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## **Factors Influencing GED and Diploma Attainment of High School Dropouts**

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### **Abstract**

This study examined correlates of degree attainment in high school dropouts. Participants were high school dropouts of Mexican American or non-Latino white descent who had no degree, a high school degree, or a GED certificate. This study was unique in that it accounted for sample bias of missing data through the use of multiple imputation, it considered students who had dropped out as early as 7th grade, and it was able to include variables found significant in previous research on returning dropouts. Logistic regression analyses identified a parsimonious set of factors which distinguished dropouts who held degrees (diploma or GED) from those who did not. Similar analyses were performed to distinguish participants who had attained diplomas from those who had attained GEDs. It was estimated that 59.2% of dropouts return to obtain high school credentials. School capability, age at dropout, and socio-economic status significantly predicted degree attainment. Presence of children, higher school capability and socio-economic status were associated with GED attainment, while later grade at dropout was

associated with diploma attainment. These relationships did not vary by ethnicity, although degree attainment was less likely for Mexican American dropouts. The study concludes that dropping out is not the end of a student's education, and more research should be directed toward returning dropouts. Further, the focus of such research should be expanded to include a more positive and broader range of correlates.

## **Introduction**

Dropping out of high school is a well-documented social problem, and often presents daunting circumstances for adolescents. Dropping out is often associated with delinquency, substance use, and low school achievement (Chavez, Oetting, & Swaim, 1994; Ekstrom, Goertz, Pollack, & Rock, 1986; Elliott, Huizinga, & Ageton, 1985). Further, people without high school degrees often experience lower wages and higher unemployment, and more dependency on welfare and other social services (Catterall, 1987; Rumberger, 1987).

Research also shows that dropping out of high school does not have to be, and is not necessarily, a permanent condition. Estimates of the percentage of dropouts who eventually attain either high school diplomas or General Educational Development certifications (GEDs) have been as high as 44% (Kolstad & Kaufman, 1989). Thus, study of the correlates of degree attainment in dropouts could be an effective tool in reducing the dropout rate, but unfortunately, few studies have been conducted in this area. Balancing the well-developed research on dropout correlates with a research base of return correlates not only provides information on why dropouts gain degrees, but also provides a different perspective from which to augment dropout prevention efforts.

## **Dropouts Who Return to School Settings**

Studies of returning dropouts have examined either dropouts who return to school (Borus & Carpenter, 1983; Chuang, 1997) or dropouts who obtain high school degrees or GEDs (Kaufman, 1988; Kolstad & Owings, 1986; Kolstad & Kaufman, 1989). Studies of this type have compared factors present in returning dropouts to a “typical dropout profile”. From the vast amount of dropout literature, these studies have been able to identify factors associated with dropping out and have analyzed variables identified in this profile, hypothesizing that those dropouts who do not fit the profile are more likely to return to high school.

This body of research is not yet sufficiently developed to identify a complete picture of why dropouts return to school settings, although some factors appear to be fairly robust. For instance, achievement test scores were found in all studies reviewed here (except Borus & Carpenter (1983)) to be positively related to return for more education. Early dropouts are less likely to return, as shown by all the studies except Kaufman (1988), which did not include this variable.

Nonetheless, the sparsity of studies on returning dropouts have left many questions as to other variables affecting return. Ethnic effects are an inconsistent mix in these studies, and other factors, such as socio-economic status, are significant in some studies and not in others. Further, questions remain as to the effects of sampling on significant relationships identified – none of these studies were able to consider dropouts who left school before 10th grade, and none were able to estimate effects due to inability to

longitudinally follow each participant in the sample.

Previous research has laid the foundation for knowledge regarding degree attainment in high school dropouts. However, such research should be extended and clarified. The next logical step is a study which can pull together significant factors found in previous studies and present estimates which infer to the entire population of dropouts. The present study will address these issues.

### **The Present Study**

The present study examines Mexican American and non-Latino white dropouts who have gained high school diplomas, GEDs, or neither, identifying factors which are associated with attainment of high school credentials. In doing so, this study will address several important problems left unsolved by previous studies on returning dropouts.

First, the present study accounts for bias introduced by dropouts who did not respond to the second wave of data collection. Longitudinal dropout studies naturally suffer from an inability to resurvey each and every dropout. However, each of the reviewed studies conducted analyses on only those dropouts who were successfully followed up. Such treatment of missing dropouts assumes that the dropouts who remained in the study are similar to the ones who did not, an assumption which leaves the study vulnerable to sample bias. The present study, through the use of multiple imputation, accounts for bias caused by missing data.

Second, previous studies were limited to participants who dropped out in tenth grade or later. Although against the law in many states, the truth is that many students leave school before age sixteen. The present study is able to consider students who dropped out earlier than tenth grade – some as early as seventh grade. Inclusion of these students, along with the estimation of missing data described above enables the present study to estimate return correlates for the full dropout population.

