV victimization (Seedat, Stein, & Forde, 2005). Past literature suggests a

similar prevalence of psychological and minor physical dating violence between same and opposite-sex adolescent couples, although some predictors of dating violence vary (Halpern, Young, Waller, Martin, & Kupper, 2004).

Gender differences in the frequency, types, motivations for, and consequences of relationship violence have received much attention in the literature. Historically, unidirectional male to female violence was the focus of research and interventions (Capaldi & Kim, 2007). However, research has documented equally high rates of victimization and perpetration in adolescent males and females in terms of physical violence (Centers for Disease Control and Prevention, 2012; O'Keefe & Treister, 1998). Some studies report rates of higher violence perpetration by women (Archer, 2000). Bidirectional violence in couples is also prevalent. In a study of adult couples, prevalence of violence in White couples was 3% for unidirectional male to female, 7% for unidirectional female to male, and 8% for bidirectional violence. In Black couples, prevalence was 3% for unidirectional male to female, 10% for unidirectional female to male, and 20% for bidirectional (Caetano, Ramisetty-Mikler, & Field, 2005). In a study focused exclusively on African American adolescent and young adults, females were more likely to report perpetrating dating violence than males, including hitting, pushing, slapping, throwing objects, and verbal threats. However, young women were more likely to experience choking and forced sexual intercourse than men (West & Rose, 2000). Gender may play an important role in the type of violence and the consequences of violence. Female victims of physical violence report a higher likelihood of injury and greater levels of emotional responses such as fear than males (Hamby & Turner, 2012). In addition, females are more likely to be sexually victimized by partners compared to males (Hamby & Turner, 2012). This research suggests that gender is an important focus in understanding violence perpetration, severity, type of violence, and consequences.

Individual, Peer and Familial Factors Associated with Relationship Violence Perpetration

A 2012 systematic review found many factors at the individual, familial, and social network were related to increased risk of intimate partner violence perpetration in adolescent and adult

relationships (Capaldi, Knoble, Shortt, & Kim, 2012). Some of the factors that appear especially important in adolescent and young adult perpetration risk include violence in the family-of-origin (Foshee, Bauman, & Linder, 1999), friends' involvement in dating violence (Foshee, Linder, MacDougall, & Bangdiwala, 2001), destructive responses to anger (Foshee et al., 2001), perceived normalcy and acceptability of dating violence (Foshee et al., 2001), outcome expectancies of dating violence (Foshee et al., 1999), alcohol use (Rothman, McNaughton Reyes, Johnson, & LaValley, 2012), and involvement in peer violence (Bossarte, Simon, & Swahn, 2008). Some of the more proximal attitudinal and norms factors appear to at least partially explain racial and ethnic differences in perpetration (Foshee et al., 2008), as well as the effects of violence in the family-of-origin (Foshee et al., 1999). Family-of-origin socioeconomic status, measured by parental education, and familial living arrangements have both also been associated with adolescent dating violence (Halpern et al., 2001; Halpern, Spriggs, Martin, & Kupper, 2009b).

Couple-Level Factors Associated with Relationship Violence

A number of factors at the partnership level also appear related to increased risk of relationship violence, although many of these studies have been conducted with non-adolescent samples. Among young women participating in the Add Health study, partnership concurrency (i.e., perceiving that one's partner is having other sexual relationships) was associated with both unidirectional and bidirectional violence perpetration (Hess et al., 2012). Cohabiting couples have been found to be at higher risk for partner violence compared to dating couples (Herrera, Wiersma, & Cleveland, 2008; Magdol, Moffitt, Caspi, & Silva, 1998; Stets & Straus, 1989). Also, having children has been tied to increase IPV risk (Vatnar & Bjørkly, 2010). Attachment anxiety and relationship discord are significantly positively related to physical aggression perpetration (Miga, Hare, Allen, & Manning, 2010), and relationships satisfaction appears protective against such perpetration (Capaldi & Langhinrichsen-Rohling, 2012).

Intra-individual Change in Perpetration

Most studies of RV in adolescence and early adulthood are limited to cross-sectional designs that only capture experiences at a single point in time, often summarized across multiple relationships, or only in the current or most recent relationship. Discontinuity across relationships between the life periods of adolescence and early adulthood may arise if the violence experienced in an adolescent relationship stems from "playful" acts gone wrong, or an immature ability to handle conflict in relationships which the individual grows out of with relationship experience (Foshee, Bauman, Linder, Rice, & Wilcher, 2007a). Alternately, continuity between adolescent and adult RV may be expected if adolescents are practicing scripts for relationships they will carry into their adult life (Henton, Cate, Koval, Lloyd, & Christopher, 1983).

The Dynamic Developmental Systems Perspective (Capaldi & Kim, 2007) suggests that relationship violence tends to occur within specific relationships, but not necessarily across relationships; time and developmental stage of the relationship are likely to influence risk for dating violence (Capaldi & Kim, 2007; Capaldi et al., 2007; Giordano, Soto, Manning, & Longmore, 2010). This model identifies developmental risk factors at the individual level (e.g., general antisocial behavior; exposure to family violence in childhood; mental health issues) which are influential across relationships, but recognizes that such factors interact with couple-specific interactions and situational factors (e.g., substance use) to impact the likelihood of RV.

Two studies of dating violence continuity/discontinuity conducted with a nationally-representative sample of U.S. adolescents and young adults suggest that as many as 40% of teen RV victims continue to be victimized into early adulthood (Halpern et al., 2009b; Spriggs, Halpern, & Martin, 2009). A number of factors were found to be important predictors of persistence: a respondent's early sexual initiation, number of partnerships in adolescence and early adulthood, and exposure to violent crime in adolescence. Another study examined mean trajectories of moderate to severe physical dating violence perpetration among high-school aged youth in rural North Carolina, finding that on average, frequency of perpetration increases until mid-adolescence, after which it decreases (Foshee et al., 2008). Unfortunately, these studies only examine

trajectories or continuity within persons and do not account for potential variability across relationships. Also, both studies have combined multiple types of violence (i.e., "any victimization," "moderate to severe perpetration"), which raises questions about continuity/discontinuity according to type of violence (i.e., physical versus sexual) and severity of violence (i.e., minor versus moderate).

