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Contextual Risk Profiles and Trajectories of Adolescent Dating Violence Perpetration

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Abstract

Social ecological and developmental systems perspectives suggest that interactions among factors within and across multiple contexts (e.g. neighborhood, peer, family) must be considered in explaining dating violence perpetration. Yet, to date, most extant research on dating violence has focused on individual, rather than contextual predictors, and used variable-centered approaches that fail to capture the configurations of factors that may jointly explain involvement in dating violence. The current study used a person-centered approach, Latent Profile Analysis, to identify key configurations (or profiles) of contextual risk and protective factors for dating violence perpetration across the neighborhood, school, friend and family contexts. We then examine the longitudinal associations between these contextual risk profiles, assessed during middle school, and trajectories of psychological and physical dating violence perpetration across grades 8 through 12. Five contextual risk profiles were identified: *school, neighborhood, and family risk*, *school and family risk*, *school and friend risk*, *school and neighborhood risk*, and *low risk*. The highest levels of psychological and physical perpetration across grades 8 through 12 were among adolescents in the profile characterized by high levels of *school, neighborhood and family risk*. Results suggest that early interventions to reduce violence exposure and increase social regulation across multiple social contexts may be effective in reducing dating violence perpetration across adolescence.

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Compliance with Ethical Standards

Ethical Approval

Ethical approval for the parent study and analyses conducted for the current manuscript was provided by the non-biomedical Institutional Review Board at UNC Chapel Hill in accordance with federal regulations governing human subjects research. All procedures were in accordance with the ethical standards of the research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individuals who participated in the parent study that provided the data used in the analyses reported in the current manuscript.

Conflicts of Interest

The authors declare that they have no conflict of interest.

Keywords

Adolescents; Contextual Risk; Latent Profile Analysis; Dating Violence; Developmental Trajectory

Introduction

Research suggests that more than one in ten US adolescents experience dating violence (DV) each year with potentially severe sequelae, including increased risk for involvement in adult intimate partner violence (Chen, Reyes, & Foshee, 2016). These findings have shifted the issue of adolescent DV to the forefront of US injury prevention control efforts (Vagi et al., 2013). For example, two national agencies recently implemented large scale DV prevention efforts (Miller et al., 2015; Tharp, 2012). Both efforts aimed to change individual as well as contextual level risk and protective factors based on a social ecological perspective, which posits that factors at multiple contextual levels (e.g. family, peer, neighborhood) must be considered in explaining and preventing the involvement in antisocial behaviors such as DV perpetration. Implementing “upstream” contextual level prevention strategies is of key importance because such strategies have the potential to produce sustained change in risk for violence at the population level (Frieden, 2010).

To date, however, limited empirical research is available to guide contextual level primary prevention efforts. Most extant research examining the etiological pathways leading to DV perpetration during adolescence has focused on individual-, rather than contextual-level factors (Chen et al., 2016; Vagi et al., 2013). Moreover, nearly all previous research has focused on identifying the unique effects of particular risk or protective factors on DV perpetration behaviors while controlling for other factors being modeled. Yet, social ecological and developmental systems perspectives suggest that context-context interactions, whereby two or more contextual factors work synergistically to influence behavior, “...are pervasive and detecting and understanding them is central to empirical research on behavioral development” (Bauer & Shanahan, 2007, p. 256). Identifying such joint effects is critical for informing contextually-focused DV primary prevention efforts; programs that target one particular context may have null or short-lived effects if their effects are attenuated by risk factors in other contexts that work in concert to foster aggression (Farmer, Quinn, Hussey, & Holahan, 2001).

In the current study, we address these research gaps by drawing on a developmental-systems framework (Lerner, 1998) as well as theories of social learning (Bandura, 1977) and social control (Elliott, Huizinga, & Ageton, 1985; Hirschi, 1969), to identify key configurations (or profiles) of risk and protective factors for DV across the neighborhood, school, friend and family contexts. We then examine the longitudinal associations between these contextual risk profiles, assessed during middle school, and trajectories of psychological and physical DV perpetration across grades 8 through 12. We determine whether certain configurations of contextual risk and protective factors longitudinally predict more problematic trajectories of DV perpetration than other contextual configurations.

The Influence of Social Context on Adolescent Dating Violence Perpetration

Although limited, an emerging body of research has begun to identify contextual level factors that predict DV including factors related to adolescents' neighborhood (e.g., neighborhood disadvantage), school (e.g., school bonding), peer (e.g., deviant peer affiliation), and family (e.g., parental warmth) environments (Chen et al., 2016; Vagi et al., 2013). These findings are consistent with theoretical perspectives (e.g., social ecological theory; Bronfenbrenner, 1977) that recognize that multiple social and physical environments form layers of influence on youth that can contribute to involvement in maladaptive behaviors such as DV. Developmental systems perspectives further suggest that particular constellations (or patterns) of influences within and across different contexts may work together as a system to promote or deflect individuals from DV behavior (Bauer & Shanahan, 2007; Lerner, 1998). For example, when the developmental system comprises primarily protective factors, these factors may collectively constrain against involvement in DV and protect against the influence of risks present in the system. Conversely, systems comprised primarily of negative risks may promote antisocial behavioral patterns (Farmer, Farmer, Estell, & Hutchins, 2007). Per this perspective, high levels of interactions between and within contextual domains create a "functioning holism" (Bauer & Shanahan, 2007). Accordingly, scholars have recommended that empirical research drawing on this perspective employ person-centered approaches (e.g., Latent Class Analysis) that treat the person, as a whole, as the unit of analysis (Bauer & Shanahan, 2007; Lanza, Rhoades, Nix, Greenberg, & Conduct Problems Prevention Research Group, 2010). Person-centered analyses can capture complex interactions by identifying distinct subgroups of individuals who are similar to each other within a group, but differ from members of other groups, in terms of their configuration of values across a set of variables (Bauer & Shanahan, 2007).