Third is the breadth of variables studied in this work. Previous studies independently drew upon factors known to be associated with dropping out and did not purposely examine variables shown to be significant in previous studies of returning dropouts. Therefore, it is not clear whether identified significances are due to omission of other important factors. To truly assess the significance of factors associated with returning dropouts, these factors should be considered in tandem. The present study addresses this need, as all variables considered were chosen based on their significance in previous return research.

Fourth, only Kolstad and Kaufman (1989) considered diploma attainment and GED attainment separately. The present study will also discern differences between students with no degree, students with diplomas, and students with GEDs.

### **Method**

The data for this study were gathered as part of a longitudinal project designed to study substance use and other correlates of high school dropout among Mexican American and non-Latino white dropouts. The sample for this study consisted of Mexican American and non-Latino white adolescent dropouts from three communities in the southwestern United States: a city with 400,000 people, a mid-sized town with 90,000 people, and a small town with 30,000 people. Dropouts were defined as students in grades 7 – 12 who had not attended school for at least 30 days, had not transferred to another school, were not being home-schooled, and had not contacted the school system about re-admission. This definition is more stringent than that recommended by Morrow

(1986), whose standard definition of a dropout calls for a period of unexcused absence from school of two weeks or more. The adoption of a period of absence of one month or longer provides a sufficient period of time to ensure that youth are, in fact, high school dropouts.

Potential participants were adolescents from dropout lists provided by school personnel in the aforementioned communities. Once they were identified and contacted, refusal rates were low (4 – 6%), so the resulting sample is a random sample from the population of dropouts from these three communities. Results from this study will be inferred to the population of Mexican American and non-Latino white dropouts in the United States. Although the sampling frame is limited geographically, previous results published from this data set have been comparable to other studies of high school dropouts (e.g., Chavez, Oetting & Swaim, 1994; Chavez, Deffenbacher, & Wayman, 1996). Therefore, inferring to this population from the present sample is appropriate.

## Measures

All survey items used in this study were embedded in a larger survey which took approximately one and a half hours to complete. Nearly all surveys were completed in English, with less than 1% completed in Spanish.

*Dependent variable.* Graduation from high school, possession of a GED, or no degree attainment were based on self-report measures.

*Demographic information.* Ethnicity was determined from school records and was double-checked by field workers with the participant. Gender and socio-economic status (SES) were based on self-reports from a demographic section of the initial survey. SES was a composite measure of the following items: education of mother, education of father (possible responses of 6<sup>th</sup> – 12<sup>th</sup> grade, 1 – 4 years of college, or 5 or more years of college were coded as 6 – 17), “do your parents have good jobs” (possible responses “they do not work”, “poor”, “not too good”, “good”, or “very good”), “what is your parents' income” (possible responses were “very low”, “low”, “average”, “high”, or “very high”) and “does your family have enough money to buy the things you want” (possible responses “almost never”, “some of the time”, “yes, most of the time”, or “yes, all of the time”). Since these items were not uniform in range of possible answers, responses were standardized before being summed to create the composite. The Cronbach alpha reliability of this scale was .65.

*Independent variables.* Achievement test scores, age at dropout, grade at dropout, and grade point average were obtained from high school records. Achievement test scores were used as a proxy for ability (or “school capability”), which was measured by averaging mathematics, reading and vocabulary scores (Kaufman, 1988) for each participant. Data were collected on achievement tests administered at many times during the participant's school career, but due to inconsistent record keeping, students transferring from districts using different procedures, etc., neither the time frame nor the quantity of test scores was uniform across participants. Thus, the highest available mathematics, reading and vocabulary scores were used. This not only provided consistency, but reduced noise in the test scores as measures of school capability – few students would attain a test score which was a higher representation of their true capability.

Whether the participant had or was expecting children was based on self-reports from the initial survey, as was teacher caring. To assess a participant's feeling of teacher caring, an item asking “how much did teachers care about you during this last year” was included on the survey, with possible responses of “not at all”, “not much”, “some”, and

“a lot”. Marriage was not used in this analysis because only three of the participants reported being married at the time of dropout.

## **Procedure**

For the first wave of data collection, dropouts were chosen randomly from monthly lists of dropouts, provided by the school district. Field workers, employed by the district and fluent in English and Spanish, first contacted potential participants. After the project was described, potential participants were asked if they wished to be involved. If they expressed interest and were over 18, they completed consent forms. If they were under 18, parents were contacted, the project was fully explained, and written parental consent was obtained. Those who refused were replaced in the sampling frame by another randomly sampled dropout.

Following informed consent, arrangements were then made for an individual administration of the survey. The survey was completed at school or at another public building such as a library, and participants were given as much time as needed to complete the survey. The survey administrator gave participants the survey, answered general questions and helped participants with reading problems, but did not see participant responses. When the survey was complete, the participant put it in a large envelope and sealed it personally. Based on the participant's choice, the survey was mailed to the research office either by the survey administrator or was taken immediately to a mailbox by the participant and survey administrator. These steps assured confidentiality; at no time was an unsealed, completed survey out of the participant's sight. Participants received \$25 for completion of the survey.

