DOCUMENT RESUME

ED 174 873 CG 013 661

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TITLE Dropouts and Turnover: The Synthesis and Test of a Causal Model of Student Attrition.
PUB DATE Apr 79
NOTE 54p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, California, April 8-12, 1979)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Behavior Patterns; *College Attendance; College Students; Critical Path Method; *Dropout Characteristics; Dropout Identification; Higher Education; Interaction Process Analysis; *Sex Differences; *Student Behavior; *Student College Relationship; *Withdrawal

ABSTRACT

The determinants of student attrition in institutions of higher education were investigated. A causal model was developed which synthesized research findings on turnover in work organizations and on student attrition. Questionnaires were distributed to university freshmen (N=1171). The data was analyzed using multiple regression and path analysis. Findings indicate that female dropouts are not committed to the institution or to attaining a degree, did not do well in high school, do not belong to campus organizations, do not believe that a college education will lead to employment or self-development, perceive an opportunity to transfer, do not find daily life at college repetitive, are not satisfied with being a student, know the social and academic rules of the institution, do not participate in decision making, and do not meet with staff and faculty members informally. The findings also indicate that male dropouts are not committed to the institution, do not have a high university GPA, are satisfied with being students, do not believe that education leads to self-development, find their lives repetitive, do not know the social and academic rules of the institution well, and often live with their parents. (Author)

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DROPOUTS AND TURNOVER: THE SYNTHESIS AND TEST OF A CAUSAL MODEL OF STUDENT ATTRITION

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PAPER PRESENTED AT THE
ANNUAL MEETING OF
THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION
SAN FRANCISCO, APRIL
1979

SESSION NUMBER 11.26

DROPOUTS AND TURNOVER: THE SYNTHESIS AND TEST OF A CAUSAL MODEL OF STUDENT ATTRITION

ABSTRACT

The purpose of this research is to investigate the determinants of student attrition in IHE's. A causal model was developed which synthesized research findings on turnover in work organizations and on student attrition. Questionnaires were distributed to university freshmen (N=1171). The data was analyzed using multiple regression and path analysis. Findings indicate that female dropouts are not committed to the institution, did not do well in high school, do not belong to campus organizations, do not believe that a college education will lead to employment, perceive an opportunity to transfer, do not believe that education leads to self-development, do not find daily life at college repetitive, are not committed to getting bachelor's degrees, are not satisfied with being a student, know the social and academic rules of the institution, do not participate in decision making, do not feel that they are being treated fairly, and do not meet with staff and faculty members informally. The findings indicate that male dropouts are not committed to the institution, do not have a high university GPA, are satisfied with being students, do not believe that education leads to self-development, find their lives repetitive, do not know the social and academic rules of the institution well, and may live with their parents. This study indicates that the theories and determinants developed in research on turnover in work organizations are useful in studies of student attrition.

DROPOUTS AND TURNOVER: THE SYNTHESIS AND TEST OF A CAUSAL MODEL OF STUDENT ATTRITION

Introduction

Student attrition is widespread, and the rate of student attrition in most institutions of higher education (IHEs) is high and has remained high for more than sixty years. Summerskill (1962) reviewed 35 different studies of student attrition made between 1913 and 1962. He found that the median loss of students in four years was 50 percent, and concluded that the attrition rate had not changed appreciably between 1920 and 1962. Astin (1972), using a national sample, reported that 41.5 percent of the students enrolled in 1966 had not graduated and were not enrolled four years later. Iffert (1958) reported similar findings in a survey of 147 institutions. Significant dropout rates have also been reported in Canada (Mehra, 1973) and Great Britain (Richling, 1971; Vaizey, 1971).

Explaining the variation in student attrition has long been a major concern of the scholars associated with the field (Astin, 1975; Cope and Hanna, 1975; Heywood, 1971; Knoell, 1960; Pantages and Creedon, 1978; Sexton, 1965; Spady, 1970; Summerskill, 1962; Tinto, 1975). The majority of the studies of student attrition have been correlational studies at single institutions, often using follow-up surveys to attempt to establish why students left an institution. More recently, beginning with the work of Spady (1970, 1971) and Tinto (1975), theoretical models have been advanced to explain the variations in student attrition, and in the case of Spady, tested. Both of these models of student attrition were based in part on Durkheim's theory of suicide (1961). The link between dropping out of school and suicide is suggested as a theoretical basis for these models, but there is insufficient evidence for this premise.

Of ·· serious weaknesses characterize the existing studies of student attrition. First most studies ignore major bodies of literature, and thus are not inclusive in their coverage of the major determinants of student attrition. Second, mos: studies do not distinguish between the determinants of student attrition (analytic variables) and the correlates of student attrition (demographic variables). The main problem with these previous models of student attrition (Spady, 1970; Tinto, 1975) lies in the fact that the definition of variables used in the analysis rendered the models unsuitable for path analysis. Specifically, strict attention was not paid to the recursiveness (directional causality) of the theoretical models, nor to the discreteness of the variables. For example, Spady's (1971) definition of "normative congruence" contains five major clusters of variables including a student's high school contacts; personality dispositions; moral values; attitudes toward the target population; and measures of campus sub-cultural orientations. Thus, no conclusions can be reached as to what elements of this measure are significant.

Other writers have decried the lack of theoretical studies about student attrition (Knoell, 1960; Pantages and Creedon, 1978). Because many of the past attrition studies lacked a theoretical base, and have involved simple correlations between dropout and selected student or institutional characteristics, little is known about the reasons why a student is likely to leave a particular institution.

Purpose

The purpose of this study is to: (1) apply a causal model adapted from employee turnover in work organizations to student attrition in IHEs; (2) test the explanatory power of this model of student attrition; and (3) to rank order the variables by the extent to which they explain variations in student attrition. For the purposes

of this study, student attrition is defined as the cessation of individual student membership in an institution of higher education. Thus, the perspective of this research is that of a single organization. Student attrition is associated with membership at a particular institution, rather than membership in IHEs in general.

A basic assumption informs this research. It is that student attrition in IHEs is analogous to turnover in work organizations. That is, students leave IHEs for reasons similar to those that cause employees to leave work organizations. The model of student attrition used in this study is adopted from a model developed by Price (1977) of turnover in work organizations. The model of student attrition was developed through a review of the literature on turnover in work organizations, as well as the past research on student attrition (Bean. 1978). This causal model containing four categories of variables was developed through a synthesis of research in these two related areas. The model contains the dependent variable, dropout; the intervening variables, satisfaction and institutional commitment; the organizational determinants; and the background variables.

Figure 1 and Table 1 About Here

The causal model of student attrition (Figure 1) is similar to Price's (1977) model of employee turnover chiefly in that organizational determinants are expected to affect satisfaction, which in turn is expected to influence dropout. (See Table 1 for the definition of variables.) Background variables have been added to this model to reflect the influences of a student's prematriculation characteristics on the student's interaction with the organization. Pay, which is viewed as one of the most significant indicators of turnover in work organizations (Price, 1977) suggested several surrogate measures used in this study. The first of these was university GPA. Spady (1970, p. 77) considered grades

as "extrinsic and are used as tangible resources in the quasi-occupational role-playing of the career oriented student in his negotiations for improved opportunity for success." Three other surrogate measures for pay were used. Development and institutional quality are expected to influence the potential earning power of a student. Practical value indicates the student's assessment of the usefulness of his or her education for getting a job.

Figure 1 represents the causal relationships between the variables defined in Table 1. The arrows represent the direction of the causation, and the sign indicates whether there is a positive or negative relationship. This figure is a summary of the propositions used to construct the model initially. Each proposition takes the form: "successively higher (lower) amounts of x (the determinant) will likely produce successively higher (lower) amounts of student attrition" (Zetterberg, 1965). The assumption is made that the determinants are additive and not multiplicative. It is a customary assumption that each of the propositions is qualified by the phrase "other things being equal." The literature which supports these propositions is provided elsewhere (Bean, 1978, 1979).

Basically, the model indicates that the background characteristics of students must be taken into account in order to understand their interaction within the environment of the IHE. The longitudinal nature of the dropout process has been noted by Spady (1970), and Tinto (1975). Next, the student interacts with the institution, preceiving objective measures such as grade point average or belonging to campus organizations, as well as subjective measures, such as the practical value of the education and the quality of the institution. These variables are in turn expected to influence the degree to which the student is satisfied with the IHE. The level of satisfaction in turn is expected to increase

the level of institutional commitment. Institutional commitment is seen as leading to a decrease in the likelihood that a student will drop out of school.

It should be indicated here that the model is quite tentative, . . label "causal model" is not meant to imply great sophistication. No model in the social sciences is likely to do away completely with the problem of spuriousness. The current model being tested might be considered in the way suggested by Kim (1975). If this were actually the causal sequence of the variables, the path coefficients indicate the way in which the model works.

Data Collection

To test the causal model of student attrition, an instrument was developed, pilot tested, and administered to a freshman composition program at a major mid-western university in December of 1977. The packets were picked up and returned by the instructors of 88 sections which had a total enrollment of 1,836 students. The 1,195 questionnaires returned contained 1,111 of the 2,587 new freshmen at the university. The rate of return of the questionnaire was about 66 percent; 98 percent of the returned questionnaires were usable. A homogenious subsample of 366 males and 541 females was used in the analyses. Control of population homogenity by selection was established by the use of five demographic characteristics. These are: age, under 22 years; race, caucasion; citizenship, U.S.; ethnicity, excludes Chicanos and Puerto Ricans; marital status, single. Four organizational variables were also controlled by selection: number of semesters enrolled, current semester is the student's first; transfer status, transfers were excluded; freshmen status, only freshmen (i.e., less than 28 semester hours credit) were included; only full time students, those enrolled for 12 or more semester hours, were included.

The sample is biased toward higher ability students. The selected sample was composed of 40 percent in the top quartile of ACT scores; 40 percent in the second quartile of ACT scores; 18 percent in the third quartile of ACT scores; and

only 2 percent in the lowest quartile of ACT scores. National ACT norms of 1977 run as follows: top quartile 17 percent, second quartile 28 percent, third quartile 26 percent, bottom quartile 29 percent (ACT, 1977). The bottom quartile is clearly under-represented, especially as compared to the national norms.

