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Towards an Understanding of Risk and Protective Factors for Violence among Adolescent Boys and Men: A Longitudinal Analysis

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Abstract

Purpose—To understand the etiology of violence among ethnically-diverse men using a nationally representative and longitudinal sample of youth.

Methods—Participants included 4,322 adolescent men followed from ages 13 to 32 from the National Longitudinal Study of Adolescent Health (Add Health). Trajectories of violence were estimated, and multinomial regression procedures were used to evaluate multiple domains of risk and protective factors for violence.

Results—Three profiles of violence (non-violent, desistors, and escalators) were identified. There were no substantial differences in the patterns of violent behavior across race/ethnicity; however, the prevalence of violence differed by racial/ethnic group. After accounting for violent behavior at Wave I, peer marijuana use (OR = 1.20), alcohol use (OR = 1.50), group fighting (OR = 2.23), and Wave I violence (OR = 4.34) were identified as risk factors for desistance, while only Wave I violence predicted escalation (OR = 2.27).

Conclusions—Three trajectories of serious violence, including a late-onset group, were identified; however, few risk and protective factors were associated with membership in this group. Risk and protective factors for violence prior to age 13 should be targeted for prevention.

Keywords

violence; longitudinal; trajectories; men; adolescents

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Introduction

According to the National Violent Death Reporting System (2010), homicide is the second leading cause of death among 15–24 year olds and the third leading cause of death among 10–14 and 25–34 year olds. During 2008, boys and men had a 3.6 times greater risk of homicide perpetration compared to women (9.0 vs. 2.5 homicides per 100,000 population), and non-Hispanic Blacks accounted for 52% of homicide deaths [1]. The estimated per capita cost of violent deaths to American taxpayers is \$160 [2]. The inflated prevalence of violence among men, as well as the disproportionate representation of minority men, highlights the need for research on risk and protective factors for violence among ethnically diverse men.

Previous research identified risk and protective factors for violence from a range of domains, including contextual, interpersonal, and individual-level. Neighborhood characteristics, such as poverty, safety, and urban environment are contextual factors related to the propensity for violent behavior [3]. Parenting, in addition to parental and peer substance use, are aspects of an individual's interpersonal relationships related to the development of violence [4, 5]. Individual characteristics such as cognitive abilities and substance use during adolescence have also been related to subsequent violence [5, 6].

Multiple theories on the development of violent behavior support linkages between the aforementioned risk and protective factors and violence [7, 8]. For instance, Patterson's developmental model of antisocial behavior posits that aspects of the parent-child relationship influence the development of disruptive behavior. Early disruptive behavior may disrupt academic performance and the development of positive peer relationships, which may lead to bonding with deviant peers in adolescence. Risk for substance use and violent behavior increases for youth as they transition into late adolescence and adulthood [8]. Patterson's theory highlights risk factors from a variety of domains that influence the development of violent behavior.

Moffitt's (1993) taxonomy of antisocial behavior [9] is another theory relevant to the developmental progression of violent behavior. Moffitt emphasizes the possibility of distinct developmental trajectories of violence, each of which may differ in risk and protective factors. The adolescent-limited trajectory refers to individuals who show no evidence of violence until the adolescent years, upon which violence initiates and subsequently desists during young adulthood. Social and contextual factors are most salient to the development of violent behavior among this group of individuals. Similarly, Sampson and Laub have documented evidence of a group of desistors, who initiate violence in late childhood or early adolescence. For this group, participation in deviant behavior is short-lived, as most desistors discontinue offending prior to adulthood when the risks of crime outweigh the benefits [10, 11]. Alternatively, life-course persistent violent behavior begins with disruptive behavior during childhood, escalating during adolescence, and maintaining high levels during adulthood. Research indicates that individual characteristics may be most salient risk factors for this group.

In general, previous research has demonstrated that chronic violence appears to be largely a male phenomenon [12–14]. Moreover, regardless of the types of trajectories identified, the rate of violence for each group is almost always greater for men [13]. While there is commonality in how risk and protective factors affect violence for men and women, men typically exhibit higher levels of risk [15]. Given these gender disparities in risk for violence, understanding pathways to violence among men is particularly important.