Accuracy and reliability of data were assured as surveys were subjected to 40 checks for inconsistency or exaggeration (e.g., endorsing a fake drug, claiming daily use of three or four drugs). Only 2% of initial surveys failed either review and were not replaced.

Four years after the first assessment, follow-up of dropouts 18 or older began, with an average time to completion of the follow-up survey of 4.29 years. Follow-up contact was first attempted through the address given at the first assessment. If this failed, staff contacted three people (e.g., parents, relatives, good friends) whom the participant indicated at the time of informed consent would always know where the participant lived. If these efforts failed, public records such as phone books, motor vehicle records, etc., were checked to locate an address. A total of 519 (49%) of the 1071 original participants were successfully followed up. Once the individual was contacted and gave his/her consent, survey administration was parallel to the first administration.

## **Data Analysis**

*Multiple imputation.* Missing data presented a potential problem in this project, since not all participants had responded to the second wave of data collection. Typically, data such as these are analyzed by using only the cases with fully completed responses in both waves on all relevant variables, discarding incomplete responses. Treating the data in this fashion not only results in a reduction of sample size, but more importantly, implicitly assumes the group of participants who answered all questions to be similar to the group who did not. Should this assumption not hold true, sample bias results. Specific to the present work, analyzing only participants who were followed up presumes these dropouts to have similar characteristics to the dropouts who were not

successfully located or who refused to participate. Further, inclusion of only those participants who answered all items would result in a substantially reduced sample size. To address issues of bias and power, multiple imputation was used to account for the missing data in this study (Rubin, 1987; Schafer, 1997). Multiple imputation has been shown to be an appropriate and robust method for estimating missing data in social science settings (Graham, Hofer, Donaldson, MacKinnon, & Schafer, 1997).

In multiple imputation, missing values for any variable are predicted using existing values from other variables. The predicted values, called “imputes”, are substituted for the missing values, resulting in a full data set called an “imputed data set”. This process is performed multiple times; results from the imputed data sets are combined for the analysis.

Multiple imputation accounts for missing data by restoring not only the natural variability in the missing data, but also by incorporating the uncertainty caused by estimating missing data. Maintaining the original variability of the missing data is done by creating values which are modeled as a function of variables correlated with the missing data and with the causes of "missingness." Random errors from a normal distribution are added to these predicted values to produce the imputed values. Imputed values produced from an imputation model are not intended to be “guesses” as to what a particular missing value might be; rather, this modeling is intended to create an imputed data set which maintains the overall variability in the population while preserving relationships with other variables.

To incorporate the uncertainty associated with estimating missing data,  $K$  multiple models are drawn from the distribution of plausible models for the population. These models are used to produce  $K$  imputed data sets. Parameter estimates are then obtained by combining these  $K$  imputed data sets.

The parameter of interest in the current study is the log odds, denoted by  $\theta$  in the formulas below. Parameter estimates are computed by averaging the point estimates,  $\hat{\theta}_k$ , obtained from the imputed data sets thusly:

$$\bar{\theta} = \sum \hat{\theta}_k / K$$

The total variance of  $\bar{\theta}$  is given by the formula

$$T = W' + (1 + K^{-1})B,$$

where  $W' = \sum W_k / K$ , the average of the  $K$  imputed variances, and  $B = \sum (\hat{\theta}_k - \bar{\theta})^2 / (K - 1)$ , the between-imputation variance of the estimates of  $\theta$ .

Thus, the total variance of  $\bar{\theta}$  is made up of a within-imputation component,  $W'$ , which estimates the natural variability in the data, and a between-imputation component,  $B$ , which estimates uncertainty caused by estimating missing data (Rubin, 1987).

Confidence intervals (95%) for  $\theta$  are given by the usual formula,

$$\bar{\theta} \pm t_{.025, df}(T),$$

with confidence intervals for odds ratios obtained by exponentiating the bounds of the confidence intervals for theta. Degrees of freedom for t-statistics are given by the formula

$$df = (K - 1)[1 + KW'(K + 1)^{-1} B^{-1}]^2$$

Multiple imputation and combination of parameter estimates was performed using the NORM for Windows software package (Schafer, 1999).

Multiple imputation is an appropriate method for treating missing data if correlates of the dependent variable are considered and if the causes of the missing data are measured and available for analysis. To this end, it is important the imputation model is carefully chosen, ensuring that biases introduced by "missingness" are eliminated. The variables which were included in the logistic regression models were necessarily included in the imputation modeling. Also utilized were items correlated with "missingness": location (city or mid-sized community), substance involvement, whether the participant had ever been suspended from school, whether the participant moved into the district from another district, current living arrangements, and whether the participant's family rented or owned their house.