Data were collected by means of a questionnaire containing 107 items from which measures of 28 variables were obtained. Fifteen indices for variables were constructed through the use of factor analysis. Thirteen variables were measured through single item indicators. Dropout was indicated by registration information provided by the university registrar in the fall semester of 1978.

Measurement of the Variables

Measures in this section are based on the perceptions by individuals of structural concepts such as centralization, psychological concepts such as satisfaction, or facts such as ACT scores. Aiken and Hage (1967) have defended the perceptual approach to the measurement of structural concepts. It is assumed in this research that students would perceive no strategic advantage in biasing their responses to questions requiring factual responses. However, normative pressures would suggest that biases would be likely to occur in a positive normative direction. For example, dropping out is not desirable behavior and the extent of this behavior is consistently underestimated (Astin, 1975). Grades, which are considered a positive sanction (Davis, 1966), would likely be over-estimated. Only the dependent variable was measured from institutional records and not from student self-reports.

Validity of the Measures

Three types of validity were used in assessing the measures. The first is content, or face validity. Kerlinger (1973, p. 485) defines content validation as

being "guided by the question: Is the substance or content of this measurement representative of the content or universe of content of the property being measured?" Content validity was assessed in interviews with the students who piloted the questionnaire on three occasions, and is assumed for all measures. The second type of validity, concurrent validity, involves factor analysis for the creation of the indicies used in scoring the variables. The logic of concurrent validity is as follows: factor analysis identifies statistical similarities or patterns existing in data sets. If these patterns, or factors, correspond with the questions which theoretically measure a single concept, then concurrent validity is established. The fifteen indicies produced by factor analysis all reflected concepts consistent with expectations, indicating a reasonable degree of concurrent validity. Convergent validity is also determined by factor analysis, and is said to exist when all the factor loadings for the items in a particular factor are relatively high and fairly consistent between items. As can be seen from Table 2, a reasonable amount of convergent validity exists in these measures.

Reliability of the Measures

Cronbach's coefficient alphas (Cronbach, 1951) were computed by SPSS subprogram Reliability. Reliability coefficients measure the amount of error in a series of observations of a single event (SPSS, 1977 pp. 60-61). The reliability coefficients of the 15 indicies used in this research appear in Table 2. None fall below .50 which is recommended by Nunnally (1967, p. 226) for exploratory research. The coefficient average is .75, which is near .80 which Nunnally recommends for basic research.

Measurement of the Variables

The results of the measurement of the variables appears in Table 2. A detailed discussion of the questionnaire, and the items selected by factor analysis,

Table 2 About Here

appear elsewhere (Bean, 1978). In general, the questions have the format of a Likert-like scale, ranging from one to five. For example, "To a very small extent" is scored one and "To a very great extent" is scored five, with intermediate values given intermediate scores. It is important to note the range of values when looking at the means and standard deviations, because the number of items included in an index influences the size of these statistics. With the exception of socio-economic status, missing cases are not a problem in this research. All missing cases were treated by pair-wise deletion where they existed in the data. It should be remembered that the variable "Campus Job" is not an indicator of having a campus job, but in reply to the question: "Could you attend the university without a campus job?" This is why more than 90 percent of the students responded "yes" to the question.

Data Analysis

Two statistical procedures will be used to analyze the data. The first is multiple regression, and the second is path analysis.

Multiple regression was selected for two key reasons. First, it indicates the net effects of each variable in a regression equation. The net effects, that is, the comparative impact of an independent variable on a dependent variable with all other independent variables controlled, shows the relative importance of each independent variable in explaining variation in the dependent variable. These net effects are called beta weights. The second reason for using multiple regression is that it provides an assessment of the over all influence of the independent variables on the dependent variables. This is the R^2, or the amount of variance in the dependent variable explained by all the dependent variables working together. The adjusted R^2 ($\bar{R}^2$, adjusted for the degress of freedom) indicates the total explanatory power of the theoretical model previously developed. Multiple regression will also

identify which variables in the regression equation are statistically significant using the F-ratio. The level of significance chosen for this research is $p \leq .05$.

The second statistical procedure used in this analysis is referred to as path analysis (Heise, 1969; Kerlinger and Pedhazur, 1973, pp. 305-332; Land, 1969). This is an application of multiple regression analysis in conjunction with causal theory. The causal linkages are posed a priori and the causal theory developed by the researcher. This causal theory specifies an ordering among the variables that reflects the presumed structure of the cause-effect linkages. Multiple regression shows the strength and direction of these linkages. As Kerlinger and Pedhazur (1973, p. 305) write: ". . . Path analysis is not a method for discovering causes, but a method applied to a causal model, formulated by the researcher on the basis of knowledge and theoretical considerations." Therefore, it is useful in testing theory rather than generating theory.

Several assumptions should be met in order to use multiple regression and path analysis. The first assumption of multiple aggression is that the relationship between the variables is additive, not multiplicative: that is, that the variables do not interact. Two interactions were expected: one between satisfaction and opportunity, and the second based on the sex of the subjects. The test for interaction effects was done by using an "increase in R^2 test" and checking the significance of the F-ratio for interaction terms in the regression.[1]

[1]For any increment in R^2 calculation, the multiple R^2 will be used. The test statistic is an F-ratio in the format of $F=(R^2_{II}-R^2_I)/b/(1-R^2_{II})/n-a-b-1$, where R^2_{II} is the R^2 for the second model, R^2_I is the R^2 for the first model, a = number of variables in model I, b is the number of variables added to model I to get model II, and n = number of cases (Kerlinger and Pedhazur, 1973, p. 70). The equation for Model I is $Y-b_1x_1+b_2x_2+a$, and Model II is $Y-b_1x_1+b_2x_2+x_1x_2+a$, where x_1x_2 is the multiplicative or "interactive" term. If an interation effect exists, then the R^2 for the equation in Model ii should be larger than for Model I. A .02 increase in the R^2 will be considered significant, as suggested by Land (1969, p. 61). For the F-ratio, $p \leq .05$ will be considered statistically significant.

No interaction effect was found for any of the opportunity variables. An interaction effect was found, however, between sex and satisfaction. Because of this discovery in the data, subsequent tests of the assumptions, and the regressions involved in path analysis and testing the model, occur separately for males and females.

The second assumption is that the relationship between the variables are linear. Linearity was tested through the SPSS subprogram Breakdown. The F-ratio for the significance of linearity was compared with the F-ratio for the significance of deviation from linearity. Dichotomous variables such as dropout are not tested for linearity since relationships with a dichotomous dependent variable are always linear. Three non-linear relationships were found, and several strategies were used to improve the linearity of these relationships. In the case of goal commitment and satisfaction for females, and goal commitment and institutional commitment for males, the linearity of these relationships could not be improved, and therefore no conclusion should be drawn about these two relationships based on this study All other relationships between variables in the path model were found to be linear.

The third assumption necessary for multiple regression is that variables are measured on an interval scale. All measures for this study were made on the ordinal scale rather than on an interval scale, and thus the assumption has not been met. Several researchers, including Bohrnstedt and Carter (1971), Heise (1969), Kim (1975a), and Land (1969) have demonstrated that multivariate parametric statistical techniques can be used with ordinal level measures. As Bohrnstedt and Carter (19) conclude, "when one has a variable which is measured at least at the ordinal level, parametric statistics not only can be, but should be applied." (p. 132). Therefore, the measures in this study will be regarded as having interval properties and will be analyzed by multiple regression and path analytic techniques.

The fourth assumption, that of independent error terms, cannot be demonstrated and will simply be assumed for the purposes of this research.

The fifth assumption is that the independent variables are not highly intercorrelated (i.e., above .70) (Kerlinger and Pedhazur, 1973,p. 94), which is referred to as multicolinearity. As can be seen by examining the intercorrelations between the background variables, and between the organizational determinants, which appear in Appendix 1, multicolinearity is not a problem in this research.

Two more assumptions are relevent for multiple regression analysis: that the error terms have constant various -- homoscedastisity -- and that the error terms are normally distributed (Kim and Kohout, 1975). Both of these conditions are assumed for the data. Fortunately, regression analysis is fairly robust (that is, unaffected by the violation of these assumptions) and thus the violation of either of these assumptions is allowable.

One final assumption is relevant to path analysis. It is that the model is recursive. Recursiveness occurs when there is a one way causal flow between the variables in the model (Kerlinger and Pedhazur, 1973). According to Land (1969, p. 34), there are two primary sources of information which can be used to support the recursiveness of a set of variables. One source is the results of existing experimental or empirical research. A large body of support for propositions implicit in the causal model of student attrition have been presented elsewhere (Bean, 1978, 1979). The second source comes from the theoretical assumptions underlying the particular model under investigation. The location of the intervening variables based on the work of Price (1977), Spady (1970), and Tinto (1975), greatly substantiates the theoretical assumptions needed for this model. Also, the temporal priority of the background variables is in large measure undebatable.

Results for Multiple Regression

The use of path analysis in this study requires the regression of the dependent variable on the background determinants, then on the organizational determinants, then on the intervening variable satisfaction, and finally on the intervening variable institutional commitment. Second, the intervening variable institutional commitment must be regressed on the background variables, the organizational determinants and the intervening variable satisfaction. Third, satisfaction must be regressed on the background determinants and the organizational determinants. Finally, the organizational determinants significantly related to the dependent variable or intervening variables are regressed on the background variables. The value given in the parenthesis following a variable in this section is the beta weight, or standardized regression coefficient. The sign of the beta weight indicates whether the relationships between the independent variable and the dependent variable is positive or negative. The size of the beta weight shifts slightly between the regressions in which all variables are included and those in which only significant variables are included. This is due either to multicolinearity or to supressor effects (Rosenberg, 1968, pp. 84-105).