A small but emerging body of research suggests the value of person-centered approaches for identifying specific combinations of risk and protective factors that jointly explain maladjustment early in the life-course, including externalizing problems and aggressive behavior during childhood (Lanza et al., 2010) and delinquency risk during adolescence (Gorman-Smith, Tolan, & Henry, 2000; Parra, DuBois, & Sher, 2006). For example, in a study of neighborhood and family-level factors, Gorman-Smith et al. (2000) found that neighborhood conditions worked synergistically with different family configurations to influence risk for delinquent behavior during adolescence. Such approaches, however, have been rarely applied to the study of adolescent DV. Rather, extant research on contextual factors associated with DV has almost exclusively used variable-centered analytic approaches oriented towards identifying common "main effect" relations that apply to all individuals and typically assume homogeneity of the underlying population with respect to how variables are related.

To our knowledge, only two studies, to date, have used person-centered analysis to examine contextual risk profiles associated with adolescent DV perpetration. In a study of 12 to 18 year-old youth focused on family processes, Mumford, Liu, and Taylor (2016) identified three parenting profiles (positive parenting, strict/harsh parenting, and strict/disengaged parenting) that differentially predicted risk for DV perpetration. Membership in the positive parenting class as compared to strict/harsh and strict/disengaged classes was longitudinally

associated with lower risk for DV at follow-up. In a study focused on peer factors, Casey and Beadnell (2010), identified four types of peer networks in a sample of youth in grades 7 to 12 (dense male, dense female, average, and popular). As compared to youth in popular networks, youth in dense male networks were at greater risk for future DV perpetration. The findings of both of these studies suggest that identifying risk typologies can be of value for predicting DV risk. However, both of these studies were limited to examining one particular context and thus do not shed light on cross-context (e.g., family x peer) interactions. Further, both studies assessed DV at only two points in time in samples that included a wide range of ages, limiting their ability to examine whether/how contextual risk profiles influence the onset and development of DV over time.

The Current Study

In the current study, we examined whether and how combinations of neighborhood, school, friend and family risk and protective factors interact to predict trajectories of psychological and physical DV perpetration. A person-centered method, Latent Profile Analysis (LPA), was used to identify risk/protection profiles based on risk and protective factors drawn from each of the contextual domains. Risk factors were identified from a social learning theory (SLT) perspective (Bandura, 1977), which suggests that adolescents who are exposed to antisocial behavior (and associated rewards) internalize norms that are generally more accepting of such behavior and are less likely to anticipate that engaging in antisocial behavior will result in negative sanction. Risk factors examined, based on SLT, were exposure to models of violence and antisocial behavior in the neighborhood, school, friend, and family contexts. Protective factors were chosen based on social control theory (SCT), which suggests that conventional controls may constrain violent behavior (Hirschi, 1969). In particular, contexts that promote social control may inhibit aggressive behavior by encouraging conformity to prosocial values and norms, including antiviolence and social responsibility norms. Based on SCT, protective factors examined included neighborhood social control, school bonding, friend prosocial beliefs and family regulation. Notably, consistent with a developmental systems perspective, empirical research suggests that social learning and control variables within and across contextual levels may work synergistically to promote antisocial behaviors (e.g., Ennett et al., 2008; Haynie, 2001); for example, Ennett et al. (2008) found that the social learning effects of alcohol modeling by peers on alcohol misuse were buffered by family social regulation.

No previous study of DV has used person-centered approaches to examine contextual risk/protection profiles across multiple domains of influence. However, drawing on findings of research examining other types of antisocial behaviors among children and high-risk youth, we expected to find at least two profiles: (1) a pervasive risk profile characterized by high violence exposure and low social control across all contexts and (2) a low risk profile characterized by low violence exposure and high social control across all contexts (Lanza et al., 2010; Parra et al., 2006). Some empirical research also suggests that some adolescents may experience risk in one domain, but not others (e.g., Parra et al., 2006); as such, we also anticipated that context-specific risk profiles, characterized by high risk and low protection in only one context might emerge.

We examined whether the contextual risk/protection profiles, assessed during middle school, predicted trajectories of DV perpetration across grades 8 through 12, a key developmental period when individual differences in DV behavior emerge (Chen et al., 2016). In particular, theory suggests that individuals with greater exposure to systemic risk across multiple contexts are more likely than individuals without such exposures to engage in persistent high levels of aggression across adolescence (Moffitt, 1993). As such, we expected that membership in the pervasive risk profile, compared to other profiles, would confer risk for involvement in elevated levels of DV perpetration across grades 8–12. This prediction is also consistent with previous research that has found that multidomain high risk/low protection profiles confer the greatest risk for involvement in other types of antisocial behavior during childhood and adolescence (e.g., Lanza et al., 2010).

