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A Public Health Perspective on School Dropout and Adult Outcomes: A Prospective Study of Risk and Protective Factors from Age 5 to 27

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Abstract

Purpose—This study aimed to advance a public health perspective on links between education and health by examining risk and protective factors that might alter the relation between dropping out of high school and subsequent negative outcomes.

Methods—A community sample (N = 585) was followed from age 5 to 27. Data included self and parent reports, peer sociometric nominations, and observed mother-teen interactions.

Results—High school dropouts were up to four times more likely to experience individual negative outcomes (being arrested, fired, or on government assistance, using illicit substances, having poor health) by age 27 and twenty-four times more likely compared to graduates to experience as many as four or more negative outcomes. Links between dropout and negative outcomes were more pronounced for individuals who were in low SES families at age 5, rejected by elementary school peers, and became parents at a younger age; the dropout effect was decreased for individuals who had been treated for a behavioral, emotional, or drug problem by age 24.

Conclusions—Addressing school dropout as a public health problem has the potential to improve the lives of dropouts and reduce societal costs of dropping out.

Keywords

school dropout; behavioral; emotional; drug problems; risk and protective factors

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National estimates suggest that each high school dropout costs the United States economy at least \$250,000 over the course of his or her lifetime because of greater reliance on welfare and Medicaid, more criminal activity, poorer health, and lower tax contributions [1]. On average, the annual median income of a high school dropout is \$25,000, compared to \$46,000 for an individual with a high school or equivalent degree [1]. A higher proportion of dropouts than high school graduates is unemployed and incarcerated [2,3], and dropouts have poorer health, even controlling for income and other sociodemographic disparities associated with dropping out [4].

School dropout has not typically been conceived as a public health issue, but the Centers for Disease Control and Prevention and the American Public Health Association have advocated such a reframing because good health is predicted by good education, and health disparities are predicted by educational disparities [5,6]. Education is a strong predictor of health outcomes including mortality [7], likely in part because less education is highly correlated with health risk behaviors such as smoking, being overweight, and being sedentary and in part because more education leads to more income which can then purchase housing in safer neighborhoods, healthier food, better health care, and the like [8,9]. Estimates suggest that promoting education to reduce health disparities could save 8 times more lives than could be saved through medical advances in drugs and devices [10].

Despite the well-documented negative outcomes associated with dropping out of school, not all individuals who drop out experience this litany of negative life outcomes. The purpose of this study was to examine risk and protective factors that might alter the link between dropping out of high school and subsequent socially relevant outcomes in adulthood: receiving government assistance (e.g., food stamps), being fired, being arrested, using illicit drugs, and being in poor health. We selected these outcomes because each is substantially more likely for individuals who drop out of high school than for graduates [1–4]. With annual data on a community sample initially recruited before kindergarten and followed to age 27, we were able to test risk and protective factors assessed during childhood, adolescence, and young adulthood that might alter the link between dropping out and subsequent socially relevant outcomes.

METHOD

Participants

We recruited target participants when they entered kindergarten in 1987 or 1988 at three sites: Knoxville and Nashville, TN and Bloomington, IN [11]. We approached parents during kindergarten pre-registration and asked if they would participate in a longitudinal study of child development. Approximately 75% agreed. About 15% of children at the targeted schools did not pre-register. We recruited late enrolling families on the first day of school or by subsequent contact. The sample consisted of 585 families at the first assessment (52% male; 81% European American, 17% African American, 2% other ethnic groups). The sample reflected a wide range of socioeconomic backgrounds, ranging from 8 to 66 on the Hollingshead index, which was computed from parental education and occupation levels when the child was in kindergarten ($M = 39.53$, $SD = 14.01$) [12]. We assessed participants annually through age 27. Parents provided written informed consent each year for their own

and their child's participation, until participants reached age 18, when they began providing their own written informed consent. Institutional review boards at the universities involved in this study approved the research protocols. The present sample included 529 individuals (90% of the original sample) who provided enough data (i.e., continued to participate in the study in the years after high school graduation would have been anticipated) to determine whether they had completed high school by the age of 24, the cut-off age used by the U.S. Department of Education in most federal reports of dropouts. Compared to the 56 original participants who did not provide enough data to determine whether they completed high school, the 529 participants with sufficient data had higher SES at age 5 and were more likely to be female, but did not differ on ethnicity. The sample size varies somewhat across variables; the smallest n (383) was for the observed mother-adolescent relationship quality variable at age 16, described below, as this required a lengthy observation session that not all participants completed.

