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ABSTRACT

The deterioration of school environments in conjunction with large numbers of dropouts are related issues of national concern. This longitudinal study evaluates student exposure to unsafe public schools during adolescence as a potential risk factor for dropping out by 10th grade. A panel of 13,217 public school students assessed at base year and 2 years later was drawn from a national database. Perceived safety in the 8th grade as compared to 10th grade was evaluated in the presence of demographic characteristics. The findings suggest that students exposed to unsafe schools are at risk of dropping out. Contains 25 references; 2 tables present statistical analysis. (SR)

Running head: UNSAFE PUBLIC SCHOOLS AND RISK OF DROPPING OUT

Unsafe Public Schools and the Risk of Dropping Out: A Longitudinal Study of Adolescents

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Abstract

This longitudinal study evaluates student exposure to unsafe public schools during adolescence as a potential risk factor for dropping out by 10th grade. The rationale for investigating the association between perceived safety in school and dropping out is based on Wener's environmental model of violence in institutions. A panel of 13,217 public-school students assessed at base year and two years later was drawn from the National Education Longitudinal Study (NELS:88) database. Perceived safety in 8th grade as compared to 10th grade was evaluated in the presence of demographic characteristics; associations among the variables were analyzed via hierarchical loglinear models. Odds ratios were computed to estimate the risk of dropping out given exposure to unsafe public schools. For example, the odds of dropping out were almost 3 times greater for adolescents who reported feeling safe in 8th grade but unsafe 2 years later as compared to students who felt safe at both times. The findings support Wener's model and suggest that students exposed to unsafe schools are at risk of dropping out.

KEY WORDS: Public school safety; dropouts; adolescence; school environment; longitudinal study.

Unsafe Public Schools and the Risk of Dropping Out: A Longitudinal Study of Adolescents

Adolescents face serious problems in school, including exposure to drugs, alcohol, and violence. The abuse of drugs and alcohol is related to victimization in school (Kingery, Pruitt, & Hurley, 1992) and handgun violence in schools poses a real threat to the safety of students (Educational Fund to End Handgun Violence, 1993; Cornell, 1993).

The deterioration of school environments in conjunction with large numbers of dropouts are related issues of national concern. This study contributes to our understanding of these social problems by describing the history of exposure to unsafe schools during adolescence and by documenting the relationship between exposure and dropping out. Furthermore, the longitudinal approach allows for the identification of patterns of exposure (from middle school through early high school) most associated with dropping out. This information should be useful to program designers who want to optimize the timing of their intervention strategies.

This study reflects a paradigmatic shift away from the more traditional student deficit models because the social climate at school rather than student academic performance or family is of interest, recognizing that a threatening school environment may have a negative impact on student behavior (Bronfenbrenner, 1979).

Failure to complete high school has serious consequences for personal, as well as public health. For example, based on the Wisconsin model of status attainment, school failure is related to low socioeconomic status and reduced opportunities for economic mobility (Blau & Duncan, 1967; elaborated by Sewell & Hauser, 1980). Low socioeconomic status, in turn, is associated with environmental contexts rife with costly health hazards (Adler et al., 1994).

By considering students-in-context and employing population-based methods of epidemiology, the risks associated with exposure to a hazardous environment (i.e., the school), may be quantified. Thus, this preliminary study assumes that student reports of school safety - when negative -- are crude indicators of hazardous environments.

Perceived safety in school and its presumed relationship with dropping out is considered in light of Wener's (1994) environmental model of violence in institutions which derives from his observation of prison life. While it may seem surprising to use such a model, he suggests that his model may generalize to other institutions resembling prison. Consider, for example, urban public schools where assault, intimidation, and the use of weapons are aspects of the social environment. What is useful for this project is his analysis of perceived safety and the probable consequences of feeling at risk of assault. He notes that inmates who feel unsafe try to reduce risk through isolation or self-defense. The latter may entail carrying a weapon, affiliating with gangs for

group protection, and/or "preemptive" assaults meant to communicate toughness. The consequences of feeling unsafe may explain, in part, the finding in the literature on school violence that victims are often victimizers (Kingery, Pruitt, & Hurley, 1992). Approximately 23% of students and 11% of teachers have been victims of violence (Mushinski, 1994; Sheley, McGee, and Wright, 1992).