Method

Study Design and Data Collection Procedures

Data are from adolescents who participated in a longitudinal study of the influence of contextual factors on the development of health risk behaviors during adolescence. The study used a cohort sequential design in which all eligible 6th, 7th and 8th grade students in two complete public-school systems were entered into the study. Participants in the targeted grades were allowed to enter the study at any time point regardless of whether they had participated or not in previous waves. Follow-up surveys were administered at six additional time points (T2-T7) ending when participants were in grades 10, 11, and 12; six-month intervals separated the first six time-points and there was a one-year lapse between T6 and T7. At each wave, all enrolled students in the targeted grades who were able to complete the survey in English and were not in special education programs were eligible for the study. Parents had the opportunity to refuse consent for their child's participation by returning a written form or calling a toll-free number. Adolescent assent was obtained from teens whose parents consented prior to survey administration. The Institutional Review Board for the School of Public Health at the University of North Carolina at Chapel Hill approved the data collection protocols. At T1, 6% of parents refused consent, 6% of adolescents declined to participate and 8% were absent on the days when data were collected for a total of 2,825 students completing a survey at T1 of whom 50% were male; 48% were Black, 45% were White, and 7% were of other race/ethnicity; and 28% reported the highest education achieved by either parent was high school or less across all waves. The response rate, calculated as the proportion of adolescents who completed a survey out of those eligible for the survey at T1 was 79%. Response rates for T2-T7 ranged between 73% and 88%.

Analytic Sample

Comprehensive multi-item scales assessing DV were added to the study at T4 (grades 8–10). Thus, of the 2,825 participating adolescents at T1, we restricted the analytic sample to those adolescents who participated in at least two waves across T4-T7 ($n=2,157$) and thus could contribute information about change over time in DV perpetration. Participant demographic factors were associated with loss to follow-up (i.e., participation in 1 waves across T4-T7); in particular males and those with low parent education were more likely to be lost to follow-up. These variables were included as covariates in all models. A small number of

participants were dropped from the analysis due to missing data on demographic covariates (n=96). Consistent with our focus on primary prevention, to control for temporality of relationships and enable us to predict onset and development of DV perpetration behavior based on risk profile membership we excluded youth who reported having hit or threatened a date at T1 (n=231) or who were missing on these indicators at T1 (n=44). The final analytic sample included 1,786 adolescents, of whom 50% were male; 48% were Black, 45% were White, and 7% were of other race/ethnicity; 28% reported the highest education achieved by either parent was high school or less. Most (81%) reported having ever dated across T4-T7 and 54% reported having been on a date prior to T4.

Measures

Measures used to construct the contextual risk profiles came from T1 and data from T4-T7 were used to create repeated measures of DV perpetration. Table 1 presents descriptive statistics for the variables used to define the contextual risk profiles.

Psychological and physical DV perpetration—Adolescents were asked, “During the past 3 months, how many times did you do each of the following things to someone you were dating or on a date with? Don’t count it if you did it in self-defense or play.” Five items were psychologically abusive acts (e.g., “threatened to hit them”) and five were physically abusive acts (e.g., “hit or slapped them”). Response options ranged from “never” (0) to “ten or more times” (4). Scores were summed to create a composite measure for each DV type and log-transformed to reduce skew (Cronbach’s alpha >.90 for both outcomes across all waves). Prevalence rates ranged between 16% and 28% for psychological DV and between 15% and 19% for physical DV perpetration across grades 8–12.

Contextual risk factors—*Family violence* was measured by averaging three items from Bloom’s (1985) family functioning scale (e.g., “family members sometimes hit each other”). Using a directory of enrolled students, adolescents were asked to identify up to five of their closest friends. *Friends’ antisocial behavior* was measured by averaging nominated friends’ reports of involvement in physical and relational peer violence perpetration (e.g., “hit or slapped another kid”) as assessed by 8 items drawn from the Problem Behavior Frequency scale (Farrell, Kung, White, & Valois, 2000). *School substance use* was measured by averaging six items assessing adolescents’ perceptions about the extent to which students at their school engaged in different types of substance use (e.g., “at your school, about how many students your age do you think drink alcohol?”). *Neighborhood violence* was measured by averaging four items assessing adolescents’ perceptions of violence and safety in their neighborhood (e.g., “people there have violent arguments”). Measures of contextual risk were scored such that higher levels denote greater amounts of exposure to violence/antisocial behavior.

Contextual protective factors—*Family regulation* was measured by averaging scores on items assessing parental demandingness (3 items), responsiveness (3 items), and attachment (3 items). Items on responsiveness and demandingness were from the Authoritative Parenting Scale (Jackson, Henriksen, & Foshee, 1998). The same nine items were asked about the respondent’s mother and father (18 items total). *Friend prosocial control* was

measured via two scales assessing the extent to which the respondent's nominated friends endorsed conventional beliefs (3 items; e.g., "it's good to be honest") and pro-social values (3 items; e.g., "it's important to finish high school"); scores were averaged to create a composite measure. *School bonding* was the mean of adolescents' agreement with three items (e.g., "students at this school are willing to go out of their way to help someone") from a scale measuring caring school communities (Battistich & Hom, 1997). *Neighborhood social control* was measured by averaging five items assessing adolescents' perceptions of neighborhood social cohesion, adult monitoring of youth, and willingness to intervene to prevent deviance. All measures of contextual protection were scored such that higher levels denote greater levels of control.

Demographic covariates—Sex was coded with female as the reference group. Two dummy coded variables indexed whether the adolescent reported they were Black or of other race/ethnicity, with White as a reference group. Grade level at T1 was coded as 0 (grade 6), 1 (grade 7) or 2 (grade 8). Parental education was the maximum reported education of either parent across all waves dichotomized so that less than high school was the reference group.