Procedures and Measures

Dropout Status—We used target participants' annual reports of school enrollment and degrees obtained to determine which participants dropped out before completing high school. We defined dropouts as those individuals who had not reported completing high school by the age of 24. Given that participants began kindergarten in 1987 or 1988, anticipated graduation would have been in 2000 or 2001 (or a year or two later if students were retained in grade). Nationally, 13.5 percent of 18- to 24-year-olds in 2000 were not in high school and had not completed high school [13], very similar to the 14 percent of our sample that had dropped out by age 24 ($n = 74$).

Socially Relevant Outcomes during Adulthood—At age 27, target participants reported on five socially relevant domains that were summed to create an index of health and well-being (see Table 1 for descriptive statistics). First, receipt of government assistance was assessed by asking whether participants (a) live in a public housing project or are on the waiting list for public or subsidized housing, (b) are receiving help from the government in paying rent, (c) are receiving welfare such as TANF or WIC for themselves or their dependents, (d) are covered by Medicaid or another public assistance program that pays for health care, or (e) receive food stamps. If participants received any of those forms of government assistance, they were coded as 1; if not, they were coded as 0. Although individuals receiving these forms of government assistance may perceive them positively, they generally have been regarded as negative outcomes for society in the dropout literature [1]. Second, participants were asked how many times in their life they had been fired or laid off (never or once coded 0, two or more times coded 1). Third, participants were asked if they had been arrested since the age of 18 (0 = no, 1 = yes). Fourth, participants reported how often they had used illicit drugs for non-medical purposes in the last six months (0 = never, 1 = one or more times). Fifth, participants rated their physical health (0 = excellent, very good, or good, 1 = fair or poor). We created a composite variable reflecting the number of socially relevant negative outcomes each participant experienced by summing ratings on these 5 domains (range = 0 to 5).

Risk and Protective Factors—Age 5 socioeconomic status (SES) was based on the Hollingshead Four-Factor Index of Social Status [12]. During the age 5 interview, mothers responded to questions regarding the child's misbehavior, their own discipline practices, and whether the child had ever been physically harmed by an adult. Interviewers then rated privately the probability that the child had been severely harmed, using a criterion of intentional strikes to the child by an adult that left visible marks for more than 24 hours or that required medical attention. A score of 0 was assigned if maltreatment had definitely not or probably not occurred, and a score of 1 was assigned if maltreatment had probably occurred, definitely occurred, or if authorities had been involved. Agreement between independent raters for this classification was 90% ($\kappa = .56$) [14].

In kindergarten through third grade (ages 5–8), sociometric interviews were conducted during the winter of each school year in classrooms in which at least 70% of children's parents gave consent [15]. Children were shown pictures of their classmates (in kindergarten and first grade) or a class roster (in second and third grades) and were asked to name up to three peers they especially liked and up to three peers they especially disliked. A social preference score was created by taking the standardized difference between the standardized like most nomination score and the standardized dislike most nomination score [15–17]. Children were classified as being rejected if their social preference score was less than 1, standardized like most score was less than 0, and standardized like least score was greater than 0. A cross-year composite was created to reflect whether children had been rejected by peers during any year in kindergarten through third grade.

When children were 12, their mothers completed nine items regarding awareness of their child's activities, whereabouts, and friends [18]. Items were rated on 5-point scales and averaged to reflect maternal monitoring ($\alpha = .69$). At age 16, mother-adolescent relationship quality was observationally assessed in a 45-minute interaction focused on communication about rules, roles, responsibilities, and conflict resolution. Coders rated individual and dyadic behavior on a set of 9-point rating scales [19]. A superordinate 9-point rating summarized overall observed relationship quality. A high score indicated the relationship was warm, open, and emotionally satisfying. Interrater agreement was computed for 20% of the total cases (average intraclass $r = .70$; $p < .001$). Also at age 16, adolescents rated how often their friends engaged in 10 antisocial behaviors [20]. Each behavior was rated on a 5-point scale ranging from 1 = never to 5 = very often, and values were averaged to create a scale ($\alpha = .74$).

At age 22, target participants reported how often they are involved in activities at church (0 = never, 6 = 5 or more times a week). They also reported their frequency of civic engagement [21] in seven areas (e.g., volunteered in a public service, neighborhood, or political association; donated money, food, or clothes to charity) in the last year (1 = never, 5 = many times). The seven items were averaged to create a civic engagement scale ($\alpha = .76$). In addition, target participants rated four items regarding their connection to a peer group (e.g., “I feel happiest when I am with members of this group”) [22], on a 5-point scale (1 = strongly disagree, 5 = strongly agree). The four items were averaged for the adult peer group affiliation scale ($\alpha = .77$). Also, at age 22, target participants rated the quality of their

relationships with their mother and father, each on an 11-point scale ranging from 0 = really bad to 10 = perfect [23].