Taken together, the purpose of the current study is to understand the etiology of violence among boys and men in an attempt to identify risk and protective factors that may be related

to gender differences in serious violence. This study is important because boys and men have consistently higher rates of violence compared with women [1, 16]. Contextual and proximal risk and protective influences were evaluated as predictors of each pattern of violence longitudinally. Based upon a review of the literature [17], we hypothesize that between three and five trajectory groups will emerge, and those in the persistently violent groups (e.g., escalators, consistently violent) will have a greater number of risk factors and a lesser number of protective factors for violence.

Methods

Design

The National Longitudinal Study of Adolescent Health (Add Health) is a school-based panel study conducted from 1994 (Wave I) through 2008 (Wave IV), when participant ages ranged from 11–32 [18]. Eighty communities were selected to ensure demographic representativeness of students in the United States. All students who were enrolled in the school and were present on the survey day were eligible for participation.

The sample used in this study includes male participants ($n = 4,379$) who were a part of the nationally representative cohort ($n=9,421$). Due to sample size limitations in applying the multinomial regression procedures to the trajectory model results, only boys and men ages 13–32 who self-identified as either Black, White, or Hispanic were included in this analysis (final $n = 4,322$) due to small sample sizes within these age (11–12, $n=6$) and racial groups ('other' race, $n=51$). Descriptive information is detailed in Table 1.

Measures

Violence—Violence was measured using three items across each of the four waves of data collection: In the past 12 months, how many times have you: 1) hurt someone badly enough that he or she needed care from a doctor or nurse?; 2) pulled a knife or gun on someone?; and 3) shot or stabbed someone? Response options included "0 times", "1–3 times", and "4 or more times" for hurting someone badly enough to need care from a doctor or nurse, and "yes" or "no" for the remaining two items. For consistency, a value from 0–12 was assigned to each participant at each wave, where a value of "0"–"2" (mean of 1–3 events), or "4" was assigned for each of these violent acts in which the individual has participated in during the past year. A zero was assigned for each item if the participant did not report the behavior. A two was assigned if the adolescent reported hurting someone badly enough to need care from a doctor or nurse one to three times in the past year. A four was assigned for each of the following occurrences: 1) shooting or stabbing someone; 2) pulling a knife or gun on someone; or 3) hurting someone badly enough to need care from a doctor or nurse four or more times in the past year. A "4" value for these two items was chosen to reflect the severity of these two behaviors, compared to a "2" value. These values were used to create trajectories of violence across Waves II–IV.

Community-level influences—According to the United States 2000 Census, residence in an urban neighborhood, and having a family income that is lower than the poverty threshold were evaluated as risk factors for violence. From the adolescent survey, perception of safety in their neighborhood was also included as a measure of contextual risk. These variables were included as contextual measures because income and poverty bidirectionally influence one another and operate at both the neighborhood and individual-levels; in addition, they were dependent upon U.S. Census measures. All community-level covariates was measured at Wave I.

Peer and parental influences—Parental involvement, parental alcohol use, peer alcohol use, and peer marijuana use were evaluated as measures of family- and peer-level risk. The parental involvement scale consisted of ten items measuring parental communication and involvement. These items included frequency of parental praise and general talking, asking about school and where the adolescent was going, discussing problems at school, alcohol advertisement influences, problems with alcohol, alcohol rules, and alcohol consequences, dining habits, and music restrictions. Responses included “Never” “Hardly Ever”, “Sometimes” “A lot”, and “All the time.” Values for each item ranged from 1 to 5, with higher scores indicating greater parental involvement. The standardized Cronbach coefficient alpha for this scale was 0.81.

Parental alcohol consumption was measured on the parent survey using the item, “How often do you drink alcohol?”. Responses were coded dichotomously as “never” and “at least once per year” due to the skewed distribution of responses. Peer substance use was measured using the item, “Of your three best friends, how many drink alcohol/use marijuana at least once a month?”. Respondents who reported having one or more friends who use alcohol monthly were coded as “having at least one friend who uses alcohol” or marijuana. All parenting and peer-level variables were measured at Wave I from the in-home parent and adolescent interviews.