Given Wener's model, dropping out of school may be seen as an attempt to remove oneself from a dangerous or threatening environment. Both students and parents have cited school violence and racial tension as reasons for excessive school absence (Klerman, Eitzman, Apert, & Lamb, 1987) and absence is a strong behavioral predictor for dropping out (Bryk and Thum, 1989). Unfortunately, when students affiliate with gangs and/or carry weapons, a more dangerous environment evolves. School violence, drug and alcohol abuse, and weapon-carrying increase the real and perceived risks associated with being in school. Thus, there is a clear need for evaluating the exposure of students to unsafe public schools *over time* as a risk factor for dropping out. (In 1991, Willett and Singer had found only one study where a time-varying predictor of dropping out had been evaluated.)

Research questions. The following research questions are addressed in this paper: is exposure to unsafe public schools in the eighth and/or tenth grade a risk factor for dropping out by tenth grade? If so, what is the risk associated with particular patterns of exposure?

Method

Data from the first two waves of the National Education Longitudinal Study of 1988 (NELS:88) issued by the National Center for Education Statistics (1994) were employed. The NELS:88 survey is based on a two-stage, stratified sample design and is representative of the nation's eighth-grade students and schools at base year. The dataset is complex and spans three time points: 1988, 1990, and 1992. Students are surveyed at all three time points; dropouts are surveyed in 1990 and in 1992 when most students are in tenth and twelfth grade.

Sample. A panel of 13,217 students and dropouts for whom information is available at base year and first follow-up was drawn. Appropriate flags and weights were used.

Only adolescents in the public school system during eighth and tenth grade were sampled; dropouts were public school students at base year. Approximately 50% of the sample were girls.

Variables. Levels of categorical variables were collapsed to minimize the sparseness of contingency subtables introduced by cross-classifying dropout status with other variables. Thus, ethnicity was treated as consisting of two groups: (1) an educationally advantaged group of Asian and white students (74%) and (2) a disadvantaged group of African Americans, Native Americans, and Hispanics (26%). Similarly, socioeconomic status (SES) was trichotomized after re-standardizing for the sample under study. Each category represented about a third of the sample.

The safety variables were dichotomized into "safe" and "not safe" categories. Students and dropouts rated the safety of their schools at 8th grade and again at 10th grade by responding to "I don't feel safe at this school." However, dropouts rated the last school attended, retrospectively. In eighth grade, about 13% of the adolescents did not feel safe; two years later, about 9% did not feel safe.

A variable was created to capture the report of safety over time by crossing the responses in eighth grade with the responses two years later. Thus, there were four possible combinations or patterns of exposure: (1) not safe/not safe (2.5%); (2) not safe/safe (9.5%); (3) safe/not safe (6.4%); and (4) safe/safe (81.6%).

NCES classifies dropouts in a variety of ways. For purposes of this study, so-called "stopouts" (students who had returned to school after one or more episodes of dropping out) were classified as dropouts. Since the premise for this study is that people leave dangerous or threatening environments, identifying students who leave school, even temporarily, is of interest. Also, excessive school absence is a predictor of failing to complete school; thus, stopouts presumably are more like dropouts than other students. Approximately 8% of the sample were dropouts or stopouts.

Loglinear Analyses. Most of the variables of interest are categorical. Hence, loglinear models were developed where cell counts in multidimensional contingency tables are modelled in terms of the associations among variables (Agresti, 1990; Wickens, 1989).

Dropping out was not treated as an outcome *per se*, but was considered simultaneously with categorical variables for the experience of (un)safe schools over time, and with student covariates for gender, ethnicity, and SES. Models were evaluated by comparing a set of nested, hierarchical loglinear models beginning with the most complex one. When a theoretically important variable was eliminated, it was re-tested against the final model. Before a model was reduced, fit indices were compared with earlier indices and residual analyses conducted. Also, analyses of nonrespondents to the perceived-safety variable were conducted to assess bias.