For females, three variables are statistically significant in explaining dropout. These were institutional commitment (-.47), institutional quality (.11), and routinization (.10) (see Table 3). The relationship for institutional commitment

Table 3 About Here

is in the predicted direction, and is clearly the most significant of the twenty-eight variables upon which dropout was regressed. The zero order correlation between routinization and dropout is not in the predicted direction. The zero order correlation between institutional quality and dropout is in the predicted direction,

(-.11), but the beta weight is not in the predicted direction (.10) The zero order correlation between all other variables and the dependent variable dropout, are in the predicted direction with the exception of communication (rules) (r=.04), socio-economic status (r= -.06), and performance (r= -.16). The 28 variables in this model account for 22 percent of the variance ($\bar{R}^2$=.22) in the dependent variable, dropout.

For males, four variables are significantly related to the dropout. By the absolute magnitude of their beta weights, these are: institutional commitment (beta weight = -.29), routinization (.15), satisfaction (.14) and communication (rules) (-.13) (see Table 4.). Clearly, institutional commitment is again the most

Table 4 About Here

important of the variables in predicting dropout. The zero order correlation for all the variables with the dependent variable is in the predicted direction except for satisfaction (r= -.01), routinization (r= .12), housing (r= -.06), campus organizations (r= -.07), socio-economic status (r= -.01). Although the explanatory power of the variables as measured by the R^2 is 16 percent, the $\bar{R}^2$ is only .09. This can be accounted for entirely by institutional commitment, with a zero order correlation of -.30.

For both sexes, clearly the most important indicator of dropout is the intervening variable, institutional commitment. For males, this is about twice as important as the nearest competitor (routinization) and for females, institutional commitment is more than four and one-half times as important as institutional quality. Routinization is also significantly related to the dependent variable in both instances. However, for females, this influence is opposite the expected direction. Institutional quality for females although having a zero order correlation in the expected direction, had net efforts of increasing dropout for women. It should be

noted that the amount of variance explained for females ($\bar{R}^2$= .22) is twice the amount explained for the males ($\bar{R}^2$= .09).

Because of the importance of institutional commitment as an intervening variable in the theoretical model, institutional commitment was regressed on all variables that preceeded it in the model. These results are also provided in Table 3 for females and 4 for males.

For females, nine variables are statistically significant in explaining institutional commitment. By the absolute magnitude of their beta weights, these are: opportunity (transfer) (-.23); satisfaction (.18); institutional quality (.16); performance (.13); goal commitment (.10); practical value (.09); campus job (.08); opportunity (job) (-.08); campus organizations (.09). All zero order correlations for the determinants that are in the predicted direction. The determinants in the model account for 34 percent of the variance in the institutional commitment for females ($\bar{R}$= .34).

Four variables are significantly related to institutional commitment for males. By the absolute value of their beta weights, these were: opportunity (transfer) (-.24); institutional quality (.21); development (.15); and communication (rules) (-.11). Communication (rules) had a zero order correlation in the expected direction (r= -.03), but the standardized regressional coefficient was not in the expected direction (-.11). All zero order correlations for all other organizational determinants are in the expected direction. The twenty-seven variables produced a $\bar{R}^2$= .22 for institutional commitment.

Satisfaction was also considered an important intervening variable in this study. For females, eight variables are significantly related to satisfaction. These are, by absolute magnitude for their beta weights: development (.22); university GPA (.20); performance (-.15); routinization (-.14); practical value (.14);

institutional quality (.11); state resident (.10); and opportunity (home) (-.09). All zero order correlations are in the expected direction except for staff/faculty relationships (-.01). The $\bar{R}^2$ for this regression was .38.

For males, four variables are significantly related to satisfaction. By the absolute magnitude of their beta weights these are routinization (-.23); university grades (.14); development (.14); and housing (.13). The direction of the zero order correlation between all the organizational determinants and satisfaction were in the expected direction except campus job (-.01). The $\bar{R}^2$ for this regression of satisfaction on the twenty-six variables is .18.

It is important to note that satisfaction, which is one of the three most important variables in explaining institutional commitment for females, is not significantly related to institutional commitment for males. However, institutional quality and opportunity (transfer) are significantly related to institutional commitment for both males and females. Another major difference between these regressions is that 34 percent of the variance in institutional commitment is explained for females, and only 22 percent for males.

Routinization, development, and university GPA are all significantly related to satisfaction for both males and females. Perhaps most important is the fact that satisfaction is positively related to institutional commitment for females, but not significantly related to institutional commitment for males. The indirect effects of satisfaction on dropout (through institutional commitment) however, makes satisfaction and important intervening variable for females. This deviant finding for satisfaction in the case of males is not easily explained. As in the case of the other two important variables in this study, for satisfaction, the amount of explained variance for females ($\bar{R}^2$ = .38) is higher than for males ($\bar{R}^2$ = .18).

Results of Path Analysis

As suggested by Kerlinger and Pedhazur (1973 p. 1318), the nonsignificant variables with low beta weights were removed from the regression equations for males and females with dropout, institutional commitment, and satisfaction as the dependent variables. This allows for the development of a more parsimonious model without loosing explanatory power measured by the $\bar{R}^2$. It also increases the size of the standardized regression coefficients for those variables where the value of the beta weight would otherwise be decreased due to slight multicolinearity with the nonsignificant variables.

For females, dropout was regressed on institutional commitment, routinization, and institutional quality. In this regression, institutional quality is not significantly related to dropout, probably due to supressor effects. The size of the beta weights (used as path coefficients) are seen in Figure 2. The $\bar{R}^2$= .21, and nearly all of

Figure 2 About Here

this relationship is due to institutional commitment. Of the eight variables significantly related to institutional commitment in the regression with all variables is the equation, all eight of these variables are significantly related to institutional commitment when regressed as a group. These eight variables produced a $\bar{R}^2$= .34. Satisfaction was regressed on the eight variables significantly related to satisfaction in the regression equation with all variables entered, and all the variables continued to be significantly related to satisfaction except the variable state resident. This variable is excluded from the regression, and Figure 2 shows the path coefficients for the seven variables significantly related to satisfaction. The $\bar{R}^2$=.28, is the same as for the regression containing all of the variables.

Organizational determinants significantly related to either satisfaction, institutional commitment, or dropout, were regressed on the five background variables: home town size, performance, state resident, socioeconomic status, and distance home. Significant paths are shown in the Figure 2 for Females. As one can see, of the background variables, only performance is significantly related to either of the intervening variables or the dependent variable. Also, the only organizational determinant with more than .05 of explained variance is university GPA ($\bar{R}^2$= .25). Thus, although these path coefficients are of some interest, with the exception of performance, they do not contribute substantially to the understanding of satisfaction, institutional commitment, or dropout.

For <u>males</u>, <u>dropout</u> was regressed on the four significant variables, plus development, because of its relatively high beta weight. These five variables are significantly related to dropout with a $\bar{R}^2$= .12. Path coefficients for this regression can be seen in Figure 3. Although only four variables are significantly related to <u>institutional commitment</u> for males when all variables were entered in the regression equation, four additional variables were included because of their relatively high beta weights, and all eight were found to be statistically significant. By order of the absolute value of their path coefficients (beta weights), these are: institutional quality (.27), opportunity to transfer (-.24), development (.16), major (area) (.14), performance (.13), distributive justice (-.11), communication (rules) (-.11), and communication requirements (.10). This regression produced a $\bar{R}^2$= .24.

The four variables significantly related to <u>satisfaction</u> when all variables are in the equation are also significantly related by themselves. However, whereas the $\bar{R}^2$ for the regression with all variables in the equation is .18, the $\bar{R}^2$ for

the regression with the four significant variables is only .13. Also, housing is positively related to satisfaction (.10), contrary to expectations.

Again, determinants significantly related to satisfaction, dropout, institutional commitment, were regressed on background variables, and again, the influence of performance on university GPA, and directly on institutional commitment, are the only paths worthy of note. Performance alone explains 28 percent of the variance in university GPA.

In summary, the R^2 was improved by the deletion of non-significant variables on institutional commitment for males from (.22 to .24) and for dropout for males (.09 to .12). In the case of satisfaction for males, the reduction in the number of variables changed the $\bar{R}^2$ from (.18 to .13). For females, the $\bar{R}^2$ was substantially the same in the trimmed models for dropout (changing from .22 to .21), institutional commitment (.34 in both cases), and for satisfaction (.28 in both cases). Therefore, the trimmed model is tenable for dropout and institutional commitment for both males and females, and for satisfaction for females, but not males.

Discussion

Before proceeding with the discussion of the final models for males and females, it is useful to recall the controls used in the study. To begin with, a single class at a single institution was used as the sample, and this control by selection eliminated possible confounding variables based on institutional and environmental differences. Second, the subjects selected for analysis had to conform to the following criteria: under 22 years of age, caucasion, U.S. citizens, non-Hispanic, single, first semester, first-time freshman, not transferred from other institutions. Third, the analysis is based upon multiple regression, so that the standardized regression coefficients show the influence of an independent variable upon the dependent variable controlling for all other variables in the equation. Also, the

path coefficients for variables in a single regression equation are comparable. A path coefficient from X_1 to the dependent variable of .20, and a path coefficient from X_2 to the dependent variable of .10, means that X_1 has twice the influence on the dependent variable as does X_2. Path coefficients from regressions of different dependent variables on the same set of independent variables, or using different samples, are not comparable.

As can be seen from Figure 2, the final model for females differs from the causal model (Figure 1) in a number of ways. It should be noted that institutional commitment is the primary variable influencing dropout. This finding, one of the most important in this study, is consistent with the previous studies of Spady (1970), and Tinto (1975). It also helps to confirm the causal model presented earlier. Although satisfaction plays an important part in influencing institutional commitment, it did not subsume all or even most of the influences from the determinants on irstitutional commitment as predicted. Second, the determinants borrowed from the causal model of turnover (including routinization, three measures of opportunity (transfer, job, home), the pay surrogate measures of development, university GPA, practical value, and institutional quality, along with satisfaction) dominate the causal model. In addition to these, only campus organizations, campus job, and goal commitment were included in the final model. Of the background variables, performance is clearly the most important. Besides directly affecting institutional commitment and satisfaction, performance also significantly influences six other determinants.