At age 24, target participants were asked whether they had ever been treated for behavioral, emotional, or drug problems (0 = no, 1 = yes) [24]. Annually from age 18 to 25, target participants were asked “Do you currently have a romantic partner?” We constructed an index of romantic involvement as the number of waves the participant reported being in a romantic relationship across these eight years [25]. Annually from age 15 to 27, target participants were asked whether they had any children; we constructed an index of the age at which the participant first became a parent. Participants who had not yet become a parent by the age of 27 (59% of the sample) were assigned a value of 28 for the age at first parenthood variable.

Analysis Plan

We conducted three sets of analyses. First, we present descriptive statistics for individuals who dropped out of high school compared to high school graduates on the frequency of each of the five individual outcome variables and then the composite that includes all five. Second, we conducted 2 (dropout or not) $\times$ 2 (categorical risk factor or not) ANOVAS predicting the continuous composite outcome. Third, for continuous risk factors, we conducted regressions that included the main effect of dropping out, the main effect of the risk factor, and the interaction between dropping out and the risk factor as predictors of the continuous composite outcome. The interaction terms in the ANOVAs and regressions tested whether each risk or protective factor altered the link between dropping out and the socially relevant outcomes.

RESULTS

Individuals who dropped out of high school were nearly four times more likely to be receiving government assistance, were twice as likely to have been fired two or more times, were more than three times more likely to have been arrested since the age of 18, were twice as likely to have used illicit drugs in the last six months, and were more than twice as likely to report poor health (see Table 1). We then examined a composite indicator by summing the number of negative outcomes experienced and found a large effect of dropping out, $F(1, 451) = 85.13, p < .001$, with individuals who had dropped out of high school nearly 5 times more likely than high school graduates to have one or more negative outcomes and 24 times more likely to have as many as four or more negative outcomes.

Despite the significant risk posed by dropping out of school, not all dropouts experienced the same level of negative outcome, so we turned to the question of which factors from childhood, adolescence, and early adulthood might alter the link between dropping out and subsequent outcomes. For categorical risk and protective factors, we conducted 2-way analyses of variance (ANOVAs) that included the main effect of dropping out, the main effect of the risk or protective factor, and the interaction between the two. For continuous risk and protective factors, we first centered the risk and protective factors and then conducted regression analyses with comparable main effects and the interaction. Links between dropout status and negative outcomes were altered by four of the risk and protective

factors we tested (see Figure 1; main effects are reported in Tables 2 and 3). First, individuals from lower SES families had more negative outcomes at age 27 than individuals from higher SES families; furthermore, the risk of dropping out in relation to more negative outcomes at age 27 was more pronounced for individuals whose family SES in kindergarten was lower than for individuals whose family SES in kindergarten was higher, $t = -2.10$, $p = .036$. Second, individuals who were rejected by peers during elementary school were at higher risk for negative outcomes at age 27, and the effect of peer rejection was more pronounced for individuals who dropped out compared to those who graduated, $F(1, 446) = 9.26$, $p = .002$. Third, whether the individual had ever been treated for emotional, behavioral, or drug problems altered the link between dropping out and experiencing later negative outcomes such that individuals who graduated were at higher risk of later negative outcomes if they had been treated, whereas individuals who dropped out were at higher risk of later negative outcomes if they had *not* been treated, $F(1, 387) = 7.35$, $p = .007$, suggesting that despite the risk posed by emotional, behavioral, and drug problems in predicting school dropout in the first place, treatment for those problems had the potential to ameliorate subsequent risk for negative outcomes into adulthood for dropouts. Fourth, the risk of dropping out in relation to more negative outcomes at age 27 was more pronounced for individuals who became a parent at a younger age than for those who became a parent at an older age or who had not yet become a parent by the end of the study period, $t = -1.99$, $p = .048$.

We tested a number of other possible risk and protective factors that might alter the link between dropping out and negative outcomes, as above using 2-way ANOVAs to test categorical factors (Table 2) and regression analyses to test continuous factors (Table 3). Civic engagement and self-reported mother-child relationship quality during early adulthood were not significant risk or protective factors for dropouts or graduates. The other factors we investigated did not alter the relation between dropping out and subsequent outcomes but instead were equally protective or risky for dropouts and graduates alike, as these risk and protective factors did not show a significant interaction with dropout status, suggesting that these risk and protective factors were related to outcomes in the same way for dropouts and graduates. Being male, being African American, being physically abused in the first five years of life, and affiliating with antisocial peers during adolescence predicted more negative outcomes at age 27 equally for dropouts and graduates. Being in a romantic relationship for more years, maternal monitoring during early adolescence, observed quality of the mother-child relationship during adolescence, self-reported father-child relationship quality during early adulthood, frequency of involvement in church activities, and strongly affiliating with a peer group in early adulthood were equally protective for dropouts and graduates.

