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Original article

Detecting Specialization in Interpersonal Violence Versus Suicidal Behavior

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A B S T R A C T

Purpose: Research suggests that interpersonal violence and suicidal behavior often co-occur and share a common set of risk factors. This study examined (1) the extent to which individuals specialize in interpersonal violence or suicidal behavior and (2) the shared and unique covariates of individual specialization.
Methods: The Project on Human Development in Chicago Neighborhoods is a longitudinal study of youths embedded within neighborhoods in metropolitan Chicago. Interviews with youths (average age, 15 years at baseline) and their primary caregivers were conducted from 1994 to 1997 (baseline) and from 1997 to 2000 (Wave 2). Analysis used an item response theory–based statistical approach on 19,502 interpersonal violence and suicidal behavior item responses from 1,628 youths within 74 neighborhoods to assess the degree to which individuals specialize in either interpersonal violence (ranging from hitting someone to shooting someone) or suicidal behavior (ideation, planning, and attempted suicide). The extent to which variables distinguished interpersonal violence and suicidal behavior was assessed.
Results: Individuals who engaged in high levels of interpersonal violence were unlikely to engage in suicidal behavior. Conversely, individuals who engaged in high levels of suicidal behavior were also likely to engage in interpersonal violence. Several shared (e.g., residential stability, substance use) and distinguishing (e.g., exposure to violent peers, depression) correlates of interpersonal violence and suicidal behavior were detected.
Conclusions: Interventions that address both self- and outward-directed violence must be evidence based. Addressing violence prevention among youths at risk for suicidal behavior appears warranted, but targeting risk factors for suicide among the most violent youths may not be justified.
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IMPLICATIONS AND CONTRIBUTION

Individuals who engaged in high levels of interpersonal violence were unlikely to engage in suicidal behavior. Conversely, individuals who engaged in high levels of suicidal behavior were likely to engage in interpersonal violence. Violence prevention approaches that address risk factors for both self- and outward-directed violence must be evidence based.

Interpersonal violence and suicidal behavior are leading causes of injury and death among youths in the United States. Homicide and completed suicide are the second and the third leading causes of death among persons aged 10–24 years [1], and nonfatal interpersonal violence and suicidal thoughts and behaviors (hereafter "suicidal behaviors") are relatively commonplace. For example, one in three youths get into a physical altercation, and one in six youths seriously contemplates suicide in any year [2]. Mortality therefore reflects only a small portion of self- and outward-directed violence.

Research suggests that interpersonal violence and suicidal behavior often co-occur [3–7] and share a common set of risk factors [8–15]. Evidence also suggests that certain risk factors are more strongly associated with one form of behavior. For example, exposure to violent peers is a particularly robust correlate of interpersonal violence [16], whereas depression is among the strongest correlates of suicidal behavior [17]. These ideas are consistent with the "stream analogy" of lethal violence, which

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suggests that common factors (e.g., economic stressors) predispose individuals to both inward- and outward-directed lethal violence, whereas distinct factors (e.g., cultural factors affecting blame attribution) diffuse the propensity for lethal violence toward either interpersonal violence or suicidal behavior [9,18,19].

Understanding the shared and unique correlates of interpersonal violence and suicidal behavior is critical to the implementation of effective interventions. But, research has yet to determine the degree to which the same persons engage in interpersonal violence and suicidal behavior compared with "specializing" in either self- or outward-directed violence. We investigate this issue using data from the Project on Human Development in Chicago Neighborhoods (PHDCN). Measures of interpersonal violence range from fighting to gun violence, and suicidal behavior is measured as ideation, planning, and attempted suicide [20–22]. Analysis utilizes an item response theory (IRT)–based statistical approach on 19,502 interpersonal violence and suicidal behavior item responses from 1,628 youths within 74 neighborhoods to examine (1) the extent and statistical significance of specialization toward interpersonal violence or suicidal behavior and (2) the correlates of individual specialization.

Methods

Study population

As a longitudinal study of individuals within their social contexts, the PHDCN is particularly well suited to address the research questions. The PHDCN's sampling strategy revolved around 343 researcher-defined neighborhood clusters (NCs) representing metropolitan Chicago. NCs were constructed on the basis of spatial contiguity (according to geographical boundaries) and internal homogeneity (with respect to socioeconomic status and race/ethnicity) and designed to approximate local neighborhoods.