Individual-level risk factors—A variety of influences were included as proximal, individual-level risk factors measured at Wave I during the in-home interview. Alcohol use, marijuana use, and other illegal drug use (e.g., cocaine, heroin, methamphetamine, etc.), depression, academic performance, and language spoken in the home (for Hispanics only) were evaluated as risk and protective factors for violence. Language spoken at home was included as a risk factor for Hispanics because of the influence of generational status and acculturation on violent behavior [19, 20]. Previous violent behavior and participation in group fighting were also controlled, as group fighting has been associated with the serious violence measures utilized in this study [21]. Each of the substance use variables was coded dichotomously, and language spoken in the home was measured as “Spanish” versus “English” for Hispanics only. Academic performance was the sum of self-reported grades in school, and depression was dummy coded as “felt sad or depressed” versus “did not feel sad or depressed” in the past month.

Analytical Strategy

Group-based trajectory modeling—To examine the number and shape of profiles of violence over time, trajectory groups were fitted to the data using group-based trajectory modeling [22, 23]. In this case, violence data follow a Poisson distribution with a large number of non-violent events (zero violent events). Therefore, a zero-inflated poisson (ZIP) distribution was specified in the models [24]. Models were tested until the most parsimonious number of trajectory groups maximizes the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the posterior probabilities. SAS PROC TRAJ was used to estimate the trajectories [24, 25].

Multinomial logistic regression—Once the trajectory groups have been specified, multinomial regression procedures were used to estimate odds-ratios for risk and protective factors on membership in each trajectory group. This procedure compares membership in each trajectory group to a reference category/trajectory group (e.g., a non-violent group) [26]. Clustered robust standard errors were estimated to produce error estimates that take into account the autocorrelation due to the sampling design [27]. STATA 11 software (College Station, TX) was used to conduct all multinomial regression analyses [28].

The first stage of model selection involved a bivariate test of the association of each predictor variable with the trajectory groups. All variables that were not marginally predictive ($p < .10$) of any dependent variable (trajectory group) in the bivariate analyses were removed from the multivariate model. Interaction terms were added to the bivariate model for each risk or protective factor to test for differences by race/ethnicity. The final model assessed the influence of all risk and protective factors, accounting for Wave I baseline violence. Post-hoc significance tests were conducted using Chi-Squared analyses.

Results

Trajectories of Violence

Three distinct trajectories were identified: (1) Non-violent (69%), who were consistently not violent across waves; (2) Desistors (18%), who were violent in adolescence and discontinued violence in young adulthood; and (3) Escalators (13%), who were not violent in adolescence but initiated violent behavior in young adulthood. This three-group trajectory model showed the lowest AIC and BIC (AIC = -10427, BIC = -10419) when compared to a 4- (AIC = -10451, BIC = -10459) group model. The mean posterior probabilities ranged from (0.81–0.90), which are well above the .70 cutoff [29]. Figure 1 displays the trajectories of violence among boys and men from ages 13–32. The patterns of violence were similar across racial/ethnic groups; however, the prevalence of violence across groups was different. Specifically, Whites were most likely to be non-violent (71.3%) compared with Blacks (62.5%) and Hispanics (64.5%). Instead, Blacks were most likely to be escalators (17.8%) compared with Hispanics (13.9%) or Whites (11.5%), which was the most violent trajectory group. Because the same patterns of violence emerged across the racial/ethnic groups, a pooled model (including all racial/ethnic groups) was used for the multinomial analyses.

Effects of risk and protective factors at Wave I on trajectories of violence

Based upon the bivariate model, residence in an urban neighborhood, parental involvement, and parental alcohol use were not significantly related to membership in either the desistor or escalator group of violent males and were therefore excluded from the final model. Prior to accounting for Wave I violence in the multivariate model, poverty increased the odds of desistance from violence (OR = 1.61, 95% CI 1.14–2.27), and the perception of living in a safe neighborhood was protective from escalation (OR = 0.64; 95% CI 0.44–0.93). These effects were no longer significant when Wave I violence was included in the model.