*Logistic regression modeling.* The research questions in the present study were answered through logistic regression analysis, defining two separate dichotomies as dependent variables – degree/no degree, and diploma/GED. Thus, one set of logistic regression models was estimated to ascertain factors which significantly predict attainment of a high school education (either a diploma or GED) or attainment of nothing. Then, the sample was restricted to participants who have attained a high school education, and models were estimated which distinguish between possession of a diploma versus possession of a GED.

Model selection was performed using a hierarchical backward selection process. In each model, all main effects were examined, along with two-way interactions involving ethnicity, gender and SES (Other interactions were too numerous to examine in one analysis, and no theoretical base was available to justify inclusion or exclusion of particular interactions. The demographic variables ethnicity, gender and SES are the most commonly included variables in return research and are therefore the most pertinent to include in interactions). From this “full” model, interactions were examined separately for significance at the .05 level, using the Wald statistic. The interaction with the smallest Wald statistic was eliminated from the model, then the model was re-estimated with the remaining main effects and interactions. This process was repeated until only main effects and significant interactions remained, if any interactions were significant. If interactions were significant, the main effects supporting these interactions were necessarily retained in the model. The process then was performed similarly for main effects not involved in significant interactions. This process was repeated until the remaining model consisted only of significant factors. These factors were then retained as the most parsimonious set of factors which described the outcome.

For each model, slope estimates ( $\beta$ 's) and standard deviations of slope estimates were obtained by performing a separate logistic regression analysis on each imputed data set. These slope estimates and standard errors were then combined as described in “Multiple imputation” above, producing one set of slope estimates and standard deviations, similar in appearance to what would result from a logistic regression analysis which did not use multiple imputation. Wald statistics were computed and significance was assessed using these combined estimates.

## **Results**

### **Sample Demographics**



Participants were 1,071 adolescents who quit high school at some point during their schooling. Because of budget constraints, the small town was eliminated from the follow-up sample. Of these participants, 204 (19%) were non-Latino white males, 163 (15%) were non-Latino white females, 400 (37%) were Mexican American males, and 304 (28%) were Mexican American females. The urban location contributed 795 (74%) participants, while 276 (26%) were from the mid-sized location. The age at dropout of these participants ranged from 13 to 21, with 6 participants (1%) having dropped out in 7<sup>th</sup> grade, 24 (2%) in 8<sup>th</sup> grade, 251 (23%) in 9<sup>th</sup> grade, 314 (29%) in 10<sup>th</sup> grade, 299 (28%) in 11<sup>th</sup> grade, and 177 (17%) in 12<sup>th</sup> grade. Note that a full 26% of the participants in the present study dropped out at 9<sup>th</sup> grade or earlier, a group previously not included in studies of returning dropouts.

Follow-up surveys were completed by 519 (49%) of the participants. Of these, 508 (47%) responded to the items regarding high school completion. There were 217 (43%) with no high school credentials, 175 (34%) with GED certificates, and 116 (23%) with a high school diploma. Table 1 gives breakdowns of degree attainment for ethnicity and gender.

**Table 1**  
**Description of Degree Attainment, for Ethnicity and Gender**

	<b>No Degree</b>	<b>GED</b>	<b>Diploma</b>
<b>Male</b>	114 (43%)	97 (36%)	56 (21%)
<b>Female</b>	103 (43%)	78 (32%)	60 (25%)
<b>Non-Latino White</b>	55 (34%)	34 (42%)	39 (24%)
<b>Mexican American</b>	162 (47%)	107 (31%)	77 (22%)

Table 2 gives means and standard deviations for the other variables considered in this study. The categorical variable (children) is included with a percent response to one category. The last column of Table 2 gives the percent of missing data for each independent variable considered in the present study. Possession of high school credentials was the only variable from the second wave of data utilized in this study. Accordingly, this variable has the greatest proportion of missing values. The variable measuring teacher caring was not included in the final two years of data collection, so it also has a high percentage of missing responses. Because of incomplete records, achievement tests were not always available for these students, resulting in the high percentage of missing data for this variable. Finally, since the socio-economic status measure included questions about both parents, many students who did not have two parents left blank the item inquiring about the absent parent. Multiple imputation was used to account for missing data in these and other variables.

**Table 2**  
**Description of Independent Variables**

<b>Continuous Variables</b>
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Table 3 gives means or percentages for each variable used in the logistic regression models, broken down by respondents and non-respondents (participants with and without follow-up data). Using statistical significance as a guide ( $\alpha = .10$ ), Mexican American participants and female participants were overrepresented in the follow-up sample. Mexican American participants comprised 68.6% of the respondents, as opposed to 63.0% of the nonrespondents, and 47.0% of the respondents were female, as opposed to 40.4% of the nonrespondents. Respondents scored slightly higher on achievement tests and were slightly younger.