The final model for males is also different than expected. Although again, institutional commitment is the most significant variable influencing dropout (by itself accounting for nine percent of the twelve percent of the variance explained in dropout), four other variables are significantly related to dropout. A deviant

finding is produced for satisfaction, which is positively related to dropout. Routinization, development, and university GPA are all related to development in the expected direction. Satisfaction, however, is not significantly related to institutional commitment, and therefore, its status as an intervening variable for males is in question. This finding was unexpected, especially when considered in the context of organizational studies. A similar finding for freshmen males, however, was reported in Spady (1971) in his study of University of Chicago students. Of the determinants of institutional commitment derived from the literature on turnover, the pay surrogates, development, university GPA, institutional quality, distributive justice, opportunity to transfer, routinization, and communication (requirements) and (rules) all appear in the final model. However, the influence of communication (requirements) (-.11) and communication (rules) (.10) are approximately equal but in opposite directions (with communication (rules) being the deviant finding). Only major area, and performance, a background variable, influence institutional commitment but are not indicated by Price's (1977) model. Performance is the most important variable in explaining university GPA, accounting for 25 percent of the variance in university GPA. The other background variables contribute little to the understanding of student attrition.

The difference between the final model for males and for females is pronounced. Satisfaction is a significant intervening variable for females, but is not related to institutional commitment in the male model. The male and female models also differ in detail in the variables influencing dropouts, but in both cases, institutional commitment is far and above the most important variable in predicting dropout. It is also important to note that institutional quality and opportunity (transfer) are the two most important variables influencing institutional commitment for males and (excluding satisfaction) the two most important variables influencing institutional commitment for females. Finally, in both cases, performance seems

to be the only important background variable. Other important variables appearing in both models are routinization, development, and university GPA.

The total explanatory power of the final model is predicting dropout is .21 for females and .12 for males, as measured by the adjusted R^2. These findings compare well with the attrition studies of Panos and Astin (1968) (R^2= .09), Bayer (1968) (R^2= .12), Mehra (1973) (R^2= .05), and Wegner and Sewell (1970) (R^2= .09). Only Spady (1971) had notably better success in predicting freshman attrition with an unadjusted R^2 of .31 for males and .39 for females. Spady's finding might be explained in part by the fact that: (a) he used a "continuous" dependent variable, scoring students who left the institution in the freshman year higher than those that left the institution in later years; and (b) he used either of two scoring systems for variables, depending on whether the absolute value of the deviation from the mean or the raw score of the variable produced a higher R^2. Although these approaches may increase the explained variance, post-hoc manipulation of data to increase explained variance without theoretical support is somewhat suspect.

Total Causal Effects

Total causal effects generated by path analytic techniques can be used for ranking the importance of a variable in explaining the variance of a dependent variable. The direct, indirect, and total causal effects which the independent variables have on a dropout, and the rank order of importance of these independent variables, are presented in Table 5. Since causal effects less than .05 are not considered meaningful by many researchers (Land, 1969; Kerlinger and Pedhazur, 1973, p. 318) all values with total effects of less than .05 were omitted from these tables.

Total causal effects are perhaps the best assessment of the importance of an independent variable in influencing a dependent variable. One of the weaknesses

of multiple regression by itself is the failure to take into account indirect effects. The discussion of the variables which follows will be in terms of total causal effects.

Discussion of Total Causal Effects on Dropout for Females

For females, institutional commitment (total effect = -.47) is, as expected,

Table 5 About Here

the most important indicator of dropout. This finding is most important because it tends to confirm the placement of institutional commitment in the model of student attrition. Also, it is consistent with Merton's (1958, pp. 475-490) notion of the self-fulfilling prophecy.

The second most important indicator of dropout is performance (total effect = -.14). This finding is not surprising in light of the majority of research in the area of student attrition. What is interesting to note is that the direct effects (-.05) are only about half of the indirect effects (-.09). Thus, although performance by itself does not significantly influence dropout decisions, the eight indirect effects of performance are quite important. University GPA, although highly correlated with performance (r=.50), was not ranked among the variables producing total causal effects with an absolute value above .05. If performance was excluded from the regression, it would be expected that the University grade point average would increase in significance in the regression equation. The third most important variable related to dropout for females was membership in campus organizations. This tends to support the hypotheses of Spady (1970) and Tinto (1975), who believed that structural integration is one of the two most important factors influencing of dropout. It is interesting to note that the zero order correlation between campus organizations and development (.18), and campus organizations and integration (.17), are about equal, suggesting that membership produces both self-development and increases social integration. Practical

value (total effect = -.11) indicates the extent to which students believe that their education will provide access to employment. It is interesting that this variable is ranked fourth in total causal effects for females, and is not ranked for males. This may indicate some new attitudes towards employment. At any rate, female students who do not believe that their education will be useful for getting employment are more likely to leave school than female students who believe that their education will be useful in getting future employment. The fifth most important variable in total causal effects is opportunity (transfer) (total effect = .10). This variable is difficult to interpret in its present location in the causal model, and may indicate more "intent to transfer" than "opportunity to transfer." At any rate, the availability of student roles in other IHEs appears to be quite important in determining dropout.

The sixth most important variable in explaining dropout for females is development, (total effects = -.09). Development was significantly related to institutional commitment until satisfaction was entered into the equation, and thus in the case of development, satisfaction behaved as a true intervening variable. It was predicted that satisfaction would subsume the significance of all the organizational determinants on intent to leave. Clearly this was not the case.

Both practical value, ranked fourth in influencing dropout, and development, ranked sixth, can be considered as surrogate measures for pay. That is, one may develop skills of use to an employer, insuring future employment; or one may believe that their education will lead to future employment. Pay is generally seen as one of the most important indicators in turnover in work organizations, and the importance of surrogate measures for pay in this study should not go unnoticed. Institutional quality, a third surrogate measure for pay (i.e., the higher the quality of the

institution you graduate from, the more valuable your degree), is significantly related to dropout, institutional commitment, and satisfaction, and the zero order correlations were all in the expected directions. However, the beta weight for institutional quality and dropout for females is in the opposite direction of that expected, and therefore, the total causal affects are negligible (.01). Further study of this variable should be considered.

Routinization, with total effects of -.08 on dropout, is one of only two variables besides institutional commitment which is significantly related to dropout in the regression containing all the variables. Therefore, this variable bears further investigation. However, repetitiousness for a college student is probably much different than repetitiousness for an assembly line worker. It should be noted that routinization was measured by a single question, and that a strong and reliable factor did not merge from the three questions intended to measure this variable. Since this variable has a significant effect on reducing satisfaction, its continued study seems advisable.

Goal commitment, (total effects = -.08) is ranked eighth in total causal effects on dropout for females. It is surprising that this variable did not have a greater influence on dropout. This may be due in part to the difficulties in establishing a linear relationship between these variables. Satisfaction also had indirect total effects of -.08. These are due primarily to the indirect effect through institutional commitment. This finding is as expected. Although satisfaction operated as an intervening variable for several of the organizational determinants, clearly it did not subsume all of the effects of the determinants on institutional commitment. It is perhaps surprising that the influence of satisfaction on dropout is not even greater than it is.

Communication (rules) (total effects = .07) and centralization (total effects = -.07) are related to dropout contrary to the direction expected. There is a possible explanation for this. It is possible that students who know about academic and social rules know about them because of infractions, and therefore, are more likely to leave school because of their difficulty in following these rules. Secondly, centralization may be unimportant to first semester freshmen, since they do not expect to participate in decision making. Both distributive justice and staff/faculty relationships have total effects of equal to a -.06. Both of these are in the expected direction, and they are ranked 12th and 13th in total effects. It is also surprising, especially in light of the work of Terenzini and Pascarella (1976) that the variable staff/faculty relationship was not more important than it appears to be from this study. Non-significant findings for integration (having close friends) is also surprising.

Discussion of Total Causal Effects on Dropout for Males

For males, institutional commitment is also the most important variable related to dropout. This finding was expected. The zero order correlation (-.30) is much smaller than for females (r= -.46). Although the relationship between institutional commitment and dropout for males was not as strong as for females, this variable is nearly twice as important in total effects as is the second most important variable - university GPA (total effects = -.15). This variable is ranked second in total causal effect for males. Its important influence on dropout is not unexpected, and the variable is well supported in the literature. A deviant finding was discovered for satisfaction, the third most important variable in influencing dropout for males (total effects = .14). The finding that satisfaction is positively related to dropout for males is contrary to expectation. One possible explanation for this

is that males who are very satisfied with being a student, are happy in their school, but not studying hard. Further study of this variable seems important, especially since satisfaction did not act as an intervening variable between the organizational determinants and institutional commitment. Development (total effects = -.14), routinization (total effects = .12), and communication (rules) (total effects = -.10) are all related to dropout in the expected direction, and ranked fourth, fifth and sixth in total effects on dropout for males. Housing (total effects = -.08) is also not related to dropout in the expected direction. This may be because those students living with their parents around the university town may not represent the parents of a typical university student. Other variables, for both males and females, failed to have total causal effects above .05.

Summary

Five major findings resulted from this study. First, the model tested in this research proved useful in the analyzing the process of student attrition. The determinants in this model accounted for 21 percent of the variance in dropout for females, and 12 percent for males. Thus, studies of turnover and work organizations are useful in the analysis of student attrition. Second, males and females leave the university for different reasons. However, institutional commitment is the most important variable in explaining dropout for students of both sexes. One major difference appears to be that males leave the university even though they are satisfied, whereas females who are satisfied are more committed to the institution and are less likely to leave. Third, opportunity variables, which have not received much previous study, are important in determining institutional commitment. Opportunity (transfer) has the highest path coefficient for those variables significantly related to institutional commitment for females, and the second highest

coefficient for institutional commitment for males. In terms of dropout, opportunity (transfer) is ranked fifth for females, but does not have total causal effects above .05 in the case of males.

From this study, one may characterize a male student who drops out as follows: The student is not committed to the institution; does not have a high university GPA, is satisfied with being a student, does not believe that the education he is receiving is leading to his development, finds his life repetitive, does not know the social and academic rules of the institution well, and may live with his parents.