Analysis

Using Mplus Version 7.4 (Muthén & Muthén, 2015), we conducted a LPA of the T1 contextual risk and protective measures. We identified the optimal number of latent profiles (also referred to as classes) by comparing models with increasing numbers of classes across different statistical fit indices including: the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the Lo-Mendel-Rubin Likelihood Ratio Test (LMR LRT). The best-fitting most parsimonious models are those that minimize the AIC and BIC and for which adding an additional class results in a significant decrease in model fit as indicated by a p-value of less than .05 for the LMR LRT. We also evaluated classification quality, as indicated by entropy scores and considered the substantive interpretation of the class profiles (Collins & Lanza, 2010). After selecting the optimal unconditional latent profile model, we reran the model including the demographic variables as auxiliary variables in order to determine whether there were any demographic differences between the classes. All of the demographic covariates showed some significant differences between profiles and were thus included as covariates in our final models (described below) linking latent profile membership to DV. In addition, we included two variables to control for dating status that indexed whether the adolescent reported having ever dated and when they first reported having ever dated.

We used the three-step approach of Asparouhov and Muthén (2014) to link the contextual risk profiles to the DV trajectories. The first step refers to the estimation of the unconditional LPA model (i.e., described above). In the second step, each individual is assigned to a profile using the latent class posterior distribution obtained in Step 1. In the third step, individual class assignments are linked to the DV trajectories (described below), taking into account measurement error of the latent profile assignment variable. The model estimated in the third step was a latent growth curve model of the DV perpetration scores across grades 8 through 12 (separate models for psychological and physical DV). Each respondent contributed DV scores a maximum of four time points (T4-T7), corresponding to the four waves of data

collection when DV was assessed. However, the cohort sequential design allowed us to model trajectories across eight time points corresponding to the fall and spring semesters of the 8th through 10th grades and the fall semesters of the 11th and 12th grades. Based on preliminary analysis, trajectories of psychological and physical DV perpetration were modeled as linear and quadratic, respectively, in the fixed effects with heteroscedastic residual errors and a random intercept (a table with parameter estimates and fit statistics for the best fitting unconditional trajectory models is available online). All models were fit using the maximum likelihood robust estimator to adjust for non-normality. Missing data were dealt with via full information maximum likelihood, which provides unbiased estimates under the assumption that data are missing at random.

To determine whether trajectories differed significantly across the latent profiles we performed a series of Wald tests to assess model fit when constraints were imposed on the growth factor means. The first model estimated allowed the fixed effects for all growth factors (i.e., intercepts, slopes, quadratic factors) to vary across profiles. We then systematically tested whether constraining the growth factors to be equal across profiles led to a significant decrement in model fit. When omnibus equality constraints were rejected, post-hoc pair-wise Wald tests were used to examine differences in trajectory parameters between profiles.

Results

Class enumeration and the five-profile model

Fit indices for the unconditional latent profile model are shown in Table 2. The AIC and BIC decreased as the number of classes increased, although decreases leveled off as the number of classes increased from four to five. The LMR LRT favored a 5-class solution, as this was the greatest number of classes for which this test was statistically significant. We selected the 5-class model based on the LMR LRT; in addition, the 5-class model was parsimonious and provided interpretable results. The top half of Table 3 shows the pattern of indicators (i.e., mean values on the indicators for individuals assigned to that class) for the final five-class latent profile model. Average posterior probabilities (AvePP) of profile membership for individuals assigned to each group, shown in the top row of Table 3, are an indication of measurement error in the latent class variable; higher values suggest less measurement error. AvePP for each profile were all >.7, indicating good correspondence of the model with the data.

The majority of the sample (Class 1, 54.8% of the sample) was characterized by low risk/high protection pattern across all contexts, consistent with our proposed *low risk* profile pattern of contextual violence and social control. The other four classes that emerged (Classes 2–5) were all distinguished from the *low risk* profile in having comparatively high levels of school substance use and low levels of school bonding (school risk) and were distinguished from each other mainly by levels of risk in the other social contexts. In particular, a second class, comprising 12.3% of the sample, was characterized by a pattern of high *school, neighborhood, and family risk*. Adolescents in this class reported elevated exposure to violence/antisocial behavior and relatively low levels of prosocial control in the school, neighborhood, and family contexts. A third class (*school and family risk*),

comprising 13.3% of the sample, was similar to Class 2 in having high levels of school and family risk, but was distinguished from Class 2 in reporting comparatively low levels of neighborhood violence. A fourth class (*school and friend risk*), comprising 5.5% of the sample, was distinguished from the other risk profiles in having high levels of risk/low protection in the friend context but comparatively low levels of family and neighborhood violence. Finally, a fifth class (*school and neighborhood risk*), comprising 14% of the sample, was distinguished from the other risk profiles in having the highest levels of neighborhood violence, but relatively low levels of family and friend violence.

Odds ratios from the conditional LPA model denoting the likelihood of profile membership (with the *low risk* class as the reference group) by sex, race/ethnicity, parent education and grade are shown at the bottom half of Table 3. Being male was associated with increased odds of being in the *school and friend* and *school and neighborhood* risk groups. The odds of being in the *family*, *school*, and *neighborhood* and *school and neighborhood* groups were greater for Black youth and youth of other race/ethnicity compared to White youth. Black (vs White) youth also had increased odds of being in the *school and friend* profile. Finally, greater parent education was associated with decreased odds of being in all four high risk classes (Classes 2–5). A supplementary table presenting associations between the demographic factors and class membership with Classes 2–5 specified as reference groups is available online.