We propose to address some of the limitations in the research regarding variability in RV over time across relationships for adolescents and young adults. Using a multilevel approach, we aim to:

(1) Examine the amount of variability in relationship violence outcomes that is attributable to relationship-level versus person-level factors versus contextual (school) factors;
(2) Investigate various types (e.g., physical and sexual) and severities (e.g., minor and moderate) of violent acts; and
(3) Identify individual, partner, and contextual characteristics that may be predictive of these outcomes and explain both person-level and partnership-level variability in dating violence; and
(4) Explore gender differences in multilevel variability and the correlates of perpetration.

METHODS

Data

We analyzed contractual data from the National Longitudinal Study of Adolescent Health, Waves I and III (Harris, 2009a). Add Health is a prospective cohort study of a nationally-representative sample of youth enrolled in grades 7-12 in the 1994-95 school year (Wave I) (Harris, 2011). Follow-up interviews were conducted in 1996 (Wave II), 2001-02 (Wave III), and 2007-08 (Wave IV). A multistage probability clustered sampling design was used to obtain its Wave I sample. The first stage was a stratified, random sample of all public and private high schools in the U.S. A feeder school was also recruited from each participating community. In-

school surveys were attempted with all students attending participating schools; a total of 90,118 were completed. In the second Wave I sampling stage, a sample of adolescents was drawn for in-depth in-home interviews, consisting of a random core sample plus selected special oversamples; a total of 20,745 interviews were conducted at this stage. At Wave II, most students (except Wave I seniors) were eligible for re-interview; at Wave III, all respondents to the Wave I in-home interview were eligible for re-interview. A total of 15,170 respondents were re-interviewed at Wave III (76% of eligibles). Sampling weights adjusted for both unequal probabilities of selection into the original sample and loss to follow-up.

At Wave III, respondents were asked to retrospectively report details about romantic and sexual partnerships they had been involved in since the summer of 1995. Questions about partner violence were only asked within "serious" relationships, which were identified via an algorithm that took into account factors such as duration, marital status, and recency. Further information about the algorithm is available on the Add Health website (Harris, 2009b). According to past research, more serious relationships are more likely to have partner violence within them (O'Keefe, 1997). We limited analysis to those persons with valid sampling weights at both the individual and school levels, in order to adjust for loss to follow-up by Wave III and to allow us to generate nationally-representative estimates. With this restriction applied, a total of 11,063 persons reported intimate partner violence experiences about 19,327 relationships.

Measures

Outcomes. Relationship violence experiences were queried using items modified from the Conflict Tactics Scale 2 (Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Respondents were asked how frequently (never to more than 20 times) they had: (1) threatened their partner with violence, pushed or shoved them, or thrown something at them that could hurt; (2) slapped, hit, or kicked their partner; (3) insisted on or made their partner have sexual relations; or (4) caused an injury like a sprain, bruise, or small cut because of a fight. We dichotomized each item to reflect

any perpetration (i.e., 4 separate outcomes: minor physical, moderate physical, sexual, and injury, respectively).

Predictors. We examined a number of predictors at the relationship/partner level, the respondent level, and the Wave I school level. At the *relationship/partner level*, we included a number of *demographic characteristics* of the partner. Partner age (in years), race (non-Hispanic white, non-Hispanic black or African American, Hispanic, other) and educational attainment (less than high school diploma, high school diploma or GED, some college, Bachelor's degree or greater) were all be explored. Relationship characteristics were also included. Whether the relationship was *same-sex or opposite-sex* was determined by the respondent's report of his/her own and his/her partner's gender. *Partnership concurrency* (yes/no) was determined based on a question asking the respondent whether he/she believed his/her partner had other sexual partners while in the relationship with him/her. *Relationship type* was measured as married, non-married/cohabiting, and dating (i.e., non-married/ not cohabiting). Finally, c*hildbearing* within the relationship was measured based on children reported by the respondent at Wave III, which were tied to intimate relationships.

Predictors at the *individual respondent level* were also explored. Similar to the demographic characteristics examined at the partner level, the respondent's age at relationship start and race/ethnicity were included. Educational attainment was not included, because questions asking about educational attainment were based on attainment as of the Wave III interview, and thus not necessarily reflective of educational attainment around the time of the relationship. We also investigated the respondent's family-of-origin socioeconomic status (i.e., highest parental education: <high school, HS diploma/GED, some college, Bachelor's degree or greater) and living arrangement at Wave I (with both biologic parents, stepfamily, single parent, other). *Childhood maltreatment* experiences of the respondent were also examined as potential predictors. Two indicators were constructed to reflect physical abuse ("slapped, hit or kicked you") and sexual abuse ("touched you in a sexual way, forced you to touch him or her in a sexual way, or

forced you to have sexual relations") by a parent/caretaker prior to the sixth grade. Finally, *prior involvement in physical violence* was also included. At Wave I, adolescents were asked how often in the year prior to interview they had gotten into a physical fight; responses were dichotomized to reflect any involvement (yes/no). Although this measure includes both fighting with dating partners as well as peers, only a small percentage of adolescents reported that their last fight was with a dating partner (2%).

Finally, a number of predictors at the *school level* were included. These characteristics were conceptualized as indicators of the social context in which the respondent started dating. These have received less attention in prior studies. *Socioeconomic disadvantage* was constructed based on a principal components analysis of the school-level prevalence of the following characteristics: not living with both biologic parents (yes/no), family receives public assistance (yes/no), parent reports difficulty paying the bills (yes/no), highest parent education less than high school (yes/no), and having an unemployed parent (defined as not currently working for pay and seeking paid employment, yes/no). Factor loadings on the first principal component were used as item weights in generating the summary score. This index has been used in past studies of dating violence in Add Health (Spriggs, Halpern, Herring, & Schoenbach, 2009). *School climate* was based on a principal components analysis of a number of indicators of adolescents' bonding with school at Wave I: feeling close to people at his/her school, feeling like a part of his/her school, students are prejudiced (reverse coded), happy to be at school, teachers treat students fairly, and feel safe at school. All questions were answered on a five-point scale (strongly agree to strongly disagree). Responses to each question were averaged across respondents within each school; a principal components analysis at the school level was then performed on these averaged items. Factor loadings on the first principal component were used as item weights in generating a summary score. *School prevalence of physical fighting* was also examined, and was based school-level prevalence any past year physical fighting. The prevalence estimate was transformed to a standard normal score across schools, so that effect estimates could be interpreted as the