One may characterize a female dropout as follows: the student is not committed to the institution, did not perform well in high school, does not belong to campus organizations, does not believe that going to college will lead to employment, perceives an opportunity to transfer, does not believe that education leads to self-development, does not find daily life at college repetitive, is not committed to getting a bachelor's degree, is not satisfied with being a student at the institution, knows the social and academic rules of the institution, does not participate in decision making, does not feel that she is being treated fairly, and does not meet with staff and faculty members informally. Although these views of the causes of student attrition for males and females may be over-simplified, they represent the findings of this study.

Practical Implications

Based on the results of this study, four recommendations are made for reducing student attrition. (1) Males and females leave universities for different reasons. Although institutional commitment is important to both males and females, those variables influencing institutional commitment differ. Therefore, any program

devised to reduce student attrition should consider these basic differences. At most, institutions, and in the literature, student attrition is considered a unitary concept. (2) The second most important variable for both males and females has to do with academic abilities: for females, performance in high school; and for males, university GPA. This study then, reconfirms the importance of these variables in influencing dropout decisions. (3) An IHE should offer an educational program which provides the best opportunity for freshmen to feel that they are developing personal, intellectual, creative, and inter-personal skills. (4) Those associated with a particular IHE should realize that the preceived quality of the education the student is receiving is one of the most important variables for both males and females in influencing institutional commitment.

Recommendations for Future Research

Four recommendations are made for future research on student attrition:

(1) Samples should be large enough to accommodate the interaction effect based on sex. A one-year study ideally would include no fewer than about 500 male and/or 500 female respondents.

(2) The causal model of student attrition should be tested on a heterogeneous population of students to see if interaction effects exist based on sex, age, race, full-time/part-time status, or other demographic characteristics.

(3) This model of student attrition should be tested using students attending different types of IHEs. The attrition process may quite different at high and low prestige schools, large and small schools, two-year and four-year institutions, and at institutions which emphasize research at the graduate level as opposed to teaching at the undergraduate level.

(4) The structure of the causal model, and the associated methodology used to test the model, should guide further studies. Variables in the model may be added

or deleted, but the basic model of background variables, organizational variables, and intervening variables, should be retained in attrition studies. Environmental variables other than opportunity, for example kinship responsibilities, could be added to the model. Personality indicators, which were assumed to be normally distributed across the population in this study, may create interaction effects or be significant in their own right. These effects also need testing.

It should be remembered that the causal model tested in this research failed to account for about 80 percent of the variance in dropout for females, and 90 percent for males. The main task of future researchers will be the identification of the missing determinants or the interaction effects which reduce the explained variance. It is felt that the main weakness of the model may lie in the area of the intervening variables, since satisfaction does not subsume most of the variance between the organizational determinants and the institutional commitment, and in the case of males, is not even significantly related to institutional commitment. Other intervening variables which might be of potential value are adjustment to the institution, absenteeism, and boredom. The location of institutional commitment in the model, however, is quite satisfactory.

REFERENCES

Aiken, M. and J. Hage
1967 "Reply to Tausky." American Sociological Review 32: 118-120.

American College Testing Program
1977 Class Profile, National Norms: ACT Class Profile Report for 1976-1977 Freshmen. Iowa City: ACT Research Services.

Astin, A. W.
1972 "College Dropouts: A National Profile." ACE Research Reports, 7. Washington, D. C.: American Council on Education.

1975 Preventing Students from Dropping Out. San Francisco: Jossey-Bass.

Bayer, A. E.
1968 "College Dropout: Factors Affecting Senior College Completion." Sociology of Education 41: 305-316.

Bean, John P.
1978 Dropouts and Turnover: The Synthesis of a Causal Model of Student Attrition. Unpublished Doctoral Thesis. Iowa City: The University of Iowa.

1979 "Path Analysis: The Development of a Suitable Methodology for the Study of Student Attrition." Paper presented at the American Educational Research Association meeting in San Francisco, 1979.

Bohrnstedt, G. W. and T. M. Carter
1971 "Robustness in Regression Analysis." In Herbert L. Costner (ed.), Sociological Methodology 1971. San Francisco: Jossey-Bass.

Cope, R. and W. Hannah
1975 Revolving College Doors. New York: Wiley.

Cronbach, L. J.
1951 "Coefficient Alpha and the Internal Structure of Tests." Psychometrika 16: 297-334.

Davis, J. A.
1966 "The Campus as a Frog Pond: An Application of the Theory of Relative Deprivation in Career Decisions of College Men." American Journal of Sociology 72: 17-31.

Durkheim, E.
1961 Suicide (J. Spaulding and G. Simpson, Trans.). Glencoe: The Free Press.

Heise, David R.
1969 "Problems in Path Analysis and Causal Inference." In Edgar F. Borgatta (ed.), Sociological Methodology 1969. San Francisco: Jossey-Bass.

Heywood, J.
1971 "A Report on Student Wastage." New Universities Quarterly 25: 189-237.

1958 Retention and Withdrawal of College Students, Bulletin 1. Washington, D. C.: U. S. Office of Education.

Kerlinger, F. L.
1973 Foundations of Behavioral Research (Second Edition). New York: Holt, Rinehart and Winston.

Kerlinger, F. L. and E. J. Pedhazur
1973 Multiple Regression in Behavioral Research. New York: Holt, Rinehart and Winston.

Kim, J.
1975 "Factor Analysis." In Statistical Package for the Social Sciences (Second Edition). Nie, N. H., C. H. Hull, J. G. Jenkins, K. Steinbrenner, D. H. Bent (eds.). New York: McGraw-Hill.

1975a "Multivariate Analysis of Ordinal Variables." American Journal of Sociology 88: 261-298.

Kim, J. and F. Kohout
1975 "Multiple Regression Analysis: Subprogram Regression." Statistical Package for the Social Sciences. Nie, et al (eds.). New York: McGraw-Hill.

Knoell, D. M.
1960 "Institutional Research on Retention and Withdrawal." 41-65 in Research on College Students. Boulder, Colorado, and Berkeley, California: The Western Interstate Commission for Higher Education and the Center for Higher Education.

Knoke, David
1975 "A Comparison of Log-Linear and Regression Models for Systems of Dichotomous Variables." Sociological Methods and Research, 3: 416-434.

Land, K. C.
1969 "Principles of Path Analysis." In Edgar F. Borgatta (ed.), Sociological Methodology, San Francisco: Jossey-Bass.

Mehra, N.
1973 Retention and Withdrawal of University Students: A Study of Academic Performance of a Freshman Class. Alberta: University of Alberta.

Nunnally, J. C.
1967 Pyschometric Theory. New York: McGraw-Hill.

Panos, R. J. and A. W. Astin
1968 "Attrition Among College Students." American Educational Research Journal 5: 57-72.

Pantages, T. J. and C. F. Creedon
1978 "Studies of College Attrition: 1950-1975." Review of Educational Research 48: 49-101.

Price, James L.
1977 The Study of Turnover. Ames, Iowa: Iowa State University Press.

Reiss, A. J., Jr., with O. D. Duncan, P. K. Hatt, and C. G. North
1961 Occupations and Social Status. Glencoe: The Free Press.

Richling, J.
1971 "70 Per Cent." New Universities Quarterly 25: 135-138.

Rosenburg, Morris
1968 The Logic of Survey Analysis. New York: Basic Books.

Sexton, V.
1975 "Factors Contributing to Attrition in College Populations: Twenty-five Years of Research." Personnel and Guidance Journal 72: 301-326.

Spady, William G.
1970 "Dropouts from Higher Education: An Interdisciplinary Review and Synthesis." Interchange 1: 64-85.

1971 "Dropouts from Higher Education: Toward an Empirical Model." Interchange 2: 38-62.

SPSS
1977 BATCH RELEASE 7.0 Update Manual. (Multilith)

Summerskill, J.
1965 "Dropouts From College." In N. Sanford (ed.), The American College. New York: John Wiley and Sons.

Terenzini, Patrick T. and Ernest T. Pascarella
1976 "The Relation of Freshmen Students' Social and Academic Integration to Attrition." Paper presented at the Annual Forum of The Association for Institutional Research, Los Angeles.

Tinto, Vincent
1975 "Dropout from Higher Education: A Theoretical Synthesis of Recent Research." Review of Educational Research 45: 89-125.

Valizey, J.
1971 "The Costs of Wastage." New Universities Quarterly 25: 139-145.

Wegner, E. L. and W. H. Sewell
1970 "Selection and Context as Factors Affecting the Probability of Graduation from College." American Journal of Sociology 75: 665-679.

Zetterberg, Hans L.
1965 On Theory and Verification in Sociology. Totowa: Bedminster.