Risk was quantified by estimating local odds ratios for subtables suggested by the final model. Also, in the discussion of findings, subgroup sizes were "weighted up" to the target population to help program designers and policymakers comprehend, for example, how many thousands of adolescents dropped out of public school by tenth grade and how many of these early dropouts felt unsafe in school.

Estimation of standard errors. The data were weighted by a panel weight normed and then adjusted for the mean design effect for students (as reported by NCES). This least-favored, although acceptable, method of adjustment is suggested in the NELS:88 documentation and has the effect of reducing the sample size so that the obtained standard errors are approximately correct. This conservative adjustment strategy controls the Type I error rate. However, the number of variables considered simultaneously is necessarily constrained by the adjusted sample size. Even with

large datasets, one runs out of observations quickly when categorical variables are cross-classified.

Results

Validity of safety measures. The validity of student reports of (un)safe schools was investigated by checking to see if perceived safety at base year and at first follow-up was related to several other indicators of school environment having to do with theft, drugs, threatened harm, and fights. All of the chi-square tests of independence were statistically significant, suggesting that student reports are valid (see Table 1).

Screening models. Initial hierarchical models were screened by testing the contributions of blocks of terms of a particular order. The most complex model included a 5-way interaction since the variables of interest were dropout status and perceived safety, controlling for ethnicity, gender, and SES. The set of statistical tests suggested that an appropriate model would include main effects and 2-factor associations (see Table 2).

Models with 2-factor associations. The next step involved finding the best-fitting and most parsimonious model with one or more 2-factor associations (see Table 3). Model I included all 2-factor associations; model II was derived from model I by eliminating gender and all its 2-factor associations. The likelihood ratio chi square difference test comparing models I and II was nonsignificant.

Model III was derived from model II by eliminating the dropout x ethnicity association. The chi-square difference test was

nonsignificant; therefore, model III was deemed the "final" or "reduced" model.

Final model. The fit of the final model was acceptable (likelihood ratio chi-square = 20.36, df = 24, weighted n = 3424, p = .676). Five two-factor associations were retained in the final model: dropout status x safety, dropout status x SES, ethnicity x safety, ethnicity x SES, and SES x safety. As a final check, the association for dropout status and gender (which had been eliminated from an earlier model) was tested against the final model and remained statistically nonsignificant.

Two-factor associations with perceived safety were further explored by estimating local odds ratios for corresponding subtables based on the predicted cell frequencies (see Table 4). The intersection of each row and column of Table 4 describes a subtable and its corresponding odds ratio. The maximum number of subtables is determined by the degrees of freedom for the corresponding 2-factor association.

For the dropout status x perceived safety association, the odds ratios vary across patterns of exposure from 1.8 to 2.9 and suggest that the third pattern relative to the fourth is the most critical; that is, the odds of dropping or stopping out are almost 3 times greater for adolescents who felt safe in eighth grade but unsafe two years later (pattern # 3) when compared to adolescents who felt safe at both times (pattern # 4). The next largest odds ratio was for the first pattern where students felt unsafe at both times.

For the perceived safety x ethnicity association, the odds ratios range from 2.0 to 2.2 across patterns of exposure. Thus, the odds of feeling unsafe at one or both times is about twice as large for minority adolescents (Black, Hispanic, and Native American) when compared to majority adolescents (Asian and White).

For the perceived safety x SES association, the odds ratios range from 1.8 to 2.2 across patterns of exposure. For example, the odds of feeling unsafe in eighth grade and again two years later is 2.2 times greater for the most socioeconomically disadvantaged adolescents as compared to the most advantaged.

Discussion

About 8% of the panel of public school 8th graders, two years later, were dropouts or stopouts. This percentage when "weighted up" to the target population represents almost 200,000 adolescents. About a third of these dropouts experienced an unsafe school environment in eighth grade and/or two years later as compared to about 18% of students who persisted.

The results of this study suggest that the experience of unsafe schools is indeed a risk factor for dropping out. Adolescents who feel safe in eighth grade, but unsafe two years later may be most at risk. Although the findings are preliminary and may not be interpreted causally, the evidence is consistent with the idea that students leave dangerous schools, as predicted by Wener's model of violence in institutions. Students may be dropping or stopping out of school as a means of coping with chronic threats to their safety in school; when leaving school is

viewed in this way, dropping or stopping out becomes an adaptive, rather than maladaptive strategy.