change in RV perpetration odds per one standard deviation change in fighting prevalence. Past studies have found a link between exposure to community violence and adolescents' victimization and perpetration of dating violence (Reed, Silverman, Raj, Decker, & Miller, 2011; Spriggs, Halpern, & Martin, 2009). Finally, *school prevalence of dating violence* in the past 18 months was based on the Wave II reports of victimization by Add Health respondents: being sworn at, insulted, threatened with violence, pushed or shoved, or having something thrown at him/her by a romantic or sexual partner. If the respondent answered yes to any of the items, he/she was coded as having been victimized. School prevalence of any dating violence victimization was transformed into a standard normal score across schools, so that effect estimates could be interpreted as the change in RV perpetration odds per one standard deviation change in dating violence victimization prevalence.

Analyses. Analyses were conducted in Stata 10.1. Individual- and school-level population weights supplied by Add Health were applied; a weight of 1 was used for each relationship. We began by reporting descriptive statistics (frequencies, means) for individuals and relationships. We then tested the relationships between predictor variables and dating violence outcomes through three-level logistic regression models with random intercepts (level 1 = relationship, level 2= respondent, level 3 = sampled school from which respondent came). We used a forward-built modeling strategy. We started with a null model to quantify the amount of variability in RV perpetration that was attributable to the relationship level, the respondent level, and the school level. We calculated intraclass correlation (ICC) for each RV perpetration outcome using an estimated level-one variance of $\Pi^2/3$ (Snijders & Bosker, 1999). We hypothesized that if a greater proportion of variability in RV perpetration outcomes was found at the person-level compared to relationship-level, this may be suggestive of more time-stable contributors to relationship violence. We then added predictors in three batches – relationship-level predictors, respondent-level predictors then school-level predictors. To assess the importance of predictors to dating violence outcomes, we considered both the statistical significance of each predictor, as well as the

proportionate reduction in unexplained variance at each level subsequent to predictors' addition to the models. Hypothesis testing was conducted at $\alpha<0.05$.

RESULTS

Descriptive Statistics

Partnership characteristics. The vast majority of relationships reported by females and males were romantic (91.1% and 85.9%, respectively), while relatively few relationships were between same sex partners (1.8% and 2.0%) [Table 1]. The average partner age at the start of a relationship was approximately two years lower for males versus females (18.8 vs. 20.4 years). While females and males reported a relatively similar proportion of relationships with non-Hispanic White partners (64.4% and 67.4%), females evidenced a higher proportion of relationships with non-Hispanic Black partners (18.3% vs. 12.3%). The majority of both females' and males' partners had achieved a high school diploma or started college (72.3% for females, 74% for males). More females than males reported having children in their current relationship (18.3% vs. 11.0%) and perceiving their partner as having concurrent sexual partners (16.2% vs. 12.8%). The majority of partnerships reported by females and males were unmarried, non-cohabiting partnerships (59.9% and 66.2%), although around one-quarter were cohabiting relationships (25.7% and 23.7%), and some were marital (14.4% and 10.1%). A substantial proportion of relationships involved violence. Minor and moderate physical perpetration were more prevalent than sexual and injury perpetration as reported by females (21.1%, 17.0%, 3.4% and 6.8%, respectively); for males, minor physical perpetration was more common than the other types (11.6% vs. 5.4%, 4.5%, and 6.7%, respectively.) Females reported a higher prevalence of minor physical perpetration and moderate physical perpetration compared to males.

Respondent characteristics. On average, both males and females' relationships started around the respondent's 18th birthday [Table 1]. Around 70% of all respondents reported non-

Hispanic White race/ethnicity. The majority of both females and males reported having a parent with some college education or at least a Bachelor's degree (58.5% and 60.1%). While over half of both females and males reported living with both biologic parents at Wave I interview, a substantial minority also reported living with a single parent (28.1% and 25.6%, respectively). Almost one in three respondents reported having experience childhood physical maltreatment (29.0% for girls, 33.5% for boys), while around 7% reported childhood sexual abuse. Fighting in the year prior to Wave I was almost twice as prevalent for males compared to females – 43% vs. 22%.

Variability in Relationship Violence

Using multilevel models with no predictors (i.e., null models), we found that the amount of outcome variability that was attributable to individual versus relationship versus school level was heterogeneous across gender as well as violence types and severities [Table 2]. For females, the majority of variability in perpetration was due to relationship-level factors. A greater proportion of males' perpetration variability was attributable to the individual level compared with females. For both males and females, a much higher proportion of sexual perpetration variability was due to individual-level factors compared to other perpetration types. Also noteworthy is the larger proportion of DV variability that is attributable to differences between school contexts for males compared to females.

Multivariable results – Females' perpetration

Results from fully saturated models for females' perpetration are presented in Table 3. A number of partner/relationship characteristics were associated with females' likelihood of minor physical perpetration. Being in a same sex relationship, having an older partner and having a more educated partner were all negatively associated with minor physical perpetration. In contrast, perceived partnership concurrency and being in a cohabiting or marital relationship were associated with increased odds of minor physical perpetration. Only a couple individual-level factors were associated with females' minor physical perpetration: living in a stepfamily (contrasted to both biologic parents) was negatively associated, while having experienced childhood physical

abuse was positively associated. At the school level, socioeconomic disadvantage was associated with an increased risk of females' minor physical perpetration. The explanatory power of the included variables for individual-level variability in females' minor physical violence perpetration was weak – adding the described relationship-level variables resulted in an increase in the estimated individual-level variability, and individual-level variables only explained 6% of the individual variability. In contrast, 100% of the school-level variability was accounted for just by relationship characteristics.