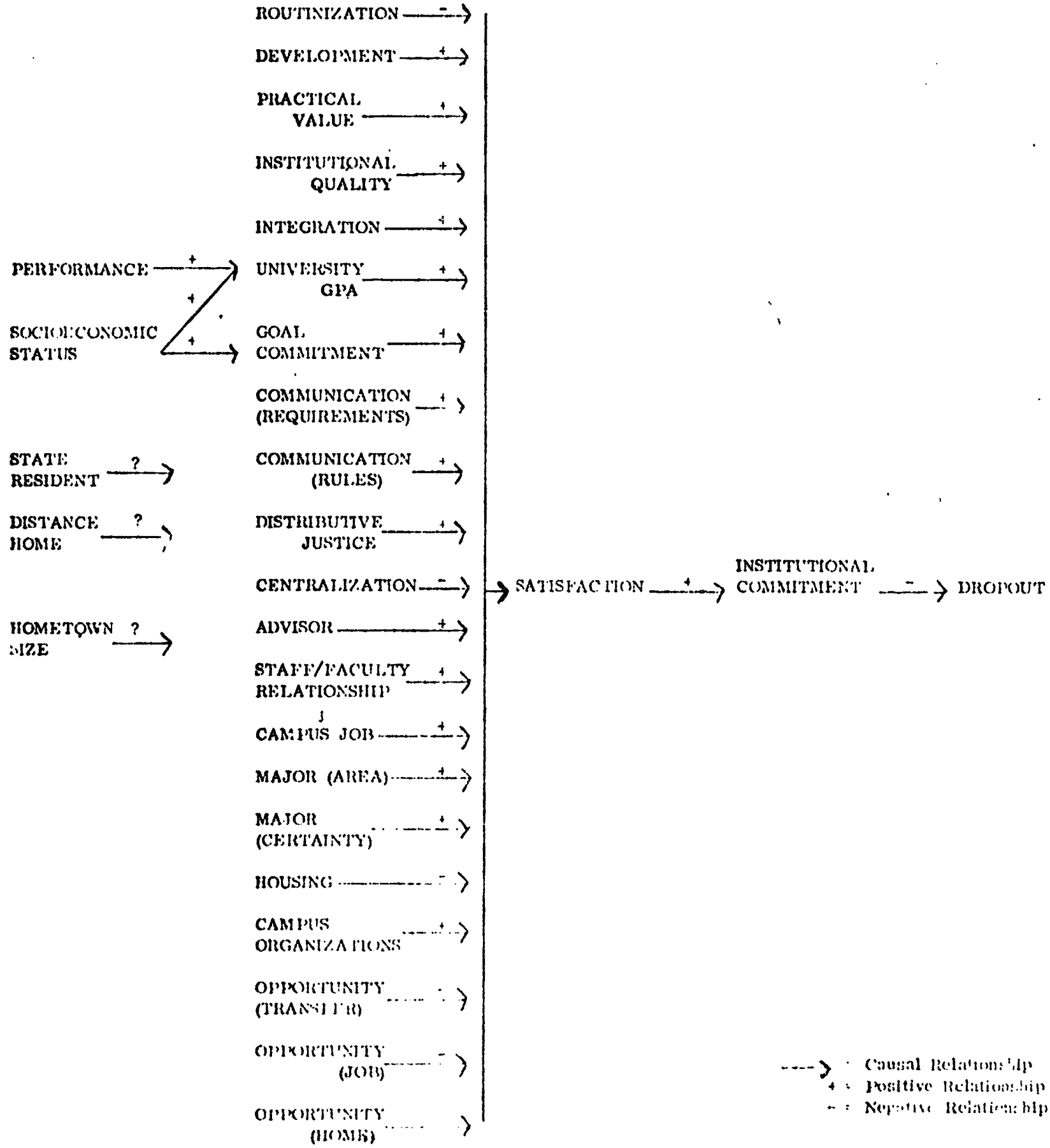
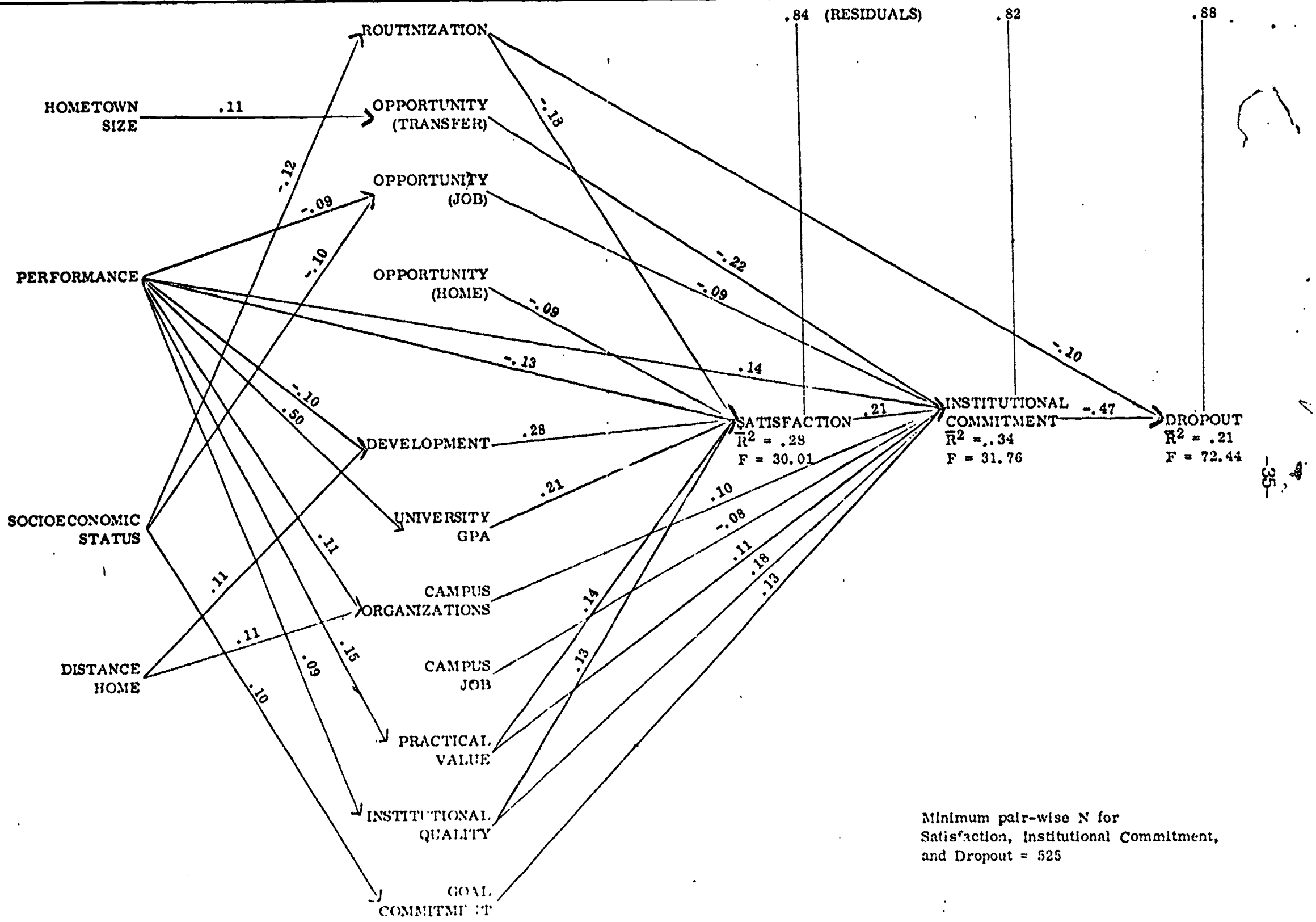


FIGURE 1. A CAUSAL MODEL OF STUDENT ATTRITION

BACKGROUND VARIABLES	ORGANIZATIONAL DETERMINANTS	INTERVENING VARIABLES	DEPENDENT VARIABLE



Minimum pair-wise N for Satisfaction, Institutional Commitment, and Dropout = 525

⟶ = Causal Relationship

FIGURE 2 . PATH MODEL OF STUDENT ATTRITION FOR FEMALES.

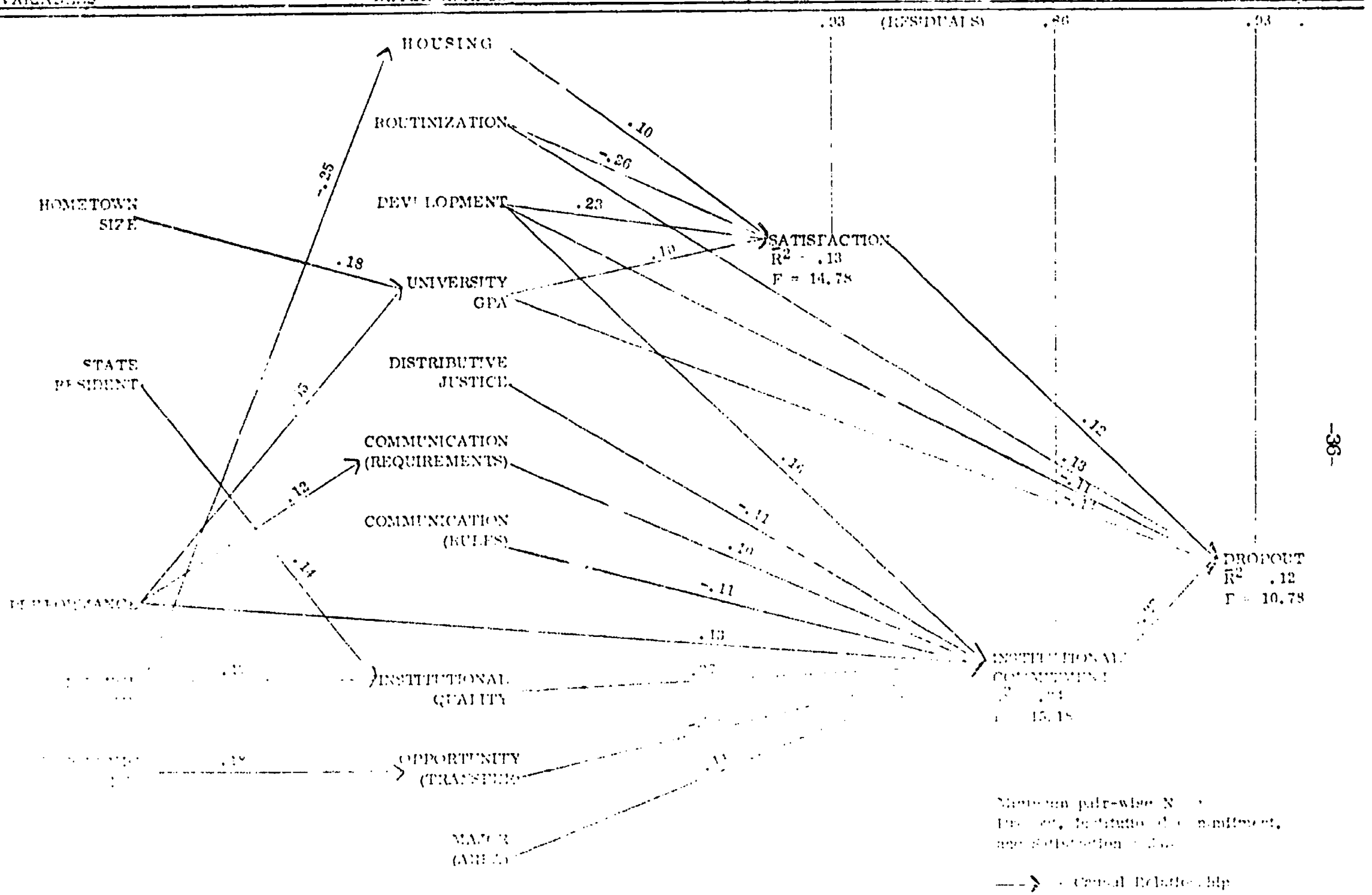


FIGURE 2. PATH MODEL OF STUDENT ATTRITION FOR "A"