DISCUSSION

Consistent with previous research, individuals in our sample who dropped out of high school were at elevated risk of problems in multiple domains during adulthood. The main effects of dropping out on negative outcomes at age 27 were striking: Individuals who dropped out of high school were 24 times more likely than graduates to have experienced four or more negative outcomes. Nevertheless, regardless of dropout status, individuals with better relationships with their parents during adolescence and early adulthood, less affiliation with

deviant peers during adolescence, more time in a romantic relationship in late adolescence and early adulthood, and more involvement with a peer group and church activities during early adulthood had better outcomes.

Furthermore, although one of the risk factors that exacerbates the negative outcomes associated with dropping out (i.e., age 5 SES) is not directly amenable to change (although some large scale interventions have attempted to move families out of poverty [26]), three of the risk factors (i.e., peer rejection during elementary school; treatment for behavioral, emotional, and drug problems; and becoming a parent at a young age) might be. First, several promising and model interventions to improve peer relationships during elementary school have been identified in the Blueprints for Healthy Youth Development (www.blueprintsprograms.com) [27]. Second, behavioral, emotional, and drug problems increase the probability of school dropout [28]. Treatments for these problems may not only reduce school dropout but, for those who dropout anyway, offer the potential to reduce the subsequent negative outcomes associated with dropping out. For graduates, our findings likely imply that individuals experiencing more negative outcomes in early adulthood are more likely to seek treatment rather than that treatment causes more negative outcomes. Third, only 40% of teen mothers complete high school, and one-third of girls who drop out indicate that pregnancy or early parenthood was a key factor [29]. This is a particularly toxic problem when parenthood also compounds the negative outcomes associated with dropping out. Approaches that help teens delay sexual debut or use effective contraception could not only reduce teen pregnancy but also prevent school dropout that often follows for pregnant girls.

Notable strengths of this study include the prospective longitudinal design following a community sample from the age of 5 to 27 with data available from multiple sources including parents, peers, direct observations, and self-reports. The study also had limitations. First, we do not claim to have studied all of the potential risk and protective factors that could have altered the link between dropping out and subsequent negative outcomes. Emotional abuse and neurocognitive functioning are examples of other potential risk factors that could be examined in future research. Second, although we had data only through age 27, development does not stop there. Life pathways tend to stabilize fairly early in adulthood, but individuals continue to change over time in response to new opportunities and constraints that may serve as turning points toward better or worse future adjustment [30]. Third, we examined effects of risk and protective factors on the link between dropout status and a composite indicator that encompassed five socially relevant outcomes, but some risk and protective factors may be more tied to specific individual outcomes than to others. Finally, we adopted a variable-centered rather than person-centered approach. Originally, we sought to identify a group of dropouts that was exhibiting success in a number of domains to understand what promotes success in this at-risk group, but this proved sadly difficult to do, as the large majority were experiencing negative outcomes in multiple domains. Future research with large national samples may be able to identify a large enough subgroup of successful dropouts to delve more into predictors of positive outcomes for this group.

Researchers, policymakers, and advocates have argued that school dropout should be reframed as a public health problem because education is a strong predictor of long-term

health and health-services utilization. In comparison to college graduates, the average American high school dropout's life expectancy at birth is 14.2 years less for men and 10.3 years less for women [31]. During their lives, dropouts are more likely than graduates to experience both chronic and acute health problems [9]. The American Public Health Association estimates that eliminating dropout could save more than \$17 billion annually in Medicaid and other health care expenditures, as well as additional billions in welfare, criminal justice, and increased tax revenues [5]. Although entirely eliminating dropout may not be possible, it is surely a worthy goal, regardless of whether dropout is the cause of later problems or a mediating marker in a risky developmental trajectory that begins long before dropout occurs. Understanding school dropout in the context of other risk and protective factors provides a starting point for disrupting continuity between school dropout and later negative outcomes.

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IMPLICATIONS AND CONTRIBUTION

Individuals who dropped out of high school were 24 times more likely than graduates to have experienced four or more negative outcomes (e.g., being incarcerated, fired) by age 27, but several risk and protective factors (e.g., treatment for behavioral, emotional, or drug problems) altered the risks associated with dropping out.