Factors associated with females' moderate physical perpetration are largely similar to those for minor physical perpetration. Being in a same-sex relationship and having an older, more educated partner was associated with reduced odds for females' moderate physical perpetration. In contrast to minor physical perpetration results, however, having a Black partner was associated with increased odds of moderate physical perpetration. Perceiving her partner to have concurrent sexual relationships, and being in either a cohabiting or marital relationship, were also associated with increased odds of females' moderate physical perpetration. At the respondent level, living in any family structure other than two biologic parents during adolescence was associated with decreased odds of moderate physical perpetration, while childhood physical abuse was associated with increased odds of such perpetration. No factors at the school level were associated with females' moderate physical perpetration. Explanatory power of the included variables for individual-level variability was again weak. After accounting for the included relationship-level factors, estimated inter-individual variability in females' moderate physical perpetration increased by 12%. Adding individual-level variables explained only 12% of the individual-level variability. In contrast, variability between schools in girls' likelihood of moderate physical perpetration was explained 100% by characteristics of relationships that were included in the model.

Results for females' sexual perpetration are notably different from those for minor and moderate physical perpetration. The only relationship-level factor significantly associated with females' odds of sexual perpetration was relationship type – being in a cohabiting or marital

relationship was associated with increased risk of girls' sexual perpetration. At the respondent level, Black and other ethnicity females were at increased risk of sexual perpetration compared to non-Hispanic white females. Additionally, experiencing childhood physical abuse, and physically fighting more than once in the year prior to Wave I interview, were each associated with increased odds of females' sexual perpetration. No factors at the school level were significantly associated with females' sexual perpetration risk. Despite the fewer variables that were significantly associated with females' perpetration of this type, a greater proportion of individual variability in risk was explained by the included variables: 20% explained by relationship-level factors, 5% by individual-level factors. Similar to other perpetration types, 100% of between school variability was accounted for by relationship characteristics.

Females' perpetration of RV injury was associated with a number of factors at both the relationship and individual level. Having a Hispanic partner, perceiving partner concurrency, and being in a cohabiting or marital relationship were all associated with increased odds of females' perpetration RV injury. Having a partner with some college education or a Bachelor's degree was associated with decreased odds of females' injury perpetration. At the individual level, the only factor associated with increased odds of females' injury perpetration was childhood physical abuse. No factors at the school level were significantly associated with this outcome. Explanatory power for inter-individual variability in injury perpetration was moderate with the given variables: 21% of inter-individual variability was explained by relationship factors, although no additional variability was explained by individual factors. One hundred percent of the variability between schools in females' injury perpetration was accounted for by relationship characteristics.

Multivariable results – Males' perpetration

Results from fully saturated models for males' perpetration are presented in Table 4. A number of partner/relationship characteristics were associated with males' likelihood of minor physical perpetration. Being in a same sex relationship, having a Hispanic partner, having a child with one's partner, perceived partner infidelity, and being in a married or cohabiting relationship

were all associated with boys' increased odds of minor physical perpetration. Having an older partner or one with a high school diploma (relative to not having a high school diploma) were both associated with decreased odds of males' minor physical perpetration. Only a few individual-level factors were associated with males' minor physical perpetration: reporting "other" race (contrasted to non-Hispanic white), past year physical fighting at Wave I, and experiencing physical or sexual abuse in childhood were all associated with increased odds of perpetration, while having some college education (relative to not having a high school diploma) was associated with decreased odds. No factors at the school level were associated with males' minor physical perpetration. The explanatory power of the included variables for individual-level variability in males' minor physical violence perpetration was weak – only 15% of the individual-level variability was explained by the full model. In contrast, 100% of the school-level variability was accounted for by relationship and individual characteristics.

Fewer factors were associated with males' moderate physical perpetration compared to minor physical perpetration. Being in a same-sex relationship, having a Black partner, perceived partner concurrency, and being in a married or cohabiting relationship were all associated with males' increased odds of moderate physical perpetration. Having a partner with a high school diploma (relative to not having a high school diploma) was associated with decreased odds of males' moderate physical perpetration. At the respondent level, only two factors associated with this perpetration type: having some college (contrasted with no high school diploma) was protective against, while having experience childhood sexual abuse was a risk factor for, males' moderate physical perpetration. Unexpectedly, at the school level, a more positive school climate was associated with an increased odds of males' moderate physical perpetration. Explanatory power of the included variables for individual-level variability was moderate. The included relationship-level factors explained about 23% of between-individual variability, while individual factors explained only 13%. In contrast, variability between schools in males' likelihood of

moderate physical perpetration was explained 100% by relationship characteristics that were included in the model.

Even fewer of the included predictors were related to males' sexual perpetration compared to physical perpetration. At the relationship level, the only factors associated with increased odds of males' sexual perpetration were perceived partner concurrency and being in a cohabiting or married relationship. At the individual level, having experienced childhood physical and sexual abuse were both related to increased odds of males' sexual perpetration. Interestingly, several factors at the school level were associated with males' odds of sexual perpetration. School disadvantage was associated with increased odds, while the prevalence of physical fighting was associated with decreased odds, of males' sexual perpetration. Not surprisingly, given the few associations found, very little between-individual variance in sexual perpetration was explained by the included covariates (5%). In contrast, more than two-thirds (68%) of the variability between schools was explained by the included covariates.

Males' perpetration of injury was associated with many of the same factors that were associated with minor and moderate perpetration. At the relationship level, being in a same sex relationship, perceived partner concurrency, and being in a cohabiting or marital relationship were associated with increased odds, while the partner having a high school diploma or Bachelor's degree (relative to less than high school diploma) were associated with decreased odds of males' injury perpetration. At the individual level, the respondent reporting Hispanic ethnicity was associated with decreased odds, while childhood physical abuse was associated with increased odds, of injury perpetration. No factors at the school level were related to this types of partner violence among males. Close to half the between-individual and between-school variability in males' odds of injury perpetration were explained by the included factors.

DISCUSSION

Theoretical models suggest that there may be high variability in partner violence risk across relationships within the same individuals (Capaldi & Kim, 2007). Little population-based research, however, has tested this proposition, nor has the amount of variability attributable to individual versus relationship factors been quantified in past studies. The purpose of this study is to examine the amount of variability in relationship violence perpetration that is attributable to relationship, individual and contextual factors among young adults in a nationally-representative sample. We also aim to explore the explanatory power of a number of factors at each level, as well as gender differences.