**Table 3**  
**Means and Percentages, by Respondents and Non-respondents**

<b>Factor</b>	<b>Respondent</b>	<b>Non-respondent</b>	<b>p</b>
Ethnicity	68.6% MA	63.0% MA	0.03
Gender	47.0% female	40.4% female	0.06
SES	0.04	0.07	0.48
Test scores	55.84	52.35	0.03
Age at dropout	16.54	16.67	0.09
Grade at dropout	10.30	10.32	0.79
GPA	1.23	1.20	0.54
Have or expecting children	18.2% yes	17.1% yes	0.64
Teacher caring	2.70	2.73	0.69

### **Distribution of Degree Attainment**

Combining estimates of degree attainment across the twenty imputed data sets estimated that 40.8% of high school dropouts had no degree, 35.0% had a GED certificate, and 24.2% had a high school diploma.

### **Final Logistic Regression Models**

Since the variables of interest were dichotomous (degree/no and diploma/GED), logistic regression was an appropriate analysis. For each logistic regression analysis in this section, predicted odds ratios are presented, and each estimate of an odds ratio is accompanied by a 95% confidence interval.

All estimates were obtained using multiple imputation (see Method). Typically, no more than ten data sets are needed for multiple imputation. However, preliminary examination of results using 10 imputed data sets indicated a greater amount of imputed data was needed to ensure stability of the estimates and to guarantee that variability due to imputation would be properly estimated. This is analogous to the practice of drawing

a large sample to ensure that results will properly infer to the population. Therefore, 20 imputed data sets were used.

Tables 4 and 5 give the estimated odds ratios with 95% confidence intervals for significant factors in each model. Estimates of odds ratios are given in terms of the increase in odds for one unit change of the independent variable.

*Degree vs. no degree.* As described in Table 4, socio-economic status, test scores and age at dropout were the only variables shown to be significantly related to returning for a degree. Socio-economic status was positively associated with degree attainment, with a one point increase on the SES scale associated with an increase in the odds of returning of 1.34. A participant's test scores were positively related to degree attainment. A one point increase in average test score increased the odds of gaining a high school degree by a factor of 1.02, while a 10 point increase in test scores increased the odds of gaining a high school degree by a factor of 1.21 ( $1.21 = 1.02^{10}$ ). Participants who dropped out as older adolescents were more likely to gain some form of high school credentials. For every year of age, the odds a participant would return for a degree was increased by 1.28. Thus, a participant who dropped out at age 18 was 2.12 times more likely to get a degree than a participant who dropped out at age 15 ( $2.12 = 1.28^3$ ).

**Table 4**  
**Final Model Describing Degree Attainment:**  
**Variables From Previous Dropout Literature**

Factor	Odds Ratio	95% Conf. Interval (Lower Bound, Upper Bound)	$\beta$	se( $\beta$ )	t	df	p
SES	1.34	1.01, 1.79	0.29	0.145	2.03	91	0.045
Test scores	1.02	1.01, 1.03	0.02	0.005	4.07	50	0.000
Age at dropout	1.28	1.12, 1.47	0.25	0.069	3.57	117	0.001
Intercept	0.01	0.00, 0.10	-4.68	1.199	-3.90	104	0.000

*Note.* Dependent variable is degree/no degree.

*High school diploma vs. GED.* As described in Table 5, socio-economic status, test scores, children and grade at dropout significantly predicted the choice between a diploma or GED. Socio-economic status was positively associated with GED attainment. A one-point increase in the SES score was associated with an increase of 1.47 in the odds of GED attainment (an increase of .68 in the odds of diploma attainment). Higher test scores were also associated with GED attainment. Similar to the previous model, a one point increase in test scores was associated with an increase in the odds of GED attainment by a factor of 1.02, (an increase of .98 in the odds of diploma attainment) while a 10-point increase raised these odds by a factor of about 1.21. Having or expecting a child at the time of dropout was also associated with GED attainment. Degree holders having or expecting children were 1.92 times as likely to have a GED than a diploma (.52 times as likely to have a diploma than a GED). The amount of school a participant

completed was a strong predictor of the type of degree held. A participant was approximately twice as likely to have a diploma for each increase in grade at dropout. To illustrate, someone who dropped out in 11<sup>th</sup> grade was estimated to be 7.46 times more likely to have a diploma than someone who dropped out in 8<sup>th</sup> grade.

**Table 5**  
**Final Model Describing Choice of Degree:**  
**Variables From Previous Dropout Literature**

Factor	Odds Ratio	95% Conf. Interval (Lower Bound, Upper Bound)	$\beta$	se( $\beta$ )	t	df	p
SES	0.68	0.47, 0.99	-0.38	0.188	-2.01	93	0.047
Test scores	0.98	0.97, 0.99	-0.02	0.006	-3.11	68	0.003
Grade at dropout	1.95	1.52, 2.51	0.67	0.126	5.31	79	0.000
Children	0.52	0.28, 0.95	-0.65	0.305	-2.14	111	0.035
Intercept	0.00	0.00, 0.03	-6.26	1.296	-4.83	79	0.000

*Note.* Dependent variable is diploma/GED.

*Note.* Children is Y/N.