TABLE 1
DEFINITION OF VARIABLES

VARIABLE	DEFINITION
Background Variables	
Performance	The degree to which a student has demonstrated past academic achievement.
Socioeconomic Status	The degree to which a student's parents have achieved status through occupational level.
State Resident	Being a resident of the state where the IHE is located.
Distance Home	Distance to a student's parents' home.
Hometown Size	Size of the community where a student spent the most time while growing up.
Organizational Determinants	
Routinization	The degree to which the role of being a student is viewed as repetitive.
Development	The degree to which a student believes that he/she is developing as a result of attending the IHE.
Practical Value	The degree to which the student perceives that his/her education will lead to employment.
Institutional Quality	The degree to which the IHE is perceived as providing a good education.
Integration	The degree to which a student participates in primary or quasiprimary relationships (has close friends).
University GPA	The degree to which a student has demonstrated a capability to perform at the IHE.
Goal Commitment	The degree to which obtaining the bachelor's degree is perceived as being important.
Communication (Requirements) (Rules)	The degree to which information about being a student is viewed as being received.

Table 1 (continued)
Definition of Variables

VARIABLE	DEFINITION
Organizational Determinants	
Distributive Justice	The degree to which a student believes that he/she is being treated fairly by the institution; i.e., receives rewards and punishments proportional to the effort expended in the student role.
Centralization	The degree to which a student believes that he/she participates in the decision making process.
Advisor	The degree to which a student believes that his/her advisor is helpful.
Staff/Faculty Relationship	The amount of informal contacts with faculty members.
Campus Job	The necessity of having a campus job to stay in school.
Major (Area)	The area of one's field of study.
Major (Certainty)	The degree to which a student is certain of what he/she is majoring in.
Housing	Where a person lives while attending the IHE.
Campus Organizations	The number of memberships in campus organizations.
Opportunity (Transfer) (Job) (Home)	The degree to which alternative roles (as a student, employee, or dependent) exist in the external environment.
Intervening Variables	
Satisfaction	The degree to which being a student is viewed positively.
Institutional Commitment	The degree of loyalty toward membership in an organization.

TABLE 2. MEASUREMENT OF THE VARIABLES.

Variable Name	# of Items Used	Factor Loadings	Coefficient Alpha	Range Low Values	Range High Values	Mean	Standard Deviation	Missing Cases
Routinization	1	---	--	1	5	3.23	.76	0
Development	8	.62, .71, .63, .61, .69, .71, .60, .70	.87	8	40	25.71	6.45	16
Practical Value	2	.91, .91	.88	2	10	7.03	2.29	0
Institutional Quality	1	---	--	1	5	3.91	.84	0
Integration	3	.73, .65, .40	.64	1	13	9.48	2.69	4
University GPA	1	---	--	1	7	5.21	1.04	1
Goal Commitment	2	.83, .82	.81	2	10	7.27	2.68	1
Communication (Requirements)	2	.79, .70	.77	2	10	6.88	1.95	1
Communication (Rules)	2	.60, .70	.63	2	10	6.65	1.56	4
Distributive Justice	2	.52, .63	.58	2	10	6.16	1.35	20
Centralization	4	.45, .51, .59, .49	.62	8	20	17.29	2.22	15
Advisor	4	.68, .87, .94, .86	.94	4	20	8.74	4.96	8
Staff/Faculty Relationship	3	.52, .58, .69	.67	3	15	6.23	2.45	12
Campus Job	1	---	--	(yes) 0	(no) 1	.09	.28	4
Major (Area)	1	---	--	Not Sure 0 Arts & Sci. 1 Pre-Prof. 2		1.47	.74	5
Major (Certainty)	1	---	--	1	5	3.24	1.36	0

Table 2. Measurement of the Variables. (continued)

Housing	1	---	--	with parents = 1 all other = 0	.07	.25	0
Campus Organizations	1	---	--	None = 1 4 or more = 5	1.74	.83	1
Opportunity (Transfer)	2	.83, .74	.83	2 - 10	6.87	2.10	2
Opportunity (Job)	2	.71, .68	.68	2 - 10	4.55	1.71	2
Opportunity (Home)	1	---	--	1 - 5	2.39	1.34	4
Socioeconomic Status	1	---	--	7 - 75	51.60	21.26	98
Performance	2	.64, .66	.60	4 - 11	9.33	1.36	6
State Resident	1	---	--	(no) 0 - (yes) 1	.78	.42	0
Distance Home	1	---	--	0-50 miles = 1 to 1000 miles = 6	2.50	1.11	0
Hometown Size	1	---	--	Rural = 1 to 250,000 = 5	2.61	1.14	11
Satisfaction	4	.79, .82, .73, .63	.87	4 - 20	15.06	2.96	2
Institutional Commitment	3	.89, .82, .80	.89	3 - 18	11.16	3.42	3

DROPOUT, FROM REGISTRATION DATA (Stayers Score = 0, Leavers Score = 1)

	Stayers	(%)	Leavers	(%)	Missing	(%)	Total
Females	454	83.9	73	13.5	14	2.6	541
Males	316	86.2	34	9.3	16	4.4	366
TOTAL	770	84.9	107	11.8	30	3.3	907

TABLE 3

REGRESSION RESULTS FOR DROPOUT, INSTITUTIONAL COMMITMENT AND SATISFACTION FOR FEMALES

		Dependent Variables					
		Dropout		Institutional Commitment		Satisfaction	
	Variables	Zero Order r	Beta	Zero Order r	Beta	Zero Order r	Beta
1.	Institutional Commitment	-.456	-.467***	---	---	---	---
2.	Satisfaction	-.145	.017	.359	.183***	---	---
3.	Routinization	-.028	-.100*	-.150	-.030	-.252	-.144**
4.	Development	-.150	-.060	.254	.064	.389	.221**
5.	Practical Value	-.176	-.044	.341	.092*	.310	.135**
6.	Institutional Quality	-.112	.105*	.390	.164***	.317	.106*
7.	Integration	-.075	-.002	.183	.007	.211	.070
8.	University GPA	-.119	-.017	.165	.016	.181	.201**
9.	Goal Commitment	-.130	-.020	.174	.100*	.066	.009
10.	Communication (Requirements)	-.014	.026	.111	.028	.102	.014
11.	Communication (Rules)	.035	.081	.073	-.032	.145	-.003
12.	Distributive Justice	-.077	-.059	.076	-.037	.173	.044
13.	Centralization	-.020	-.065	-.068	.004	-.101	.003
14.	Advisor	-.076	-.026	.143	-.003	.104	-.023
15.	Staff/Faculty Relationship	-.094	-.059	.120	-.010	.213	.077
16.	Campus Job	.056	.073	.074	.077*	-.013	-.039
17.	Major (Area)	-.072	.029	.176	.052	.066	.021
18.	Major (Certainty)	-.074	-.028	.151	.037	.083	-.010
19.	Housing	.044	-.006	-.106	-.070	-.107	-.006
20.	Campus Organizations	-.148	-.060	.228	.085*	.199	.073
21.	Opportunity (Transfer)	.144	-.004	-.335	-.229***	-.120	-.015
22.	Opportunity (Job)	.153	.007	-.262	-.081*	-.139	.001
23.	Opportunity (Home)	.053	-.014	-.164	-.045	-.141	-.088*
24.	Socioeconomic Status	-.060	-.061	.007	-.026	.076	.023
25.	Performance	-.156	-.053	.190	.125**	-.020	-.145**
26.	State Resident	.031	.072	.042	.052	-.009	.097*
27.	Distance Home	.001	.042	.019	-.056	.138	.085
28.	Hometown Size	.025	.041	-.023	.015	.072	.084
			$\bar{R}^2$ = .22		$\bar{R}^2$ = .34		$\bar{R}^2$ = .28

(Minimum pair-wise 471)

* = $p < .05$ ** = $p < .01$ *** = $p < .001$

TABLE 4

REGRESSION RESULTS FOR DROPOUT, INSTITUTIONAL COMMITMENT AND SATISFACTION FOR MALES

		Dependent Variables					
		Dropout		Institutional Commitment		Satisfaction	
	Variables	Zero Order r	Beta	Zero Order r	Beta	Zero Order r	Beta
1.	Institutional Commitment	-.302	-.294***	---	---	---	---
2.	Satisfaction	-.014	.140*	.200	.045	---	---
3.	Routinization	.122	.153*	-.084	-.020	-.264	-.232***
4.	Development	-.172	-.125	.283	.154**	.232	.135*
5.	Practical Value	-.114	-.023	.300	.103	.202	.061
6.	Instittttional Quality	-.092	.066	.355	.211***	.263	.091
7.	Integration	-.019	.057	.111	-.084	.136	.023
8.	University GPA	-.161	-.163	.102	.011	.114	.137*
9.	Goal Commitment	.009	.009	.103	.044	.044	.056
10.	Communication (Requirements)	-.086	-.000	.172	.099	.224	.113
11.	Communication (Rules)	-.119	-.129*	.025	-.114*	.117	.030
12.	Distributive Justice	-.034	-.019	.048	-.102	.153	.042
13.	Centralization	.040	-.038	-.134	-.069	-.166	-.067
14.	Advisor	-.092	-.041	.159	.011	.094	-.024
15.	Staff/Faculty Relationship	-.046	-.005	.019	-.061	.177	.070
16.	Campus Job	.011	.000	-.010	.036	-.012	-.009
17.	Major (Area)	-.064	.025	.188	.100	.043	.006
18.	Major (Certainty)	-.079	.004	.203	.037	.081	-.046
19.	Housing	-.059	-.094	.005	-.011	.119	.132*
20.	Campus Organizations	-.07)	-.034	.054	-.018	.096	.019
21.	Opportunity (Transfer)	.097	.012	-.029	-.241***	-.166	-.051
22.	Opportunity (Job)	.025	-.014	-.071	.046	-.050	-.021
23.	Opportunity (Home)	-.002	-.028	-.094	.023	-.129	-.062
24.	Socioeconomic Status	-.007	-.013	-.107	-.038	-.064	-.087
25.	Performance	-.096	.045	.127	.119	.054	-.089
26.	State Resident	-.004	.043	.102	.073	-.010	-.057
27.	Distance Home	.047	.062	-.003	.007	-.022	-.016
28.	Hom town Size	.005	.047	-.075	.035	-.056	-.050
		$\bar{R}^2$ = .09		$\bar{R}^2$ = .22		$\bar{R}^2$ = .18	