Our results suggest that risk for relationship violence perpetration is highly variable across relationships in late adolescence and early adulthood. This finding is consistent with past studies of victimization within the Add Health sample, which found 60% of adolescents experiencing dating violence victimization were no longer being victimized in early adulthood (Halpern et al., 2009b; Spriggs, Halpern, & Martin, 2009). Together, findings suggest that aspects of relationships likely interact with characteristics of the individual partners to influence whether and when partner violence perpetration will occur. Variability across partnerships in perpetration risk suggests that prevention and intervention efforts will need to address both individual and partnership factors to be effective.

Gender differences were observed in the proportion of perpetration variability that was attributable to each level studied, with a greater proportion of males' perpetration attributable to the individual level compared to females' perpetration. This may be suggestive of greater perpetration continuity across relationships for males versus females, or relatively greater importance of individual versus relationship factors for males' versus females' perpetration. To our knowledge, this is the first study documenting such a difference. Although past individual-level studies examining trajectory shapes and continuity of RV over time have not found gender differences (Foshee et al., 2008; Halpern et al., 2009b), it is unclear if changes were within single or multiple relationships across time. Predictors of perpetration among high-school aged teens have been

found to vary by gender (Foshee et al., 2001), such that social normative influences and personal competencies (which likely carry over across relationships) are more important in predicting males' versus females' perpetration. Quantitative and qualitative studies of teens and young adults have suggested differences in male versus female motivations for violence. In one qualitative study of rural teens in North Carolina, females reported using violence most often to respond to systematic abuse by a male partner, and males reporting using violence most often in response to violence initiated by a female partner (Foshee, Bauman, Linder, Rice, & Wilcher, 2007b). Among college students from South Carolina, jealousy was the number one motivator for males, while showing anger and responding to emotional hurt were the top motivators for females (Follingstad, Shannon, Lloyd, & Sebastian, 1991). In contrast, in a study among high school aged youth in Los Angeles, the top motivators for boys were anger and getting control over their partner, while for females they were anger and self-defense (O'Keefe, 1997). Further studies that capture partner violence across relationships and that measure some of these more nuanced, proximal risks for RV perpetration are needed to explicate observed gender differences.

In null models, a large proportion of variability in males' perpetration (especially injury) appeared to be attributable to differences between high school contexts. In subsequent models, nearly all this variability was explained by relationship and individual characteristics, with relationship characteristics being especially important. There are a few possible interpretations of this finding. A compositional interpretation would be that differences between school contexts are due to differences in the types of people who attend different schools. This would explain reduction in school-level variance after accounting for individual factors. Another interpretation would be that school contexts influence the type of relationships one chooses, both in adolescence and early adulthood. Such contextual effects could operate through availability of mates in the school context itself (for partnerships that begin in adolescence and carry over into adulthood), or the conditioning of school attendees to value and seek certain types of partners. Although we are

unable to tease apart such interpretations with the current models, future research may wish to explore these pathways.

Across gender and perpetration types, the most consistent correlates of perpetration were same sex relationships (protective for females, risk factor for males), perceived partner concurrency, cohabiting and marital relationships, and childhood abuse. Findings of increased risk for persons with a history of childhood abuse mirror results from many other studies (Capaldi et al., 2012; Foshee et al., 1999; Manchikanti Gómez, 2011), together suggesting the power of social learning theory in the intergenerational cycle of violence. Greater partner violence among cohabiting and marital relationships relative to dating relationships is also consistent with past literature (Herrera et al., 2008; Magdol et al., 1998; Stets & Straus, 1989). It has been suggested that this increased risk can partially be attributed to increases in the amount of time spent together, greater number of shared activities, more areas for potential conflict, and greater power imbalances of these types of relationships relative to dating relationships (Magdol et al., 1998). Also consistent with past work is the increased risk of perpetration associated with perceived partner concurrency (Hess et al., 2012). One can imagine that such perceived infidelity would increase likelihood for conflicts within the partnership, and thus increase risk for physical violence.

In contrast to these other associations, our finding of differences in perpetration risk depending on whether the relationship is same or opposite-sex contrasts with findings among adolescents, which found a similar prevalence of victimization between same-sex and opposite-sex couples (Halpern et al., 2001; Halpern et al., 2004). Our results are more comparable to one study conducted using nationally-representative data from the National Violence Against Women Survey. This study found higher rates of lifetime intimate partner violence experiences among males and females who reported ever living with a same-sex partner compared to their heterosexual counterparts; however, most of the intimate partner violence experienced by same-sex cohabiting females was perpetrated by male rather than female partners (Tjaden, Thoennes, & Allison, 1999). Differences in prevalence may be due to the way in which gender roles are enacted in same-sex

versus opposite-sex couples; however, further study, perhaps using qualitative approaches including both same and opposite-sex couples, are needed to explore reasons for this disparity.

Although this study has notable strengths, including use on partnership-specific data from a large, nationally-representative sample, its findings should be interpreted with knowledge of the study limitations. First, even after including many potential predictors at the relationship and individual level, a large amount of variability in perpetration risk remains unexplained. Many variables we would have liked to have included – such as perceived norms for RV, outcome expectancies, relationship conflict, communication style, and anger management style – were not included in Add Health. Future primary data collection efforts that are better able to capture these measures, especially how they change over time and across relationships, are needed. Second, due to our outcome variable being dichotomous, we were unable to assess to what extent the variables we included explained relationship-level variability in perpetration. Additionally, because variance could not be directly observed, we had to use an estimate of variance at the relationship-level, which may or may not accurately characterize variability across relationships. A third limitation is the relatively small number of relationships reported per person, which may raise concerns about the validity of random effects estimates (i.e., variance estimates). One simulation study found that in two level models, having an average of two units per cluster (with 100 clusters) resulted in upward bias in estimates of group-level variance, and also a decrease in precision of these estimates (Clarke, 2008). In another simulation study, researchers found that when the number of clusters was large (i.e., >459), bias in variance estimates was minimal, even when 90% of clusters only had one individual per cluster (Theall et al., 2011). Both of these simulation studies, however, were meant to examine bias in multilevel studies with neighborhoods as level-two units; given there is a much higher correlation between repeated measures within individuals compared to individuals nested within neighborhoods, it is possible that bias in variance estimates may be different in the present study. Recommendations for multilevel growth curve models are a minimum of three repeated measures per individual (Raudenbush & Bryk, 2002), but this recommendation is

primarily made to enable testing of nonlinear growth functions over time. Fourth, due to time and space constraints, we were unable to include a separate examination of intimate partner violence victimization, which we had originally planned to include. In the future we aim to execute such analyses.