## Discussion

The present study extended and clarified previous work regarding degree attainment in high school dropouts. Previous studies had provided information on returning dropouts, but had been unable to include students who dropped out before 10<sup>th</sup> grade and students who were unavailable for subsequent followup. The present study was able to estimate relationships within the entire dropout population by including students who dropped out before 10<sup>th</sup> grade, and by using multiple imputation to estimate effects of students not included in followup data collection. Also, although previous studies had identified factors significantly associated with returning, each study contained omissions of factors deemed important by other studies. The present study was able to consider a broader view of the dropout's situation by collecting factors found significant in other studies, thus answering questions regarding the significance of these factors in the presence of other important factors. Finally, the present study compared dropouts without degrees to those with either a diploma or GED, performed in return studies only by Kolstad and Kaufman (1989).

Two separate logistic regression models were estimated, one discerning between dropouts with some sort of degree and those with no degree, the other discerning between dropouts with diplomas and those with GEDs. Results indicated that dropouts of higher socio-economic status, higher achievement test scores and greater age at dropout were more likely to attain some sort of degree. Analyses further showed that

dropouts of higher socio-economic status, with higher test scores, and who dropped out having or expecting children were more likely to have GED certificates than high school diplomas, while those who dropped out in later grades were more likely to have diplomas than GEDs. Commonly identified factors such as ethnicity and gender were not significantly associated with either dependent measure.

### **How Many Gain Degrees?**

One of the most striking findings of the present study is perhaps the simplest, that an estimated 59.2% of the high school dropouts from this study have returned to gain either a high school diploma or GED certificate. This result supports the assertions of previous studies that dropping out does not represent the end of a student's education. Further, it gives evidence of an increasing trend in degree attainment over the last ten years, as the estimate is 15.2% higher than the 44% estimate given by Kolstad and Kaufman (1989). The difference is even more noteworthy when one considers that the present study includes participants who dropped out between seventh and twelfth grades, while the Kolstad and Kaufman study only included participants who dropped out in the tenth through twelfth grades. Grade has been shown in both studies to be positively associated with degree attainment, so the Kolstad and Kaufman estimates should be biased upward.

Also important to note from this finding is the role played by multiple imputation in reducing the bias introduced by participants who did not respond to the second wave of data collection. It has been commonly assumed (e.g., Kolstad, 1988) that dropouts who did not respond to subsequent waves of longitudinal data were "hard core" dropouts who were less likely to hold high school credentials. Such assumptions are admittedly conjecture, since degree estimates for this population were unavailable. The present study, however, estimated that dropouts who do not participate in subsequent data collection actually are slightly more likely to have some form of high school credential. Degrees were held by 57.2% of the participants who participated in the follow-up wave; estimates using multiple imputation indicated that 59.2% of the total sample holds high school credentials.

### **Degree vs. no degree**

The results from this study indicate that generally, dropouts who gain some form of high school degree are of higher socio-economic status (SES), possess higher school capability (as measured by test scores), and are older when they drop out. The age and capability findings are consistent with previous literature and the fact that the present study proves these findings while accounting for earlier dropouts, participant nonresponse, and a wider breadth of factors suggests that these factors are robust. The SES finding clarifies some confusion in previous literature as to the significance of this factor. These findings stress the importance of targeting students of low SES and low capability, in addition to continued emphasis on early dropout prevention.

Possibly the greatest contribution of the model describing degree attainment is in the clarification of factors which are not significantly associated with returning for a degree. For instance, previous research had identified interactions involving ethnicity and SES, test scores and SES, gender and ethnicity, and gender and grade at dropout, but these interactions were not presented controlling for other important variables (Kolstad and Kaufman (1989); Kolstad and Owings (1986)). Results from the present study

indicate that although significantly associated with degree attainment, grade at dropout and SES operate independently of other factors. Further, ethnicity and gender are not significant at all when controlling for other factors.

The fact that ethnicity was not found to be significant in these models should not be construed as a statement that ethnicity is unrelated to degree attainment. The univariate relationship between degree attainment and ethnicity indicated that non-Latino white dropouts are 1.73 times more likely to return to earn some form of high school degree (95% CI: 1.23, 2.43). However, the multivariate model indicated that SES, achievement test scores and age at dropout sufficiently explain the ethnic differences involved in the univariate effect. Further inspection of these results reveals that Mexican American dropouts display more risk in these factors than do non-Latino white dropouts. The test scores of Mexican American dropouts were on average 15.56 percentile points less than non-Latino white dropouts (95% CI: 12.08, 19.03), Mexican American dropouts were 2 months younger than non-Latino white dropouts (95% CI: .08, 3.85), and Mexican American dropouts averaged .56 of a standard deviation less on the SES scale than non-Latino white dropouts (95% CI: .48, .64). That these factors account for the univariate effect helps clarify some contradictory findings from previous literature on returning dropouts – if a study includes sufficient covariates, ethnic effects should be rendered insignificant.