Linking the Profiles to the Dating Violence Trajectories

As noted above, trajectories of psychological and physical DV were estimated, respectively, as linear and quadratic growth curve models controlling for the demographic variables and adjusting for measurement error in the latent profiles. Multi-parameter Wald tests indicated that the slope (psychological and physical DV) and quadratic (physical DV only) factor means did not differ significantly across profiles. However, for both outcomes, trajectory intercepts were found to differ significantly across profiles (psychological DV $\chi^2=14.03(4)$, $p=.007$; physical DV $\chi^2=17.14(4)$, $p=.002$). These findings thus suggest that profile membership is significantly associated with overall levels of (but not rates of change in) psychological and physical DV perpetration over time. Findings are visually depicted in Figure 1 which shows the model estimated conditional trajectories of psychological (Top Panel) and physical (Bottom Panel) DV perpetration for each profile. For psychological DV, the slope factor mean was significant and positive ($b=.04$, $p<.001$), indicating a linear increase in this type of perpetration. For physical DV, the significant positive slope ($b=.05$, $p=.02$) and negative quadratic ($b=-.01$, $p=.03$) growth factor means indicate that, on average, perpetration levels tended to increase and then decrease across adolescence. As noted above and reflected in Figure 1, these overall patterns of change were not found to differ across profiles for either outcome. However, consistent with expectations for joint context effects, the highest levels of psychological and physical DV across grades 8 through 12 were among adolescents in the *school*, *neighborhood* and *family* risk profile. Post-hoc Wald tests of intercept differences indicate that levels of psychological DV perpetration were significantly higher for youth in this class (Class 2) compared to youth in the *low risk* ($\chi^2=8.84(1)$, $p=.003$), *school and family* ($\chi^2=6.17(1)$, $p=.01$) and *school and neighborhood* ($\chi^2=4.47(1)$, $p=.03$) profiles. Class 2 youth also reported marginally higher levels of psychological DV

perpetration compared to youth in the *school and friend* profile ($\chi^2=3.26(1)$, $p=.07$). Physical DV perpetration was also significantly higher for youth in the *school, neighborhood and family risk* class compared to youth in the *low risk* ($\chi^2=7.86(1)$, $p=.005$) and *school and friend* ($\chi^2=5.90(1)$, $p=.02$) profiles and marginally higher compared to youth in the *school and family* profile ($\chi^2=2.80(1)$, $p=.09$). In addition, levels of physical perpetration were significantly higher for those in the *school and neighborhood* compared to the *low risk* profile ($\chi^2=3.86(1)$, $p=.049$). No other comparisons between profiles were statistically significant for either outcome.

Discussion

The present study advances our understanding of the nature of the interplay among contextual risk and protective factors and their association with DV perpetration during adolescence. We identified a small set of interpretable patterns of risk, a finding consistent with previous research that has demonstrated the value of person-centered approaches for providing a parsimonious representation of the interplay among contextual factors from multiple domains (Lanza et al., 2010). Further, the finding that these patterns longitudinally predicted trajectories of DV suggests the utility of this approach for identifying the contextual configurations that confer the greatest risk for DV and thus should be targeted by primary prevention efforts.

We identified five salient contextual risk profiles: *low risk*; *school, neighborhood, and family risk*; *school and family risk*; *school and friend risk*; and *school and neighborhood risk*. The *low risk* profile was characterized by low levels of violence and high levels of prosocial control across all contexts, whereas each of the other profiles were characterized by a combination of school risk and elevated violence exposure in particular contexts. Notably, consistent with expectations, approximately 12% of the sample was characterized by a pattern of pervasive high risk/low protection across the school, neighborhood, and family contexts; however, unexpectedly, this pattern did not extend to the friend context. This was unexpected given that numerous studies have found that dysfunctional neighborhood, family and school processes are associated with deviant peer affiliation (e.g., Cantillon, 2006; Shaw et al., 2016), suggesting there is a subgroup of youth who experience all these risks as part of a “correlated package” (Cairns & Cairns, 1994). This finding may be explained by the fact that our reliance on school-based collection of friendship network data precluded the ability to capture data from peers who were school drop-outs or attended different schools. This may have biased findings given research suggesting youth in more violent neighborhoods are more likely to be friends with peers who don’t attend their school (Harding, 2008).

Although not a central purpose of the paper, we found that demographic variables were associated with profile membership. Low parent education, an indicator of socioeconomic status (SES) during adolescence (Goodman, 1999), was associated with increased odds of membership in *all* of the contextual risk profiles compared to the *low risk* profile. Further, minority race/ethnicity was also associated with increased odds of membership in all of the risk profiles except the *school and family* profile. These findings are consistent with empirical work that has found persistent socioeconomic and racial/ethnic disparities in

contextual factors related to violence exposure (Zimmerman & Messner, 2010). For example, research suggests that minority youth are more likely than white youth to reside in disadvantaged neighborhoods characterized by violence and may become involved in deviant peer networks because: (1) they provide the opportunity to obtain respect, a valuable form of social capital, and/or (2) due to a lack of trust that membership in prosocial networks will yield positive resources (e.g., economic success and status; Haynie & Payne, 2006; Zimmerman & Messner, 2010).

Sex emerged as a unique predictor of membership in the *school and friend* and *school and neighborhood* risk profiles, with boys (vs. girls) more likely to belong to these profiles than to the *low risk* group. These findings are consistent with those of previous research that has demonstrated differential exposure to friend and neighborhood violence as a function of sex. For example, other research has found that boys are more likely than girls to report deviant peer affiliation (e.g., Weerman & Hoeve, 2012) and witnessing community violence (e.g., Finkelhor, Turner, Shattuck, & Hamby, 2014), perhaps because gender-related norms encourage lower levels of adult supervision and greater levels of delinquency in boys' friendship networks as compared to those of girls (Morash, 1986).