As detailed in Table 2, peer marijuana use increased the odds of desistance by 20% (OR = 1.20; 1.01–1.43). Individual-level alcohol use increased the odds of desistance by 50% (OR = 1.50; 95% CI 1.10–2.06), and academic performance was protective from membership in the desistors group (OR = 0.79; 95% CI 0.65–0.95). Group fighting and Wave I violence were significantly predictive of desistance; however, group fighting was only marginally associated with escalation (OR = 1.40; 95% CI 0.96–2.01). There were also some differences by race/ethnicity in the risk factors for violence; specifically, Hispanics who reported depressive symptoms or sadness were more likely to be desistors than Whites who did not report sadness or depression (OR = 10.42; 95% CI 1.82–59.60).

As shown in Table 3, post-hoc analyses were conducted to understand the distribution of risk and protective factors among those who were violent at Wave I. A number of significant differences emerged. First, those who were violent in adolescence were more likely to believe that they live in an unsafe neighborhood, have peers who use alcohol and marijuana, use alcohol, marijuana, and other drugs themselves, do poorly in school, and report sadness or depression. Violent boys are also more likely to report group fighting, and identify as African- American or Black.

Discussion

The current study examined the etiology of violence longitudinally among boys and men using a nationally representative, longitudinal sample by investigating the direct effects of multiple domains of risk and protective factors for membership in each trajectory of violence. The group-based trajectory models extracted three groups: (1) non-violent, (2) desistors from violence, and (3) escalators whose severity of violence increased with age. Although a number of contextual influences were predictive of violence in unadjusted analyses (including poverty, perception of neighborhood safety), these effects were no longer significant once prior (baseline) violence was controlled.

These results are consistent with previous research on trajectories of violence, and risk and protective factors for violent behavior among adolescents. Three trajectory groups were extracted from the data in this study, and this is consistent with the literature that suggests there are between three and five unique groups of adolescents who participate in violent behavior [17, 19, 30]. The findings from this study are unique in that a late-onset group of violent men was identified. Although a small number of studies have found support for the existence of this group [13, 31], the majority of the literature on trajectories of delinquency supports the agecrime curve, in which adolescents “age out” of delinquent behaviors before age 20 [17, 32].

The results from this study did not identify patterns of predictors among escalators, a high-risk late-onset group of men. This finding highlights the need for future research on this group of escalators, as unique and early risk factors may be present. In one study that identified this late-onset escalator group [31], a variety of psychological predictors were identified among both men and women, including high anxiety, low IQ, delinquent friends, having few friends early in life, and late onset of sexual intercourse. These results indicate that childhood risk factors may predict this late-onset group of violent young adults, and more research on this unique group is necessary to further understand the etiology of late-onset escalation.

This study identified several risk and protective factors that predicted violence. There has been disagreement as to the role of peer substance use on violence [33, 34]; however, these results support the argument that peer marijuana use directly effects violence. Relatedly, another interesting finding was observed regarding the role of individual alcohol use on distinguishing trajectories. Specifically, while the direction of the effect of individual alcohol use was the same for the desistors and the escalators, the effect was only significant for distinguishing the desistors group. This may indicate that some adolescents whose alcohol use co-occurs with violence during adolescence ‘age out’ of both of these behaviors simultaneously upon entering young adulthood, [35] or they ‘age out’ of both of these behaviors upon becoming bonded to society through informal institutions of social control (e.g., employment or marriage). In addition, this study also found a relationship between academic achievement and violent group membership. This finding has important implications, as it may suggest that adolescents who do exhibit violence in adolescence may still have the opportunity to benefit from academic achievement as a mechanism to become bonded to a social institution such as education, particularly higher education, which can serve as an age-graded transition to enable their eventual desistance from violence in early adulthood [36, 37].