In summary, we found a substantial amount of variability in perpetration risk was due to relationship-level factors, suggesting that interventions for partner violence need to address not only individual factors but also relationship dynamics. Future work examining relationship dynamics as they evolve over time and interact with individual characteristics and situational factors will be informative regarding partner violence etiology and interventions. Additionally, studies exploring potential gender differences in relationship violence continuity are warranted. Factors contributing to differences in partner violence risk across same- and opposite-sex couples also need further exploration.

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Table 1. Descriptive characteristics of relationships and individuals

	Females weighted %	Males weighted %
Relationship characteristics		
N	10,517	8,813
Romantic	91.1%	85.9%
Same sex	1.8%	2.0%
Partner age at start (mean)	20.4	18.4
Partner race/ethnicity		
Non-H White	64.4%	67.4%
Non-H Black	18.3%	12.3%
Hispanic	10.4%	11.9%
Other	6.9%	8.4%
Partner's education		
<HS	14.3%	13.5%
HS Diploma / GED	46.9%	53.1%
Some college	25.4%	20.9%
≥Bachelor's	13.4%	12.5%
Child in relationship	18.3%	11.0%
Perceived infidelity	16.2%	12.8%
Relationship type		
Unmarried, non-cohab	59.9%	66.2%
Unmarried, cohabiting	25.7%	23.7%
Married	14.4%	10.1%
Respondent perpetration		
Minor Physical	21.1%	11.6%
Moderate Physical	17.0%	5.4%
Sexual	3.4%	4.5%
Injury	6.8%	6.7%
Respondent Characteristics		
N	6,255	5,348
Age at rel. start (mean)	18.1	18.6
Race/ethnicity		
Non-H White	69.6%	68.2%
Non-H Black	15.1%	14.9%
Hispanic	11.1%	12.2%
Other	4.2%	4.8%
Parent education at W1		
<HS	11.6%	10.6%
HS Diploma / GED	30.0%	29.3%
Some college	21.5%	19.6%
≥Bachelor's	37.0%	40.5%
Family structure at W1		
Both bio. Parents	55.3%	57.5%
Stepfamily	10.3%	10.7%
Single parent	28.1%	25.6%
Other	6.3%	6.2%
Childhood physical abuse	29.0%	33.5%
Childhood sexual abuse	6.8%	7.9%
Past year fighting at W1		

None	78.2%	57.0%
Once	14.6%	24.7%
>Once	7.2%	18.3%

Table 2. Proportion of variance at each relationship, individual, and school level (results from three-level null models)[†]

	Girls			Boys		
	Rel.	Indiv.	School	Rel.	Indiv.	School
Perpetration						
Minor Physical	77.8%	16.6%	5.5%	64.5%	29.8%	5.7%
Moderate Physical	77.6%	17.7%	4.7%	38.9%	49.7%	11.4%
Sexual	53.7%	42.6%	3.8%	31.7%	56.1%	12.2%
Injury	79.5%	15.5%	5.1%	47.3%	34.0%	18.7%

[†]Level 1 = relationship, level2=individual, level3=school. Variance at level 1 approximated as $\Pi^2/3$.

Table 3. Females' Perpetration – Full models

	Minor Physical			Moderate Physical			Sexual			Injury		
	AOR	95% CI	P>|z|	AOR	95% CI	P>|z|	AOR	95% CI	P>z	AOR	95% CI	P>z
Partner/partnership characteristics												
Romantic relationship	1.36	0.95-1.94	0.092	1.37	0.91-2.05	0.128	0.65	0.28-1.53	0.327	0.89	0.48-1.64	0.699
Same sex relationship	0.39	0.16-0.93	0.034	0.27	0.09-0.77	0.014	0.41	0.11-1.50	0.178	0.80	0.31-2.04	0.635
Partner's age	0.95	0.93-0.98	0.000	0.95	0.92-0.97	0.000	0.96	0.92-1.01	0.089	0.99	0.95-1.02	0.476
Partner's race (ref: White)												
Black	1.26	0.85-1.89	0.253	1.52	1.05-2.19	0.026	1.20	0.58-2.49	0.617	1.01	0.59-1.74	0.964
Hispanic	1.07	0.77-1.48	0.688	1.19	0.87-1.64	0.277	1.47	0.90-2.41	0.125	1.49	1.02-2.18	0.037
Other	0.89	0.64-1.22	0.461	1.16	0.80-1.70	0.427	0.73	0.42-1.29	0.279	1.02	0.58-1.79	0.950
Partner's education (ref:<HS)												
HS grad/GED	0.78	0.62-0.97	0.027	0.83	0.63-1.09	0.173	0.80	0.48-1.33	0.387	0.78	0.56-1.08	0.137
Some college	0.64	0.50-0.83	0.001	0.63	0.47-0.84	0.002	1.12	0.62-2.00	0.707	0.61	0.42-0.90	0.012
Bachelor's +	0.32	0.21-0.48	0.000	0.28	0.17-0.44	0.000	0.73	0.32-1.66	0.447	0.35	0.17-0.71	0.004
Child from relationship	1.13	0.87-1.46	0.360	1.03	0.77-1.37	0.867	0.74	0.42-1.28	0.278	0.99	0.72-1.34	0.932
Partner's concurrency	2.23	1.68-2.98	0.000	1.62	1.27-2.07	0.000	1.50	1.00-2.26	0.052	2.21	1.68-2.91	0.000
Relationship type (ref: dating)												
Cohabiting	4.60	3.64-5.81	0.000	3.61	2.90-4.50	0.000	4.18	2.91-5.99	0.000	3.93	2.89-5.35	0.000
Marital	2.82	1.98-4.02	0.000	2.90	1.84-4.57	0.000	2.91	1.68-5.07	0.000	2.63	1.75-3.95	0.000
Respondent characteristics												
Respondent race (ref: white)												
Black	1.31	0.88-1.94	0.186	1.15	0.76-1.72	0.506	2.65	1.30-5.41	0.007	0.90	0.51-1.61	0.734
Hispanic	1.16	0.85-1.58	0.359	1.25	0.93-1.67	0.137	1.32	0.84-2.08	0.230	1.18	0.83-1.69	0.363
Other	1.09	0.77-1.55	0.632	1.21	0.83-1.76	0.324	2.49	1.26-4.93	0.009	1.12	0.65-1.94	0.675
Respondent education (ref:<HS)												
HS Grad / GED	1.17	0.85-1.60	0.331	1.11	0.80-1.55	0.517	1.11	0.58-2.13	0.753	1.02	0.63-1.65	0.945
Some College	1.18	0.84-1.67	0.343	1.14	0.82-1.57	0.434	1.04	0.55-1.95	0.914	0.94	0.63-1.41	0.759
Bachelor's +	0.90	0.57-1.44	0.668	0.89	0.58-1.37	0.608	0.91	0.37-2.27	0.842	0.59	0.29-1.21	0.152
Parental education (ref:<HS)												
HS Grad / GED	0.84	0.58-1.23	0.371	1.00	0.67-1.49	0.999	0.78	0.35-1.70	0.526	0.86	0.58-1.27	0.437