Most importantly, risk profiles predicted trajectories of psychological and physical DV perpetration across adolescence controlling for demographic covariates. Specifically, adolescents who experienced *school, neighborhood and family risk* reported greater levels of psychological and physical DV perpetration across all grades compared to youth in the *low risk* group. For physical, but not psychological DV, the *school and neighborhood* profile (vs. *low risk*) was also associated with elevated perpetration levels. These findings suggest that exposure to antisocial behavior across multiple contexts may have synergistic effects that increase perpetration risk. For example, emotion regulation deficits and pro-violence norms that result from exposure to family and school violence may be exacerbated for youth in high-violence neighborhoods that reinforce antisocial norms and provide limited opportunities to learn self-regulatory skills.

In terms of primary prevention implications, the findings of the current study suggest the need to target multiple social contexts concurrently. Further, as noted by Lanza et al. (2010), the identification of those at greatest risk for DV can inform efforts to target limited prevention resources more effectively and efficiently. While more research is needed to replicate our findings, the results of the current study suggest that, compared to youth with other contextual risk configurations, middle-school aged youth who have been exposed to family violence, live in high-violence neighborhoods, and attend schools where substance use is normative are at the most risk for engaging in DV across the high school years and thus should be targeted by DV prevention programs. Such programs should concomitantly aim to decrease exposure to antisocial behavior and increasing prosocial bonding in each of these contexts (families, neighborhoods, schools). We note that few DV prevention programs have been evaluated among high risk youth (for a review see, Reyes, Foshee, & Chen, 2016) and extant programs may need to be modified to address systemic risk across multiple contexts in order to achieve and sustain effects. For example, Shaw et al. (2016) suggest that family-centered prevention programs need to be more intensive and designed to reduce

access barriers (e.g., able to be implemented in homes) in order to achieve effects for high risk youth nested in highly deprived neighborhoods.

Unexpectedly, levels of DV were not significantly different for those in the *school and family* and *school and friend* profiles compared to those in the *low risk* group. It's possible that measurement limitations may have influenced these findings. In particular, our measures of family and friend violence did not directly assess exposure to interparental violence or friends' DV behaviors. Witnessing a friend or parent perpetrate partner violence may influence specific cognitions about romantic relationships; thus, measures that specifically assess these exposures may be more predictive of DV than general measures that may tap into exposure to other types of violence in the peer and family contexts. Also, contrary to expectations, change in DV perpetration over time did not vary as a function of risk profile membership. This may have been due to the fact that, while there was significant individual variability in trajectory intercepts (i.e., levels of DV), there was little individual variability in change over time in DV that profile membership could explain. Notably, there was significant residual variability in DV at each time-point, suggesting the importance of future research that examines whether and how time-specific within-person increases in contextual risk may influence risk for DV perpetration (Davis et al., 2017).

The current study has several limitations to consider in interpreting results. The study used a non-probability sample and was restricted to those who reported not having perpetrated at T1, limiting the generalizability of results. Measures were self-report and thus subject to social desirability and same-source bias. Latent profiles were created using a single indicator of risk and protection within each context and our indicator of school risk, in particular, was limited in that it assessed substance use rather than violence exposure. Finally, we did not evaluate whether the influence of the contextual risk profiles on DV varied for different demographic subgroups. Research has found the etiological pathways leading DV may vary as a function of sex and race, suggesting this may be an important avenue for future research (Foshee, Reyes, & Ennett, 2010).

Notwithstanding these limitations, the current study has several strengths. First, the study focused on contextual factors associated with DV, which have been understudied relative to individual level factors in extant literature. Second, our use of a person-centered approach to identify contextual risk profiles is consistent with developmental perspectives that suggest contextual factors operate synergistically to predict risk behavior. Third, our analytic approach leveraged the availability of longitudinal data to establish temporality between contextual risk profiles and DV, while controlling for demographic factors and measurement error.

To our knowledge, this is the first study to identify and characterize distinct profiles of contextual risk and protective factors and link them to trajectories of adolescent DV. The associations identified provide more evidence of the salience of the neighborhood, school, and family contexts in the development of DV and suggest that early adolescents exposed to antisocial behavior in all of these contexts may be at greatest risk. Although more research is needed, findings suggest that DV prevention efforts early in the life-course should seek to

prevent or reduce exposure to violence and increase prosocial regulation in the neighborhood, school *and* family contexts.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