### **Diploma vs. GED**

Dropouts who chose a GED over a high school diploma were typically of higher socio-economic status (SES), possessed greater levels of school capability and were more likely to have children. Dropouts who chose to get a diploma rather than a GED typically dropped out at a later grade.

The grade in which a student drops out of high school is a strong predictor of which degree (s)he will attain. This is not unexpected – for a student who dropped out early in her/his high school career, finishing a high school diploma takes more time and effort than would attaining a GED. The magnitude of the grade/attainment relationship is large, more so than found by Kolstad and Kaufman (1989). This is likely due to the inclusion of younger dropouts in the present study.

Students of higher SES and of higher school capability were more likely to get a GED than a high school diploma. These results suggest that many students have the resources and capability needed to complete high school, but for some reason, school does not provide them with the fit they are looking for. It is possible that these students have specific aims in dropping out – given their higher social standing and ability, these students may have access to better jobs, schooling or training that require quick attainment of a high school credential. Or, these students may not have a specific goal in mind, but feel they have the ability to succeed at something, and that school does not afford them the environment to succeed as they want to. Also, it is possible these students dropped out with no future plans, then as they decided to return, they had better access to GED programs, GED information, etc., and just saw a GED as a quicker and easier way to get a degree.

Kolstad and Kaufman (1989) showed that participants who were parents were more likely to return for some kind of degree, while Kolstad (1988) showed these students more likely to stay out of school. Results from the present study indicate that children don't affect overall degree attainment, but for those students who did attain a degree, those who had or were expecting children at the time of dropout were more likely to get a GED than a diploma. This is a reasonable finding, as many of these

students would not be able to put forth the time required to finish a high school diploma. Also interesting is that there is no interaction with this factor and gender, indicating that the effect is the same for males as it is for females. Many studies (e.g., Rumberger, 1983; Wehlage & Rutter, 1986) suggest that females are more likely to drop out for child-related reasons. However, the return process is not that way.

## **Implications**

The results and conclusions presented here have implications for education, and more specifically, dropout prevention and retrieval. Because of the breadth of factors considered, and the consideration of dropouts previously left out, this study has been able to clarify questions arising from previous research. In doing so, the present study has identified a group of factors which together appear to be most proximal in effecting degree attainment.

This study has joined previous research in affirming that dropping out is not the end of a student's education. Degree attainment in dropouts is a common occurrence, and results from the present study suggest it is more common now than ever. Despite these findings, the research devoted to dropping out of high school continues to weigh heavily toward studying causes and correlates of dropping out. It is imperative that research institutions and school systems greatly increase efforts to help dropouts return for degrees if in fact, they do drop out. In some schools, this may be an untapped resource in the fight to reduce dropout rates.

The simplicity of the final models should be helpful for practitioners. Based on factors considered here, degree attainment, whether by way of diploma or GED, can be explained in terms of a few important factors. Further, the decision to return for a degree operates similarly regardless of gender or ethnicity (Mexican American or non-Latino white). Therefore, the models estimated here suggest that dropout retrieval programs (and some facets of dropout prevention programs) can possibly be simplified, streamlined, and ultimately, less expensive.

Important for practitioners also is the finding that of dropouts who return for degrees, GED-holders on average have higher school capability. As described above, the reasons why these factors are significant are not evident. It is clear that these students have capability to do school work, and seemingly, school is not a good fit for them. However, it seems that these students are walking a dangerous line in opting for a GED instead of a diploma, since attainment of a high school diploma is associated with more labor and economic success than is attainment of a GED certificate (Cameron & Heckman, 1993; Passmore, 1987). This is not to say that for all students, a high school degree is a better choice than a GED, but research suggests that a high school degree is better for most students unless there is a demonstrated situation where the GED would be better. Therefore, schools should persevere to provide opportunities which could channel these students toward diploma attainment, an endeavor which will likely be more positive for the student in the long run.

Although there are positives associated with the simplicity of these models, the specific factors identified are also discouraging for practitioners attempting to change the life trajectories of these dropouts. Starkly obvious from the models presented here is the fact that degree attainment in dropouts is a function of factors in a student's life which are very difficult for schools to change. Despite the fact that this study has clarified many issues regarding returning dropouts, it is now clear that different frameworks should be explored in order to identify factors which are more easily changed by practitioners.

Educational research can inform decisions on where to turn next. Finn and Rock (1997) have argued that the research on academic success has placed undue focus on relatively constant characteristics of the individual, and that more focus should be placed on factors which can be changed by educators. Augmenting this notion is the assertion by Alva (1991), that subjective student appraisals are very important in the evaluation of the student's educational experience. School structure could play a role in helping dropouts return, in fact, many researchers (e.g., Finn & Rock, 1997; Wehlage & Rutter, 1986) believe that the secret to educating at-risk students lies in the alteration of factors related to school. Judicious alteration of school factors could serve to aid in positive alteration of individual factors.