This study had several limitations. First, risk factors were analyzed at multiple levels; however, hierarchical linear modeling, nesting, weighting, and clustering was not considered due to the small sample sizes available in some of the trajectory groups, as well as methodological limitations of statistical modeling. However, all multinomial regression

analyses accounted for the nesting, weighting, and clustering of adolescents. Second, Add Health data collection commenced when adolescents were between the ages of 11 and 19. Risk and protective factors that may have been present earlier in life (e.g., during the early to midchildhood years) were not measured directly during data collection. Third, it is important to consider that the average age of the adolescents was 15 at baseline; therefore, a great deal of aggression and violence may have gone uncaptured in these data. However, the measures used at baseline in this study included participation in violence anytime prior to baseline; potentially minimizing misclassification. Regardless, it is important to consider that some boys may have participated in some unreported violent behavior prior to data collection. Finally, there is the potential that certain unmeasured covariates may account for/distinguish the trajectory groups identified in this study. For example, the desistors could be influenced by time-varying or age-graded factors such as employment and marriage [36, 37]; therefore, these effects are likely non-existent at baseline (where our covariates were measured). Nevertheless, age-graded transitions measured at later follow-up periods may distinguish the trajectory groups. In this same vein, other ethnic-specific unmeasured covariates may differentiate the trajectory groups as well such as what Anderson (1999) describes as the ‘code-of-the-streets’ or a ‘might-makes-right’ attitude [38] that exists in low income African American communities or cultural factors such as familialism, intergenerational conflict, and perceived discrimination for Hispanics [39]. We encourage future research to incorporate these potentially important measures when data permits.

Despite these weaknesses, the current study had several strengths. First, data were derived from a longitudinal, nationally representative sample of adolescents followed into young adulthood. As such, this sampling design allows for generalizations to be made to a national sample of boys and men across the United States. Second, the current study had sufficient sample size to evaluate racial/ethnic differences in patterns of violence among boys and men as they age. This is a unique feature of the current analysis and provides information specifically applicable to men. Finally, the trajectories estimated in this study are especially appropriate for studies of violence, as patterns tend to change over time [17, 32].

Future Research

These results call for future studies to investigate the etiology of late-onset escalation, especially among young men. Specifically, the hypothesis that men who are involved in late-onset violence are more likely to participate in undetected status offenses may be investigated to identify a “gateway” progression to serious violent offending. In addition, future research should utilize young samples of boys and men to identify the earliest symptoms that may increase propensity for violence in early adolescence and adulthood.

In conclusion, the findings from this study identify a late-onset, high-risk group of boys and men (escalators) which has rarely been identified in the literature on crime and violence. In addition, results indicate that the risk and protective factors for membership in each of the three violence trajectory groups differ. Taken together, these findings have significant implications for violence prevention. Specifically, social influences, such as exposure to peers who use alcohol or marijuana, and community-level risk influence adolescents’ likelihood for violent behavior. Prevention programming should begin early in elementary school settings to prevent initiation of violence.

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Figure 1.
Trajectory model of violence among boys and men, ages 13–32, Add Health, n=4322.

Table 1

Sample description of adolescent boys and men, N=4322, Add Health Study, Wave I.

Variable	Whites (n=2815)	African-Americans (n=821)	Hispanics (n=686)
	n(%)	n(%)	n(%)
<i>Community-level</i>			
Income less than poverty line	414(15.0) ***	377 (47.0)	202 (30.1)
Urban area	1196(43.1) ***	477 (58.6)	572 (84.0)
Live in a safe neighborhood	2586 (92.2) ***	716 (87.8)	550 (80.8)
<i>Parental and Peer Influences</i>			
Parental Involvement (Mean, SE)	6.0 (3.5) ***	5.3 (3.3)	5.5 (3.5)
Parental alcohol use (Parent survey)	1619 (62.1) ***	313 (43.6)	270 (45.4)
Peer alcohol use	1561 (56.3) ***	352 (44.3)	367 (54.8)
Peer marijuana use	874 (31.6) **	265 (26.5)	253 (37.4)
<i>Individual-level Risk Factors</i>			
Alcohol use	1619 (57.7) ***	357 (44.0)	416 (60.9)
Marijuana use	762 (27.3) *	225 (27.9)	216 (31.9)
Other drug use	367 (14.6) ***	35 (4.4)	94 (13.8)
Depression	855 (30.4) **	264 (32.2)	239 (34.2)
Poor academic performance	382 (13.6) ***	130 (15.8)	133 (19.4)
Speaking Spanish at home	--	--	292 (42.6)
<i>Violence</i>			
Group fighting	580 (21.0)	216 (26.4)	207 (30.8)
Baseline violence	145 (6.5) ***	91 (14.5)	66 (12.2)
<i>Demographics</i>			
Age (Mean, SE)	15.3 (1.6)	15.3 (1.6)	15.7 (1.6)
US-Born	--	--	535 (78.0)