This study considers two of the project's core components: the Community Survey (CS) and the Longitudinal Cohort Study (LCS). The CS was a probability sample of 8,782 adults residing throughout the 343 NCs. A three-stage sampling design was used to select city blocks within NCs, households within city blocks, and one adult (18+) per household. For the LCS, the 343 NCs were assigned to 21 strata based on race/ethnicity (seven levels) and socioeconomic status (three levels), and 80 NCs were sampled within these strata. A simple random sample of households within these 80 NCs identified over 6,000 youths within 6 months of their birth (zeroth), third, sixth, ninth, 12th, 15th, and 18th birthdays.

This study examines youths from cohorts aged 12, 15, and 18 years who were interviewed at baseline, answered at least one suicidal behavior question and at least one interpersonal violence question at Wave 2, and resided in a neighborhood with at least five respondents. Interviews with youths and their primary caregivers were conducted from 1994 to 1997 (baseline) and from 1997 to 2000 (Wave 2). More than 19% of respondents would have been excluded from analysis due to missing data on person-level covariates. Modest differences existed between these subjects and those with complete data, but no detectable patterns emerged. Missing data were imputed within NCs using chained equations (the "mi impute" commands) in STATA 13 (StataCorp, College Station, TX). All independent and dependent variables were included in the imputation models. The original format of the variables (e.g., binary) was preserved during this process. Statistical models (see below) were estimated using maximum likelihood in HLM 7 (Scientific Software International, Inc, Skokie,

IL), which averaged coefficients from the 10 imputed data sets and used the approach recommended by Little and Schenker [23] to create robust standard errors across data sets, thereby addressing assumption violations (e.g., non-normality) [24,25].

The final study sample includes reports on 19,502 interpersonal violence and suicidal behavior item responses from 1,628 respondents within 74 neighborhoods. The average item-level sample size within persons is 11.8 (range = 9–12); the average person-level sample size within NCs is 22 (range = 5–53). The use of PHDCN data for this study was approved by the Institutional Review Board at Northeastern University, and no data identifiable to a person were collected by the researchers.

Outcome measures

The outcome measures capture an array of violent and suicidal behaviors that have been validated in prior research using the PHDCN [26,27]. Respondents reported whether (0, no; 1, yes) they engaged in eight acts of interpersonal violence during the year preceding the Wave 2 interview: carrying a hidden weapon; hitting someone (outside the house); attacking someone with a weapon; throwing objects (e.g., bottles) at people; shooting someone; shooting at someone; using a weapon to rob someone; and being involved in a gang fight. These items capture both more frequent, less serious behaviors (e.g., fighting) and less frequent, more serious offenses (e.g., shooting someone).

Respondents also reported their involvement (0, no; 1, yes) in four suicidal behaviors: thinking about suicide; thinking seriously about suicide often; having an exact plan for suicide; and attempting suicide. These items follow recent consensus on the definition of nonfatal suicidal behavior and reflect suicidal ideation, suicidal planning, and attempted suicide [20–22].

Respondents on average engaged in .5 of the eight acts of interpersonal violence (standard deviation = 1.0; range = 0–7) and .1 of the four suicidal behaviors (standard deviation = .5; range = 0–4). Table 1 reports descriptive statistics for all study measures. A detailed description of these measures is provided in the Appendix.

Statistical methods

The statistical approach allows for an examination of the factors that differentiate interpersonal violence and suicidal behavior. A multivariate multilevel Rasch model, an IRT model with logit form, nests the 12 dichotomous outcome measures (Level 1) within persons (Level 2) within neighborhoods (Level 3). This method follows the methodology developed in criminology by Osgood and Schreck [28] to investigate specialization in violent versus property offending.

The Level 1 regression equation is

$$\text{Log}\left[\text{odds}\left(Y_{ijk}=1\right)\right]=\beta_{0jk}+\beta_{1jk}\text{Spec}+\sum_{i=2}^{I}\beta_{ijk}D_{ijk}+e \qquad [1]$$

The Level 2 equations are

$$\beta_{0jk}=\gamma_{00k}+\gamma_{01k}X_{01k}+\ldots+\gamma_{0nk}X_{0nk}+\mu_{0jk} \qquad [2]$$

$$\beta_{1jk}=\gamma_{10k}+\gamma_{11k}X_{11k}+\ldots+\gamma_{1nk}X_{1nk}+\mu_{1jk} \qquad [3]$$

$$\beta_{ijk}=\gamma_{i00} \qquad [4]$$