Thus, there is room for future research on returning dropouts to expand into a less restrictive framework. Attention should be turned to more positive correlates, ones associated with academic success rather than failure, aiming to identify areas where both the school and student can more easily exact positive change. Candidates for such expansion include the roles of attitudinal factors, which are more malleable and more internal to the student, factors pertaining to peers and family, factors pertaining to schools, such as teacher attitudes and communication, and school opportunities and definitions of success.

## **Conclusion**

The present study has extended previous research on dropouts who gain degrees. This study has found, as have other studies, that high school dropouts frequently return to gain degrees of some form, a finding which underscores the need for more research in this area. This study has also provided clarification of correlates of degree attainment. In doing so, it has presented a neat, concise package of factors which influence returning for a degree. Although concise, this group of factors also presents a problem, in that they are factors which are difficult to change in order to create a more positive situation for a dropout. Hence, this study has illuminated the need for additional studies on returning dropouts which can build upon knowledge presented here. Such studies should endeavor to consider more positive correlates of returning, ones which can more easily be effected by schools and practitioners.

## **Notes**

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## **References**

Alva, S.A. (1991). Academic invulnerability among Mexican-American students: The importance of protective resources and appraisals. *Hispanic Journal of Behavioral Sciences*, 13 (1), 18-34.

Borus, M.E. & Carpenter, S.A. (1983). A note on the return of dropouts to high school.



*Youth and Society*, 14, 501-507.

Cameron, S.V., & Heckman, J.J. (1993). The nonequivalence of high school equivalents. *Journal of Labor Economics*, 11 (1), 1-47.

Catterall, J.S. (1987). On the social costs of dropping out of school. *High School Journal*, 71, 19-30.

Chavez, E.L., Deffenbacher, J.L., & Wayman, J.C. (1996). A longitudinal study of drug involvement in Mexican American and white non-Hispanic high school dropouts, academically at risk students and control students. *Free Inquiry in Creative Sociology*, 24, 185-193.

Chavez, E.L., Oetting, E.R., & Swaim, R.C. (1994). Dropout and delinquency: Mexican-American and Caucasian non-Hispanic youth. *Journal of Clinical Child Psychology*, 23 (1), 47-55.

Chuang, H. L. (1997). High school youths' dropout and re-enrollment behavior. *Economics of Education Review*, 16 (2), 171-186.

Ekstrom, R.B., Goertz, M.E., Pollack, J.M., & Rock, D.A. (1986). Who drops out and why? Findings from a national study. *Teachers College Record*, 87, 356- 373.

Elliott, D.S., Huizinga, D., & Ageton, S. S. (1985). *Explaining delinquency and drug use*. Newbury Park, CA: SAGE.

Finn, J.D., & Rock, D.A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology*, 82 (2), 221-234.

Graham, J.W., Hofer, S.M., Donaldson, S.I., MacKinnon, D.P., & Schafer, J.L. (1997). Analysis with missing data in prevention research. In K. Bryant, M. Windle, & S. West (Eds.), *The science of prevention: Methodological advances from alcohol and substance abuse research*. (pp. 325-366). Washington, D.C.: American Psychological Association.

Kaufman, P. (1988). *High school dropouts who return to school*. Unpublished doctoral dissertation, Claremont Graduate School, Claremont, CA.

Kolstad, A.J. & Owings, J.A. (1986). *High school dropouts who change their minds about school*. Washington, DC: Office of Educational Research and Improvement. (ERIC Document Reproduction Service No. ED 275 800)

Kolstad, A.J. & Kaufman, P. (1989, March). *Dropouts who complete high school with a diploma or GED*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Morrow, G. (1986). Standardizing practice in the analysis of school dropouts. *Teachers College Record*, 87, 342-355.

Passmore, D.L. (1987). *Employment of young GED recipients*. American Council on Education Research Brief (14).

Rubin, D.B. (1987). *Multiple imputation for nonresponse in surveys*. New York: Wiley.

Rumberger, R.W. (1983). Dropping out of high school: The influence of race, sex and family background. *American Educational Research Journal*, 20, 199- 220.

Rumberger, R.W. (1987). High school dropouts: A review of issues and evidence. *Review of Educational Research*, 57 (2), 101-121.

Schafer, J.L. (1999) NORM: Multiple imputation of incomplete multivariate data under a normal model, version 2. Software for Windows 95/98/NT, available from <http://www.stat.psu.edu/~jls/misoftwa.html>.

Schafer, J.L. (1997). *Analysis of incomplete multivariate data*. New York: Chapman and Hall.

Waxman, H.C., Huang, S.L., Padron, Y.N. (1997). Motivation and learning environment differences between resilient and nonresilient Latino middle school students. *Hispanic Journal of Behavioral Sciences*, 19 (2), 137- 155.

Wehlage, G.G., & Rutter, R.A. (1986). Dropping out: How much do schools contribute to the problem? *Teachers College Record*, 87, 374-392.

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