Some College	0.86	0.60-1.25	0.442	0.97	0.65-1.45	0.889	0.67	0.32-1.43	0.305	0.76	0.50-1.16	0.205
Bachelor's +	0.85	0.59-1.22	0.373	1.02	0.68-1.54	0.928	0.75	0.33-1.70	0.492	0.99	0.68-1.45	0.964
W1 Family Sturcture (ref: Both Bio)												
Stepfamily	0.71	0.51-0.98	0.040	0.60	0.44-0.82	0.001	0.63	0.39-1.00	0.050	0.83	0.52-1.34	0.458
Single Parent	0.82	0.65-1.04	0.096	0.77	0.59-1.00	0.048	0.72	0.46-1.12	0.142	0.98	0.72-1.35	0.919
Other	0.68	0.45-1.01	0.053	0.54	0.34-0.84	0.007	0.88	0.50-1.55	0.655	0.84	0.52-1.36	0.479
Childhood Phys Abuse	1.55	1.19-2.01	0.001	1.76	1.39-2.23	0.000	2.04	1.37-3.04	0.000	1.70	1.29-2.24	0.000
Childhood Sexual Abuse	0.73	0.46-1.16	0.183	0.93	0.66-1.31	0.680	0.88	0.43-1.81	0.734	0.86	0.55-1.36	0.524
W1 Physical fighting in past year												
1ce past yr	1.21	0.94-1.55	0.138	1.22	0.95-1.57	0.126	0.79	0.45-1.39	0.416	1.22	0.86-1.74	0.272
>1ce past yr	1.41	0.94-2.10	0.093	1.35	0.91-2.01	0.139	1.94	1.13-3.35	0.017	1.25	0.78-2.01	0.357
School Characteristics												
School disadvantage	1.14	1.01-1.29	0.032	1.08	0.92-1.26	0.337	1.09	0.89-1.33	0.396	1.06	0.91-1.24	0.435
School climate	0.96	0.83-1.11	0.592	0.99	0.86-1.15	0.932	0.89	0.69-1.15	0.368	0.90	0.73-1.11	0.334
School prev physical fighting	1.05	0.93-1.19	0.416	0.98	0.84-1.15	0.805	0.88	0.72-1.08	0.213	0.94	0.81-1.11	0.482
School prev physical dv	1.05	0.95-1.17	0.326	1.00	0.90-1.11	0.994	1.00	0.84-1.20	0.997	1.09	0.96-1.23	0.173
Variance Explained*												
Individual Variance												
% explained by rel factors	-17%			-12%			20%			21%		
% explained by indiv factors	6%			12%			5%			0%		
TOTAL % EXPLAINED	*-11%*			*0%*			*25%*			*21%*		
School variance												
% explained by rel factors	100%			100%			100%			100%		
% explained by indiv factors	0%			0%			0%			0%		
% explained by school factors	0%			0%			0%			0%		
TOTAL % EXPLAINED	*100%*			*100%*			*100%*			*100%*		

*Based on changes in estimated variance at each level in a series of forward-built models for each perpetration type: (1) null, (2) relationship variables added, (3) individual variables added, (4) school variables added. Changes in relationship-level variance are unknown since level-one variability is not directly observed with dichotomous outcomes. Results from detailed models available from authors on request.

†Greater than 100% because estimated between-individual variance increased after adding relationship-level variables