- Asparouhov T, Muthén B. Auxiliary variables in mixture modeling: Three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal*. 2014; 21(3):329–341.
- Bandura A. *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall; 1977.
- Battistich V, Hom A. The relationship between students' sense of their school as a community and their involvement in problem behaviors. *American Journal of Public Health*. 1997; 87:1997–2001. [PubMed: 9431290]
- Bauer DJ, Shanahan MJ. Modeling complex interactions: Person-centered and variable-centered approaches. *Modeling contextual effects in longitudinal studies*. 2007:255–283.
- Bloom BL. A factor analysis of self-report measures of family functioning. *Family Process*. 1985; 24(2):225–239. [PubMed: 4018243]
- Bronfenbrenner U. Toward an experimental ecology of human development. *American Psychologist*. 1977; 32(7):513–531.
- Casey EA, Beadnell B. The structure of male adolescent peer networks and risk for intimate partner violence perpetration: Findings from a national sample. *Journal of Youth and Adolescence*. 2010; 39(6):620–633. [PubMed: 20422351]
- Cairns RB, Cairns BD. *Lifelines and risks: Pathways of youth in our time*. York: Cambridge University Press; 1994.
- Cantillon D. Community social organization, parents, and peers as mediators of perceived neighborhood block characteristics on delinquent and prosocial activities. *American Journal of Community Psychology*. 2006; 37(1–2):111–127. [PubMed: 16680540]
- Chen MS, Reyes HLM, Foshee VA. Dating abuse: prevalence, consequences, and predictors. In: Levesque RJR, editor *Encyclopedia of Adolescence*. New York, NY: Springer; 2016. 1–21.
- Collins LM, Lanza ST. *Latent class and latent transition analysis: With applications in the social, behavioral, and health sciences*. Hoboken, NJ: John Wiley & Sons; 2010.
- Davis JP, Merrin GJ, Berry DJ, Dumas TM, Hong JS, Smith DC. Examining within-person and between person effects of victimization and social risk on cannabis use among emerging adults in substance-use treatment. *Psychology of Addictive Behavior*. 2017; 30(1):52–63.
- Ennett ST, Foshee VA, Bauman KE, Hussong A, Cai L, Reyes HLM, DuRant R. The social ecology of adolescent alcohol misuse. *Child Development*. 2008; 79(6):1777–1791. [PubMed: 19037949]
- Elliott DS, Huizinga D, Ageton SS. *Explaining delinquency and drug use*. Beverly Hills, CA: Sage Publications, Inc; 1985.
- Farmer TW, Quinn MM, Hussey W, Holahan T. The development of disruptive behavioral disorders and correlated constraints: Implications for intervention. *Behavioral Disorders*. 2001; 26(2):117–130.
- Farmer TW, Farmer EM, Estell DB, Hutchins BC. The Developmental Dynamics of Aggression and the Prevention of School Violence. *Journal of Emotional and Behavioral Disorders*. 2007; 15(4): 197–208.

- Farrell AD, Kung EM, White KS, Valois RF. The structure of self-reported aggression, drug use, and delinquent behaviors during early adolescence. *Journal of clinical child psychology*. 2000; 29(2): 282–292. [PubMed: 10802836]
- Finkelhor D, Turner HA, Shattuck A, Hamby SL. Violence, crime, and abuse exposure in a national sample of children and youth. *JAMA Pediatrics*. 2013; 167(7):614–621. [PubMed: 23700186]
- Foshee VA, Reyes HLM, Ennett ST. An examination of sex and race differences in the longitudinal predictors of the initiation of adolescent dating violence perpetration. *Journal of Aggression, Maltreatment and Trauma*. 2010; 19(5):492–516.
- Frieden TR. A framework for public health action: The health impact pyramid. *American Journal of Public Health*. 2010; 100(4):590–595. [PubMed: 20167880]
- Gorman-Smith D, Tolan PH, Henry DB. A developmental-ecological model of the relation of family functioning to patterns of delinquency. *Journal of Quantitative Criminology*. 2000; 16(2):169–198.
- Goodman E. The role of socioeconomic status gradients in explaining differences in U.S. adolescents' health. *American Journal of Public Health*. 1999; 89(10):1522–1528. [PubMed: 10511834]
- Harding DJ. Neighborhood violence and adolescent friendships. *International Journal of Conflict and Violence*. 2008; 2(1):28–55. [PubMed: 20428462]
- Haynie DL. Delinquent peers revisited: Does network structure matter? *The American Journal of Sociology*. 2001; 106(4):1013–1057.
- Haynie DL, Payne DC. Race, friendship networks, and violent delinquency. *Criminology*. 2006; 44(4): 775–805.
- Hirschi T. *Causes of delinquency*. Berkeley, CA: University of California Press; 1969.
- Jackson C, Henriksen L, Foshee VA. The Authoritative Parenting Index. *Health Education and Behavior*. 1998; 25(3):319–337. [PubMed: 9615242]
- Lanza ST, Rhoades BL, Nix RL, Greenberg MT. Conduct Problems Prevention Research Group. Modeling the interplay of multilevel risk factors for future academic and behavior problems: A person-centered approach. *Development and Psychopathology*. 2010; 22(2):313–335. [PubMed: 20423544]
- Lerner RM. Theories of human development: Contemporary perspectives. In: Damon W, Lerner RM, editors *Handbook of child psychology: Vol. 1. Theoretical models of human development*. 5. New York: John Wiley & Sons; 1998. 1–24.
- Miller S, Williams J, Cutbush S, Gibbs D, Clinton-Sherrod M, Jones S. Evaluation of the start strong initiative: preventing teen dating violence and promoting healthy relationships among middle school students. *Journal of Adolescent Health*. 2015; 56(2):S14–S19.
- Moffitt TE. Adolescence-limited and life-course-persistent antisocial behavior: a developmental taxonomy. *Psychological Review*. 1993; 100(4):674–701. [PubMed: 8255953]
- Morash M. Gender, peer group experiences, and seriousness of delinquency. *Journal of Research in Crime and Delinquency*. 1986; 23(1):43–67.
- Mumford EA, Liu W, Taylor BG. Parenting profiles and adolescent dating relationship abuse: attitudes and experiences. *Journal of Youth and Adolescence*. 2016; 45(5):959–972. [PubMed: 26906058]
- Muthén LK, Muthén BO. *Mplus user's guide (Version 7)*. Los Angeles, CA: Muthén & Muthén; 2015.
- Parra GR, DuBois DL, Sher KJ. Investigation of profiles of risk factors for adolescent psychopathology: A person-centered approach. *Journal of Clinical Child and Adolescent Psychology*. 2006; 35(3):386–402. [PubMed: 16836476]
- Reyes HLM, Foshee VA, Chen MS. Dating abuse: Primary prevention efforts. In: Levesque RJR, editor *Encyclopedia of Adolescence*. New York, NY: Springer; 2016. 1–27.
- Shaw DS, Sitnick SL, Brennan LM, Choe DE, Dishion TJ, Wilson MN, Gardner F. The long-term effectiveness of the Family Check-Up on school-age conduct problems: Moderation by neighborhood deprivation. *Development and Psychopathology*. 2016; 28(4):1471–1486. [PubMed: 26646197]
- Tharp AT. Dating matters™: The next generation of teen dating violence prevention. *Prevention Science*. 2012; 13(4):398–401. [PubMed: 22644504]