Additionally, the associations for ethnicity and socioeconomic status with perceived safety document the social inequities impeding access to a safe school and, presumably, a good education. Two of the major indicators of educational disadvantage are poverty and minority status (Davis & McCaul, 1991), characteristics of the groups most likely to be exposed to high-risk settings (National Academy of Sciences, 1993). The results of this study confirm that ethnic minorities (excluding Asians) and economically disadvantaged adolescents are most likely to be exposed to unsafe schools.

A methodological caveat. The estimated odds of dropping out for the several patterns of exposure to unsafe public schools are probably too conservative, that is, too small, since an analysis of the nonrespondents (8.2%) for the perceived-safety variable indicated that about 32% were dropouts or stopouts, 42% were Hispanic, Black, or Native American, and 50% were economically disadvantaged. Thus, the groups most at risk of being exposed to unsafe school(s) are overrepresented in the nonrespondent category. This troubling nonresponse rate is explained in part by a budget shortfall incurred by NCES at an intermediate point in the conduct of the longitudinal survey. To reduce costs associated with tracking dropouts and administering questionnaires, two abbreviated versions of the dropout questionnaire were administered. Thus, about 32% of the dropouts were not asked to rate the safety of the school last attended. Future analyses, should adjust for the

probable bias introduced by the nonoverlapping items in the three versions.

This preliminary study needs to be extended in several ways. For one, the impact of maturation needs to be addressed since the second most common pattern reported by adolescents was feeling unsafe in eighth grade and safe two years later. Evaluation of personal safety probably depends, in part, on physical size and emotional maturity. Also, the validity of response patterns to one item regarding safety needs to be corroborated by response patterns to a set of items, all measuring the construct or aspects of the construct; hence, a multi-item scale for safety needs to be developed. Finally, future studies should simultaneously address school environment and adolescent risk behaviors (Kolbe, Kann, & Collins, 1993) known to be predictors of dropping out (Chavez, 1989; Mensch and Kandel, 1988).

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Table 1

Evidence for the Validity of Student Reports of Safety

Base Year (1988)	χ^2	df	n
Perceived safety x			
(1) Respondent got into fight with another student (23%)	67.17	2	3641
(2) Respondent had something stolen at school (50%)	37.50	2	3625
(3) Someone offered to sell drugs to respondent at school (11%)	40.00	2	3622
(4) Someone threatened to hurt respondent at school (30%)	86.31	2	3621
1st Follow-up (1990)	χ^2	df	n
Perceived safety x			
(1) Respondent got into fight with another student (18%)	45.63	2	3376
(2) Respondent had something stolen at school (46%)	58.48	2	3381
(3) Someone offered to sell drugs to respondent at school (18%)	38.75	2	3372
(4) Someone threatened to hurt respondent at school (25%)	113.81	2	3371

Note. All likelihood ratio chi square statistics are significant ($p<.00001$) ; the reported n is the sample size after the adjusted panel weight is applied (see the section in text on estimation of standard errors); rounded percentages after each item refer to the relative numbers of students who indicated the event had occurred at least once.

Table 4

Local Odds Ratios for Selected 2-Factor Associations in the Final Model

Dropout Status x Perceived Safety:	1 vs 4	2 vs 4	3 vs 4
Dropout vs Persister	2.24	1.79	2.91

Perceived Safety x Ethnicity:	Minority vs Majority
1 vs 4	2.10
2 vs 4	2.19
3 vs 4	1.96

Perceived Safety x SES:	Low vs High SES
1 vs 4	2.19
2 vs 4	1.81
3 vs 4	1.86
1+2+3 vs 4	1.87

Note. Perceived safety was coded to capture the student's experience over time. For example, "not safe/safe" means that a student felt unsafe in 8th grade but safe two years later. For dropouts, the second report is for the last school attended. The coding for perceived safety is: 1=not safe / not safe, 2=not safe/ safe, 3=safe / not safe, 4=safe / safe .