

Individual, Peer, and School Effects on Math Achievement and High School Dropout

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Abstract

This study examines different levels of influence on an individual. We wanted to determine whether individual, peers, or school factors influenced high school dropout. The current study used data from two waves, collected two years apart, from the Educational Longitudinal Study of 2002 (ELS, 2002). Analyses in this study were limited to participants who gave valid responses to the variables of interest. A total of 8,531 respondents were included in this study. Both individual and peer factors influenced high school dropout. Peer dropout had the strongest influence on high school dropout. Potential areas of prevention efforts that would aid in the deterrence of high school dropout are discussed.

Keywords: high school dropout, school engagement, peer dropout, school climate, prevention

INTRODUCTION

Over the last several decades, education has been the focus of policymakers and educators in the United States. In fact, President Obama has made a concerted effort to concentrate on education as part of his presidential agenda. He has set educational goals to boost achievement, prevent high school dropout, and encourage all students to pursue higher education. Given that the United States has one of the highest high school dropout rates of any industrialized nation in the world (National Center for Education Statistics, 2010), the President's attention to education seems warranted. Dropout rates in the United States are alarmingly high. A report conducted by the U.S. Department of Education's National Center for Education Statistics (2010) found that the overall national public school dropout rate was thirty percent.

The importance of staying in school is highlighted by the wide range of negative outcomes related to dropout. For example, it substantially limits an individual's career opportunities and lowers his or her earning potential. Dropouts are also more likely to be unemployed when compared to those with a high school degree (U.S. Department of Labor, 2006). In addition to the income disparity, research has indicated that individuals 25 years and older who drop out of high school are in worse health than those who graduated (Deaton, 2003; Freudenberg & Ruglis, 2007; Pleis & Lethbridge-Çejku, 2007). Even more troubling, a disproportionately higher percentage of the nation's prison and death row inmates are high school dropouts (U.S. Department of Justice, 2002).

Given these alarming statistics, our study intends to determine which factors may predict high school dropout. In particular, we acknowledge that various factors of differing proximity to an individual can influence high school dropout. Thus, we are interested in which factors (individual, peer, or school) are related to high school dropout. By knowing which factors are the most predictive of high school dropout, better prevention programming can be developed.

Individual Factors

An individual's beliefs and motivation may influence academic outcomes. For instance, in a large sample of children ranging in age from 12 to 16 years, Janosz and colleagues (2008) found that those individuals with the greatest risk for dropping out were those with the lowest levels of school engagement, measured via enjoyment and interest in school as well as willingness to learn. In a related, study, Alexander and colleagues (1997) also demonstrated the importance of school engagement, within a much younger sample. These researchers followed a large group of children from first grade through high school and indeed found school engagement in the first grade to be an important personal resource in the prediction of high school dropout. Other studies have illustrated the importance of personal goals and self-efficacy, or the perceived ability to perform academic tasks, in school performance among high school students (Zimmerman et al., 1992).

Peer Factors

Another important factor that may influence high school dropout is peer influence. In a longitudinal

study beginning with seventh graders, those individuals who eventually dropped out of school were more likely to affiliate with others also at risk for dropping out (Cairns et al., 1987). In a more recent study, Battin-Pearson et al. (2000) found evidence for a direct relationship between dropout before grade 10 and affiliation with antisocial peers.

Peers not only influence behavior but also attitudes towards school. The mechanism through which peers influence each other's attitudes towards school was assessed by a study of eighth grade students and their close friends, dissimilar attitudes among dyads converged after discussing school-related issues. After just three minutes of conversation, peers had the ability to alter another's opinion of academic-related issues such as the importance of completing schoolwork over engaging in a free time activity (Berndt et al., 1990).

School Factors

Lastly, it is believed that one's perceptions of school climate may have an important influence on school dropout. In comparing a group of individuals at-risk for high school dropout to those not at-risk, Kagan (1990) argued that the former may perceive a sense of alienation from their school, which essentially renders them unable to adequately perform their academic responsibilities. More recently, Lee and Breen (2007) conducted a qualitative study of high school dropouts and found that these individuals experienced exclusion from both teachers and students at school. Some described the appearance of their schools as "prisons, which consequently made the participants feel like prisoners" (p. 337). Clearly, negative perceptions of one's school climate can have harmful effects on students' academic performance and the decision to continue their education.