- Vagi KJ, Rothman EF, Latzman NE, Tharp AT, Hall DM, Breiding MJ. Beyond correlates: A review of risk and protective factors for adolescent dating violence perpetration. *Journal of Youth and Adolescence*. 2013; 42(4):633–649. [PubMed: 23385616]
- Weerman FM, Hoeve M. Peers and delinquency among girls and boys: Are sex differences in delinquency explained by peer factors? *European Journal of Criminology*. 2012; 9(3):228–244.
- Zimmerman GM, Messner SF. Neighborhood context and the gender gap in adolescent violence crime. *American Sociological Review*. 2010; 75(6):958–980. [PubMed: 21709751]

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Figure 1.

Adjusted model estimated mean trajectories for psychological (top) and physical (bottom) dating violence perpetration across grades 8 through 12 by latent contextual risk/protection profile.

Table 1

Descriptive Statistics for Contextual Risk and Protective Factors

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Family violence	--	-.28*	.03	-.04	.15*	-.06*	.28*	-.11*
2. Family regulation		--	-.04 [^]	.10*	-.13*	.17*	-.18*	.27*
3. Friend antisocial behavior			--	-.35*	.12*	-.07*	.07*	-.02
4. Friend prosocial control				--	-.12*	.06*	-.08*	.05 [^]
5. School substance use					--	-.28*	.18*	-.07*
6. School bonding						--	-.07*	.15*
7. Neighborhood violence							--	-.06*
8. Neighborhood social control								--
Range	0-4	0-3	0-3	1-4	0-4	0-4	0-4	0-4
Mean (SD)	0.96 (1.16)	2.27 (0.59)	0.44 (0.29)	3.13 (0.31)	0.88 (0.79)	1.33 (1.11)	0.91 (1.04)	2.92 (0.91)
Skew	1.09	-0.78	1.43	-1.46	1.23	0.53	0.99	-0.76
α	.84	.90	.74	.68	.88	.78	.77	.71

Note:

[^]
p<.10,*
p<.05

Table 2

Fit Indices for Unconditional Latent Profile Analysis of the Contextual Risk and Protective Factors

	Unconditional Model					
	2 classes	3 classes	4 classes	5 classes	6 classes	
AIC	27700	27267	26937	26740	26529	
BIC	27837	27454	27173	27026	26863	
LRT <i>p</i> value	<.001	<.001	.004	.049	.97	
Entropy	.88	.89	.88	.85	.86	

Note. AIC= Akaike information criteria; BIC= Bayesian information criteria; LRT= Lo-Mendell-Rubin adjusted likelihood ratio test

Table 3

Latent Profiles of Contextual Risk

	Class One Low Risk 54.8% (n=979)	Class Two School, Neighborhood, & Family Risk 12.3% (n=220)	Class Three School & Family Risk 13.3% (n=239)	Class Four School & Friend Risk 5.5% (n=98)	Class Five School & Neighborhood Risk 14% (n=251)
AvePP	.93	.86	.85	.84	.92
Family context					
Violence	0.34	2.68	2.60	0.66	0.41
Regulation	2.40	1.88	2.05	2.22	2.29
Friend context					
Antisocial behavior	0.39	0.47	0.43	0.85	0.46
Prosocial control	3.20	3.09	3.18	2.38	3.11
School context					
Substance use	0.73	1.14	1.01	1.07	1.01
Bonding	1.46	1.22	1.17	1.14	1.18
Neighborhood context					
Violence	0.33	2.29	0.48	0.72	2.49
Social control	3.02	2.75	2.71	2.75	2.92
Logistic regression results relating classes to covariates					
Male	Reference	1.20 (0.85, 1.70)	1.06 (0.75, 1.51)	3.14 (1.74, 5.65) ***	1.58 (1.13, 2.21) **
Black (vs. White)	Reference	2.59 (1.75, 3.81) ***	0.95 (0.66, 1.37)	3.16 (1.80, 5.55) ***	3.50 (2.38, 5.15) ***
Other Race (vs White)	Reference	3.71 (2.03, 6.76) ***	0.63 (0.24, 1.60)	1.59 (0.45, 5.66)	3.80 (2.01, 7.18) ***
Parent education > high school	Reference	0.53 (0.36, 0.77) **	0.58 (0.39, 0.84) **	0.47 (0.27, 0.82) *	0.61 (0.42, 0.88) *
Grade level at time 1	Reference	0.89 (0.72, 1.10)	0.92 (0.74, 1.14)	1.62 (1.21, 2.18) **	1.05 (0.85, 1.30)

Note.

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

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Average posterior probability of class membership for those assigned to the class based on maximum probability assignment rule. Logistic regression results are from a conditional model including all covariates simultaneously as predictors of class membership using the three-step method.