___ = significant (p<0.05) factors

Table 4. Boys' Perpetration – Full models

	Minor Physical			Moderate Physical			Sexual			Injury		
	AOR	95% CI	P>z	AOR	95% CI	P>z	AOR	95% CI	P>z	AOR	95% CI	P>z
Partner/partnership characteristics												
Romantic relationship	1.39	0.95-2.03	0.091	1.11	0.55-2.24	0.779	1.26	0.62-2.59	0.520	1.68	1.00-2.83	0.050
Same sex relationship	2.55	1.08-6.01	0.032	4.09	1.51-11.05	0.005	2.92	0.60-14.14	0.183	3.85	1.15-12.83	0.028
Partner's age	0.95	0.91-1.00	0.045	0.94	0.87-1.01	0.091	0.96	0.89-1.04	0.293	0.96	0.90-1.03	0.247
Partner's race (ref: White)												
Black	1.78	0.92-3.44	0.085	3.47	1.45-8.29	0.005	1.13	0.46-2.79	0.788	1.30	0.58-2.90	0.519
Hispanic	1.70	1.12-2.58	0.013	1.35	0.78-2.34	0.285	1.73	0.89-3.37	0.104	0.98	0.52-1.83	0.947
Other	0.91	0.53-1.58	0.744	1.20	0.44-3.26	0.715	1.46	0.57-3.69	0.429	0.49	0.22-1.07	0.075
Partner's education (ref:<HS)												
HS grad/GED	0.52	0.38-0.73	0.000	0.53	0.30-0.91	0.023	0.57	0.32-1.02	0.059	0.34	0.22-0.54	0.000
Some college	0.88	0.58-1.35	0.570	0.73	0.39-1.35	0.312	0.70	0.40-1.22	0.204	0.67	0.37-1.21	0.185
Bachelor's +	0.56	0.30-1.05	0.070	0.45	0.19-1.09	0.077	0.70	0.29-1.71	0.436	0.34	0.14-0.81	0.015
Child from relationship	1.87	1.25-2.80	0.002	1.23	0.63-2.39	0.541	0.81	0.38-1.70	0.570	0.99	0.54-1.82	0.969
Partner's concurrency	2.63	1.95-3.54	0.000	2.54	1.66-3.89	0.000	1.93	1.14-3.26	0.014	2.61	1.64-4.16	0.000
Relationship type (ref: dating)												
Cohabiting	2.95	2.18-4.00	0.000	3.20	1.86-5.49	0.000	2.13	1.29-3.51	0.003	3.69	2.39-5.70	0.000
Marital	2.69	1.60-4.54	0.000	3.69	1.77-7.69	0.000	2.85	1.21-6.73	0.017	4.00	1.92-8.31	0.000
Respondent characteristics												
Respondent race (ref: white)												
Black	1.38	0.69-2.73	0.360	0.63	0.26-1.55	0.318	1.36	0.48-3.87	0.568	1.30	0.54-3.13	0.551
Hispanic	0.87	0.57-1.33	0.531	0.85	0.42-1.71	0.641	0.51	0.17-1.56	0.241	0.43	0.19-0.98	0.045
Other	2.76	1.50-5.06	0.001	1.64	0.58-4.61	0.346	1.68	0.53-5.35	0.378	2.17	0.87-5.39	0.095
Respondent education (ref:<HS)												
HS Grad / GED	0.76	0.48-1.21	0.242	0.51	0.27-0.99	0.047	0.86	0.45-1.67	0.666	0.92	0.49-1.73	0.789
Some College	0.52	0.30-0.90	0.019	0.31	0.15-0.67	0.003	0.50	0.23-1.08	0.079	0.50	0.24-1.04	0.064
Bachelor's +	0.54	0.25-1.20	0.130	0.42	0.12-1.48	0.178	0.43	0.15-1.20	0.108	0.48	0.20-1.14	0.097
Parental education (ref:<HS)												

HS Grad / GED	1.30	0.79-2.16	0.304	0.70	0.30-1.63	0.410	0.87	0.33-2.27	0.774	0.71	0.32-1.55	0.385
Some College	0.97	0.58-1.63	0.921	0.74	0.26-2.05	0.557	0.74	0.23-2.32	0.601	0.66	0.28-1.55	0.344
Bachelor's +	1.23	0.70-2.16	0.464	0.77	0.29-2.04	0.600	0.96	0.38-2.44	0.930	0.84	0.37-1.90	0.672
W1 Family Sturcture (ref: Both Bio)												
Stepfamily	0.89	0.56-1.41	0.620	0.58	0.28-1.21	0.146	0.57	0.25-1.32	0.190	0.72	0.39-1.33	0.298
Single Parent	1.01	0.73-1.39	0.946	0.77	0.45-1.33	0.348	1.31	0.76-2.28	0.329	1.06	0.68-1.66	0.786
Other	0.85	0.49-1.49	0.581	0.72	0.30-1.74	0.461	0.41	0.14-1.19	0.100	0.75	0.28-2.01	0.572
Childhood Phys Abuse	1.78	1.31-2.41	0.000	1.60	1.00-2.58	0.052	2.21	1.26-3.86	0.005	2.20	1.42-3.39	0.000
Childhood Sexual Abuse	2.04	1.31-3.17	0.002	4.95	2.16-11.36	0.000	2.51	1.07-5.91	0.035	1.17	0.63-2.19	0.618
W1 Physical fighting in past year												
1ce past yr	1.37	1.00-1.87	0.049	0.91	0.51-1.62	0.749	1.25	0.69-2.26	0.469	1.11	0.73-1.70	0.627
>1ce past yr	1.23	0.83-1.83	0.298	1.25	0.60-2.61	0.551	1.06	0.57-1.96	0.855	1.41	0.86-2.31	0.176
School Characteristics												
School disadvantage	1.05	0.88-1.25	0.613	1.06	0.83-1.34	0.654	1.39	1.04-1.87	0.025	1.13	0.87-1.46	0.376
School climate	1.09	0.91-1.31	0.342	1.34	1.03-1.76	0.030	1.04	0.71-1.52	0.848	1.32	0.95-1.83	0.101
School prev physical fighting	0.96	0.78-1.19	0.709	0.99	0.75-1.30	0.940	0.70	0.50-0.97	0.034	0.95	0.67-1.35	0.792
School prev physical dv	1.06	0.94-1.20	0.344	1.17	0.97-1.41	0.104	0.89	0.71-1.11	0.292	1.03	0.82-1.29	0.800

Variance Explained*				
Individual Variance				
% explained by rel factors	3%	23%	2%	17%
% explained by indiv factors	12%	13%	3%	26%
TOTAL % EXPLAINED	*15%*	*36%*	*5%*	*43%*
School variance				
% explained by rel factors	71%	100%	59%	44%
% explained by indiv factors	29%	0%	-8%	-11%
% explained by school factors	0%	0%	17%	9%
TOTAL % EXPLAINED	*100%*	*100%*	*68%*	*42%*

*Based on changes in estimated variance at each level in a series of forward-built models for each perpetration type: (1) null, (2) relationship variables added, (3) individual variables added, (4) school variables added. Changes in relationship-level variance are unknown since level-one variability is not directly observed with dichotomous outcomes. Results from detailed models available from authors on request.

___ = significant ($p<0.05$) factors