Current Study

This study examines different levels of influence on an individual. We wanted to determine whether individual, peers, or school factors influenced high school dropout. Given the results of previous research conducted on similar constructs (i.e., Battin-Pearson et al., 2000; Lee & Breen, 2007; Janosz et al., 2008), it was hypothesized that individual, peer, and school factors would all be significantly related to high school dropout. By focusing on these various conditions, we are able to assess the influence of different systems within a child's ecology. The individual is assessed by means of individual-based proximal constructs such as school enjoyment and the importance of getting good grades. One's associated peers' values and dropout rates are used to evaluate the influence of a peer context, and finally, school climate is used as an indicator of one's school context.

METHOD

The current study used data from two waves, collected two years apart, from the Educational Longitudinal Study of 2002 (ELS 2002). This dataset was designed to provide trend data about the transition out of high school (Ingels et al., 2004). The ELS 2002 data set is a nationally representative sample of adolescents from 752 public, Catholic, and private schools. The base year of data collection was in 2002 when all the participants were in the 10th grade, where 15,362 students completed a survey. The same sample was retested two years later in 2004. Efforts were made to obtain data from those students who had transferred schools, graduated early, or had dropped out. Analyses in this study were limited to participants who gave valid responses to the variables of interest. A total of 8,531 respondents were included in this study. Of our final sample, 53% was female and 47% was male. The majority of our sample was European American (68%), but the ethnic breakdown was representative of the national ethnic mix.

Measures

The predictor variables for our study were divided into three categories: individual factors, peer factors, and a school factor. We assessed two individual factors (school enjoyment and importance of grades), two peer factors (peer values and peer dropout), and one school factor (school climate). Our outcome variable was high school dropout. Predictor variables were assessed at Wave 1 only. High school dropout was assessed at both Wave 1 and Wave 2.

Individual Factors

School enjoyment was assessed by asking participants "how much do you like school?" **Importance of grades** was measured by asking participants "how important are good grades to you?"

PEER FACTORS

Peer values was measured by a five item scale that had good reliability ($\alpha = .84$). Participants were asked to rate how important, attending classes regularly, studying, getting good grades, finishing high school, and continuing their education past high school was to their close friends.

Peer dropout was assessed by asking participants, "altogether, how many of your close friends have dropped out of high school before graduating?"

SCHOOL FACTOR

School climate was assessed with a 14-item scale ($\alpha = .77$). Participants were asked to state how much they agreed or disagreed to various items. Some example items were, "students get along well with teachers," "there is real school spirit," and "I don't feel safe at this school."

OUTCOME VARIABLES

High school dropout was measured by asking participants if they have ever dropped out of school since the base year of data collection.

RESULTS

Our research question wanted to examine what predictors differentiated those who dropped out of high school versus those who did not. Dropout status was obtained at time 2 of data collection. A sequential logistic regression analysis was performed on dropout status as the outcome, first on the basis of math achievement at time 1 and family income, then after the addition of two individual factors (school enjoyment and importance of grades, followed by two peer factors (peer values and peer dropout), and then with the addition of a school factor (school climate). All these predictor variables were collected at time 1.

There was a good model fit on the basis of the two control demographic predictors alone, $X^2(2, 8531) = 290.45, p < .05$, indicating that the control variables as a set reliably distinguished between dropouts and non-dropouts. After the addition of the two individual factors, $X^2(2, 8531) = 89.30, p < .05$, the model was still a good fit. Comparison of log-likelihood ratio for models with and without the family and school predictors showed reliable improvement with the addition of the four predictors, $X^2(2, 7153) = 49.92, p < .05$. After the peer factors were added to the model, it was still significant, $X^2(2, 8531) = 49.92, p < .05$. Lastly, after school climate, the model was no longer a good fit, $X^2(1, 8531) = 2.69, n.s.$ The variance in offender status accounted for was small, with Cox and Snell R squared = .05 for the full model. Prediction success was good, with an overall success rate of 96%.

According to the regression coefficients in the full model, only school climate did not significantly predict dropout status (see Table 4). We found that higher math achievement ($B = -.07$) and higher family income ($B = -.11$) was related to dropout status. In addition, those participants who had lower levels of school enjoyment ($B = -.22$), lower emphasis placed on school grades ($B = -.38$), and those with peers who place a lower emphasis on school ($B = -.06$) were more likely to drop out of school. In addition, participants who had more peers who had dropped out were more likely to be dropouts themselves ($B = .53$). However, the odds ratio coefficients showed that peer dropout was the most influential on dropout status ($\text{Exp}(B) = 1.70$), a one unit change in peer dropout increased the likelihood of dropout.

DISCUSSION

The present study was interested in how individual factors (school enjoyment and importance of grades),

peer factors (peer values and peer dropout), and a school factor (school climate) influenced high school dropout. Both individual factors (school enjoyment and importance of grades) were negatively related to high school dropout. In addition, both peer factors (peer values and peer dropout) were significantly related to high school dropout. Lower peer value placed on school and higher peer dropout was related to high school dropout.