Figure 1.

Significant interactions between dropout status and four risk factors (household SES in kindergarten; rejection by elementary school peers; treatment for behavioral, emotional, or drug problems by age 24; age at first parenthood) in the prediction of age 27 negative outcomes. For the continuous SES and age at first parenthood variables, the plotted lines depict slopes at one standard deviation above and below the mean. Each risk factor was related to the number of negative outcomes experienced by dropouts but not by graduates. The high age of first parenthood group included individuals who had not yet become parents by the age of 27.

Table 1

Comparisons of High School Dropouts versus Graduates on Socially Relevant Outcomes at Age 27

Age 27 Outcome	% of Dropouts	% of Graduates	χ^2
Government assistance	67.9	17.6	65.48, $p < .001$
Fired more than once	31.5	15.2	8.82, $p = .006$
Arrested since age 18	65.4	20.6	47.90, $p < .001$
Illicit drug use in last 6 months	43.9	22.9	11.49, $p = .002$
Poor health (self-reported)	21.8	9.4	7.62, $p = .010$
None of these outcomes	10.5	47.7	95.11, $p < .001$
Four or more of these outcomes	19.3	0.8	95.11, $p < .001$

Table 2

ANOVAs Predicting Socially Relevant Outcomes at Age 27 from Dropout and Categorical Risk and Protective Factors

Risk Factor	M (SD)	M (SD)	F for Dropout	F for Other Risk	Partial η^2
Gender	Male	Female	88.97, $p < .001$	15.12, $p < .001$	.21
Dropout	2.50 (1.35)	1.86 (1.13)			
Graduate	1.08 (1.06)	.62 (.85)			
Ethnicity	African Am.	European Am.	66.31, $p < .001$	10.10, $p = .002$	.17
Dropout	2.68 (1.11)	1.86 (1.25)			
Graduate	1.05 (.95)	.82 (.99)			
Age 5 abuse	Abused	Not Abused	59.10, $p < .001$	5.40, $p = .021$	.18
Dropout	2.64 (1.22)	2.05 (1.27)			
Graduate	1.06 (1.15)	.81 (.96)			
Ages 5–8 peer rejection ^a	Rejected	Not Rejected	88.84, $p < .001$	19.34, $p < .001$	.20
Dropout	3.00 (1.08)	1.82 (1.18)			
Graduate	1.02 (1.02)	.80 (.98)			
Treated by age 24 ^a	Treated	Not Treated	54.03, $p < .001$	.09, $p = .761$	.16
Dropout	1.89 (1.25)	2.39 (1.33)			
Graduate	1.12 (1.11)	.72 (.91)			

^aMain effects were qualified by a significant interaction depicted in Figure 1.

Table 3

Regressions Predicting Socially Relevant Outcomes at Age 27 from Dropout and Continuous Risk and Protective Factors

Risk Factor	b (SE b) [t] Dropout	b (SE b) [t] Other Risk	R²
Age 5 SES ^a	1.02 (.18) [5.52, p < .001]	-.01 (.00) [-1.46, p = .146]	.18
Age 12 parental monitoring	1.11 (.17) [6.36, p < .001]	-.56 (.16) [-3.52, p < .001]	.14
Age 16 deviant peer affiliation	1.03 (.17) [6.23, p < .001]	.49 (.08) [5.94, p < .001]	.22
Age 16 relationship with mother	.89 (.24) [3.70, p < .001]	-.12 (.05) [-2.68, p = .008]	.14
Age 22 church involvement	1.21 (.19) [6.41, p < .001]	-.10 (.02) [-4.32, p < .001]	.14
Age 22 civic engagement	1.31 (.16) [8.15, p < .001]	-.10 (.09) [-1.10, p = .271]	.15
Age 22 peer group	1.42 (.24) [5.85, p < .001]	-.19 (.08) [-2.34, p = .020]	.14
Age 22 relationship with mother	1.22 (.16) [7.53, p < .001]	-.04 (.03) [-1.51, p = .131]	.12
Age 22 relationship with father	1.08 (.17) [6.52, p < .001]	-.04 (.02) [-2.46, p = .014]	.11
Ages 18–25 romantic partnerships	1.18 (.30) [3.97, p < .001]	-.07 (.02) [-3.56, p < .001]	.17
Age at first parenthood ^a	.90 (.21) [4.38, p < .001]	-.02 (.02) [-1.21, p = .228]	.17

^a Main effects were qualified by a significant interaction depicted in Figure 1. R² was adjusted for the number of predictors in the model.