Note: A chi-squared or t-test was conducted across race.

*
 $p < 0.05$ **
 $p < 0.01$ ***
 $p < 0.001$

Table 2

Multivariate effects of multiple domains of risk and protective factors on trajectories of violence among boys and men, Add Health, n=4322.

	Trajectory Group			
	Desistors		Escalators	
	OR	95% CI	OR	95% CI
<i>Community-level</i>				
Income less than poverty line	1.21	0.76–1.92	0.91	0.63–1.31
Live in a safe neighborhood	1.26	0.74–2.12	0.87	0.53–1.39
<i>Parental and Peer Influences</i>				
Peer alcohol use	0.99	0.85–1.16	1.03	0.88–1.21
Peer marijuana use	1.20 *	1.01–1.43	1.08	0.88–1.34
<i>Individual-level Risk Factors</i>				
Alcohol use	1.50 *	1.10–2.06	1.26	0.89–1.82
Marijuana use	1.08	0.74–1.59	0.89	0.59–1.34
Other drug use	1.20	0.91–1.58	1.13	0.85–1.52
Depression	0.88	0.69–1.11	0.95	0.72–1.24
Better academic performance	0.79 *	0.65–0.95	0.91	0.72–1.14
<i>Violence</i>				
Group fighting	2.23 ***	1.49–3.35	1.40+	0.96–2.01
Baseline violence	4.34 ***	2.56–7.37	2.27 **	1.26–4.08

Note: The “Non-Violent” trajectory group serves as the reference category. All analyses are controlling for age and race/ethnicity and Wave I violence.

*
 $p < 0.05$

**
 $p < 0.01$

 $p < 0.001$

Table 3

Post-hoc description (means and percentages) of boys by violence participation at Wave I, n=4322.

	Violence at Baseline		
	Violent (%)	Non-Violent (%)	<i>p</i>
<i>Community-level</i>			
Living in a safe neighborhood	0.25	0.29	0.009
Poverty (Mean)	0.13	0.13	0.683
Urban Area	0.12	0.39	0.318
<i>Parental and Peer Influences</i>			
Parental Involvement (Mean)	5.57	5.85	0.056
Parental alcohol use	0.59	0.58	0.377
Peer alcohol use	0.71	0.53	<0.001
Peer marijuana use	0.52	0.31	<0.001
<i>Individual-level Risk Factors</i>			
Alcohol use	0.74	0.53	<0.001
Marijuana use	0.49	0.25	<0.001
Other drug use	0.24	0.10	<0.001
Academic achievement	0.60	0.74	<0.001
Depression	0.47	0.40	<0.001
<i>Violence</i>			
Group fighting	0.50	0.15	<0.001
<i>Demographics</i>			
Age (Mean)	15.27	15.16	0.117
White	0.66	0.75	<0.001
African-American or Black	0.25	0.17	<0.001
Hispanic or Latino	0.14	0.11	0.025

Notes: Participants were considered violent at baseline if they reported any of the violence items that were used to estimate violence trajectories: shot or stabbed someone, used knife or gun in a fight, or hurt someone badly enough to need care from a doctor or nurse. The Wave IV weighting variable was used for these analysis.

**
 $p < 0.01$

 $p < 0.001$