GENERAL CONCLUSION

It appears that both individual and peer factors are good predictors of high school dropout. In regards to individual factors, the importance that participants placed on grades was indicative of their level of emotional engagement. Emotional engagement refers to the extent to which children feel that they value and belong in school (Finn, 1989). Ladd and Dinella (2009) found that emotional school engagement was partially positively associated with children's school achievement. Although, research within the area of emotional engagement is slowly emerging, it is indicating that it may play a vital role in achievement outcomes in children (Ladd et al., 2000). The most robust predictor in our study of high school dropout was peer dropout. Much like previous studies have reported (Berndt et al., 1990; Cairns et al., 1989; Estell et al., 2002), specific peer affiliations have demonstrated to be associated with school dropout.

Finally, the lack of any significant effects attributed to school climate is also worth mentioning. A recent review of the literature found that positive school climate was associated with well being, deterrence of smoking habits, lessened problem behavior and academic achievement (Sellstrom & Bremberg, 2006). A primary reason for the lack of consensus between our investigation and previous findings is the variability and complexity in which school climate is conceptualized. Some investigations utilized teacher reports (Tubbs & Garner, 2008), changes in school policy (Sellström & Bremberg, 2006), parent and school faculty connectedness (Brookmeyer et al., 2006), and classroom size (Lubienski et al., 2008) among other variables. In contrast our investigation focused on adolescent reports of school climate. It could be that the effect of school climate is best captured by the active agents within the schools (i.e. teachers, administration, rules and regulations) and less by students' perceptions of school climate. Unfortunately, due to the restrictions of the data available, the use of additional indices in order to fully capture school climate was not possible.

LIMITATIONS AND FUTURE DIRECTIONS

Several important limitations of our study should be addressed. First, given an archived data set was utilized, we had some measurement limitations. For instance, as mentioned earlier, it was not possible to

obtain a more comprehensive measure of school climate. Additionally, the available data consisted of only two data collection points. Considering the complexity of the course of adolescent development, more data collection points would have been beneficial. Additional data collection points would have permitted a more complete view of the developmental trajectory of those adolescents who demonstrated poorer outcomes and whether at different times of development different systems were more influential than others.

Results demonstrate the importance of not only emphasizing the importance of personal factors that contribute to academic success, but also the formative effect of peers on school dropout. Therefore, efficacious prevention programs should acknowledge biological, psychological, and social factors and the interplay among these three. In doing so, successful primary and secondary prevention programs may be developed and focused on decreasing the rate of school dropout.

Specifically, primary prevention efforts should focus on promoting and establishing early a positive value system with respect to the importance of school and school completion within an entire student body. In doing so, self-views about the importance of school are positively affected and peer perceptions are also influenced. In this manner, both influencing factors that were observed in this investigation would be targeted in order to prevent school dropout. Another primary prevention effort should focus on perpetuating wise decision making with respect to peer affiliations. As this investigation and others have noted, peers exert a significant degree of influence on the decisions and choices that adolescents make. Specifically, research has demonstrated that individuals that were dropouts were usually affiliated with others who were also at risk for dropout. Therefore, an additional primary prevention effort should focus on teaching children to affiliate with peers with positive school outlooks in order to encourage positive outcomes.

The focus of this investigation was to examine the ecological system surrounding adolescents. Taken as a whole, this investigation supported previous literature and also highlighted the potentially stronger influence that peers have over self-views. By undertaking such an investigation, results identified potential areas of primary prevention efforts that would aid in the deterrence of school dropout.

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Table 1

Sequential Logistic Regression Analysis Predicting High School Dropout (N = 8,531)

Variable	B	S.E.	Exp(B)
Step 1			
Math Achievement Time 1	-.09	.01	.92*
Family Income	-.10	.02	.90*
Step 2			
Math Achievement Time 1	-.08	.01	.92*
Family Income	-.12	.02	.89*
School Enjoyment	-.37	.11	.69*
Importance of Grade	-.49	.08	.61*
Step 3			
Math Achievement Time 1	-.08	.01	.93*
Family Income	-.10	.02	.90*
School Enjoyment	-.26	.11	.77*
Importance of Grades	-.38	.08	.69*
Peer Values	-.07	.03	.93*
Peer Dropout	.54	.09	1.72*
Step 4			
Math Achievement Time 1	-.07	.01	.93*
Family Income	-.11	.02	.90*
School Enjoyment	-.22	.11	.80*
Importance of Grades	-.38	.08	.69*
Peer Values	-.06	.03	.94*
Peer Dropout	.53	.09	1.70*
School Climate	-.02	.01	.98