(Minimum pair-wise N 311)

* = $p < .05$ ** = $p < .01$ *** = $p < .001$

TABLE 5

DECOMPOSITION OF THE TOTAL CAUSAL EFFECTS ON DROPOUT FOR FEMALES

	Direct Effects	Indirect Effects	Total Effects	Rank
Institutional Commitment	-.47	--	-.47	1
Performance	-.05	-.09	-.14	2
Campus Organizations	-.06	-.05	-.11	3
Practical Value	-.04	-.07	-.11	4
Opportunity to Transfer	.00	.10	.10	5
Development	-.06	-.03	-.09	6
Routinization	-.10	.02	-.08	7
Goal Commitment	-.02	-.06	-.08	8
Satisfaction	.02	-.10	-.08	9
Communication (Rules)	.08	-.01	.07	10
Centralization	-.07	.00	-.07	11
Distributive Justice	-.06	.00	-.06	12
Staff/Faculty Relationship	-.06	.00	-.06	13

* *

DECOMPOSITION OF THE TOTAL CAUSAL EFFECTS ON DROPOUT FOR MALES

	Direct Effects	Indirect Effects	Total Effects	Rank
Institutional Commitment	-.29	--	-.29	1
University GPA	-.16	.01	-.15	2
Satisfaction	.14	.00	.14	3
Development	-.13	-.01	-.14	4
Routinization	.15	-.03	.12	5
Communication (Rules)	-.13	.03	-.10	6
Housing	-.09	.01	-.08	7

APPENDIX 1
ZERO ORDER CORRELATION MATRIX

	Dropout	Institutional Commitment	Satisfaction	Routinization	Development	Practical Value	Institutional Quality	Integration	University GPA	Goal Commitment	Communication (Requirements)	Communication (Rules)	Distributive Justice	Centralization	Advisor	
Dropout		-.456	-.145	-.028	-.150	-.176	-.112	-.075	-.119	-.130	-.014	.035	-.077	-.020	-.076	
Institutional Commitment	-.302		.359	-.150	.254	.341	.390	.183	.165	.174	.111	.073	.076	-.068	.143	
Satisfaction	-.014	.200		-.252	.389	.310	.317	.211	.181	.066	.102	.145	.173	-.101	.104	
Routinization	.122	-.098	-.269		-.137	-.104	-.107	-.187	.023	-.069	-.030	-.059	-.027	.054	-.069	
Development	-.172	.283	.232	-.014		.281	.314	.246	-.010	.045	.057	.172	.178	-.116	.158	F
Practical Value	-.114	.300	.202	-.047	.301		.429	.127	.137	.118	.202	-.085	.237	.132	-.019	E
Institutional Quality	-.092	.344	.263	-.080	.347	.415		.139	.129	.061	.142	.172	.219	-.094	.197	M
Integration	-.019	.111	.136	-.162	.221	.185	.147		-.059	.045	.028	.077	.111	-.057	.045	A
University GPA	-.161	.102	.114	.020	.079	.112	.096	.004		.103	.141	.102	.088	-.013	.021	L
Goal Commitment	.009	.013	.044	-.053	-.150	-.083	-.022	.060	.065		-.018	.004	.031	.036	.071	E
Communication (Requirements)	-.086	.172	.224	-.113	.110	.131	.233	.095	.058	.031		.300	.099	-.138	.259	S
Communication (Rules)	-.119	.025	.117	-.049	.098	.069	.146	.107	.107	.028	.298		.145	-.100	.122	
Distributive Justice	-.034	.048	.153	-.002	.181	.120	.314	.051	.019	.016	.228	.134		-.112	-.005	
Centralization	.046	-.134	-.166	.090	-.085	-.111	-.137	.021	-.025	-.004	-.091	-.164	-.092		-.101	
Advisor	-.092	.159	.091	.056	.141	.181	.160	.096	.000	.053	.213	.176	.130	-.115		
Staff/Faculty Relationship	-.046	.019	.177	-.067	.131	.095	.093	.102	.019	.071	.141	.093	.065	-.259	.180	
Campus Job	.011	.010	-.012	-.032	-.055	.045	.039	.087	-.085	-.016	.045	.061	.046	.017	.013	
Major (Area)	-.064	.188	.043	.017	.090	.265	.150	.038	.111	-.030	.170	.145	.087	-.004	.313	
Major (Certainty)	-.079	.203	.081	-.043	.104	.234	.191	.081	.122	.090	.197	.072	-.035	-.036	.153	
Housing	-.059	.005	.119	.026	-.101	.020	-.006	-.017	-.017	-.017	.019	-.191	.034	-.079	.024	
Campus Organizations	-.070	.054	.096	-.089	.174	.108	.116	.128	.185	.022	.028	.125	-.026	-.126	.045	
Opportunity (Transfer)	.097	-.289	-.165	.082	-.173	-.124	-.162	-.221	.092	-.006	-.010	-.161	-.056	.094	-.209	
Opportunity (Job)	.625	-.071	-.060	-.017	-.071	-.164	-.038	-.054	-.105	.024	-.047	-.044	.011	-.127	.007	
Opportunity (Home)	-.092	-.049	-.125	.056	-.103	-.093	-.097	-.067	.005	.020	-.054	.026	-.108	.022	.008	
Socioeconomic Status	-.007	.017	-.061	-.070	.066	-.010	-.027	.018	.066	.044	-.007	.011	.036	-.005	.014	
Performance	-.096	.127	.044	-.103	-.021	.056	-.011	-.002	.532	.066	.118	.052	.018	-.054	-.068	
State Resident	-.004	.102	-.010	.068	.070	.056	.056	.109	-.013	.007	-.098	-.136	-.004	-.014	.011	
Distance Home	.047	-.003	-.022	-.025	.029	.016	.108	-.063	.025	-.034	.048	.145	-.047	-.022	.034	
Hometown Size	.005	-.075	-.056	-.037	-.024	-.024	-.017	-.059	.113	-.011	-.011	.059	.055	.018	-.054	

MALES

APPENDIX 1, continued
ZERO ORDER CORRELATION MATRIX

	Staff/Faculty Relationship	Campus Job	Major (Area)	Major (Certainty)	Housing	Campus Organizations	Opportunity (Transfer)	Opportunity (Job)	Opportunity (Home)	Socioeconomic Status	Performance	State Resident	Distance Home	Hometown Size
Dropout	-.094	.056	-.072	-.074	.044	-.148	.144	.153	.053	-.060	-.156	.031	.001	.027
Institutional Commitment	.120	.074	.176	.151	-.106	.228	-.335	-.262	-.165	.007	.190	.042	.019	-.023
Satisfaction	.213	-.013	.066	.083	-.107	.199	-.119	-.139	-.141	.076	-.020	-.009	.138	.072
Routinization	-.033	-.039	-.039	-.082	.010	-.183	.077	.077	.064	-.133	.050	.004	-.072	-.087
Development	.236	.020	.028	.045	-.173	.180	-.095	-.175	-.056	.067	-.105	-.061	.115	-.018
Practical Value	.132	-.019	.232	.204	-.047	.099	-.129	-.183	-.087	-.016	.146	-.033	.035	.009
Institutional Quality	.215	.041	.156	.169	-.063	.094	-.220	-.175	-.112	-.011	.091	.014	.052	-.034
Integration	.079	.044	.025	-.013	-.164	.166	-.269	-.105	-.044	.014	-.036	-.095	.142	.018
University GPA	.131	.004	-.006	.088	-.023	.089	.019	-.090	-.042	.008	.500	.046	.061	-.035
Goal Commitment	-.036	-.111	.101	.145	-.038	.052	-.009	-.075	-.042	.093	.155	-.013	.031	-.007
Communication (Requirements)	.122	-.031	.087	.166	-.006	.055	-.016	-.001	-.047	-.081	.096	.011	.015	-.042
Communication (Rules)	.177	.013	.022	.109	-.061	.118	.008	-.030	-.054	.016	.006	-.052	.056	.012
Distributive Justice	.102	-.033	-.012	-.019	-.004	-.004	-.042	-.067	-.054	-.006	.012	-.034	.019	-.023
Centralization	-.240	.006	.006	-.018	.074	-.104	.073	-.008	.021	-.022	.025	-.042	.010	.059
Advisor	.185	-.012	.323	.239	-.051	.090	-.062	-.051	.031	-.050	.033	-.038	.076	-.023
Staff/Faculty Relationship	---	.003	.018	.014	-.050	.095	-.048	-.027	-.076	.007	.041	.019	.029	-.080
Campus Job	-.003	---	.011	.029	-.019	-.010	-.031	.036	-.072	-.020	-.031	-.017	.049	-.006
Major (Area)	-.024	-.002	---	.471	-.032	.110	-.063	.009	.019	-.078	.110	-.131	.079	.080
Major (Certainty)	.053	-.000	.372	---	.002	.054	-.006	-.022	.060	-.004	.042	-.161	.067	.042
Housing	.126	-.026	-.165	.049	---	-.158	-.072	.118	.062	.027	-.025	.146	-.349	-.052
Campus Organizations	.202	-.039	.062	.071	-.069	---	-.113	-.150	.022	.074	.106	-.043	.108	.038
Opportunity (Transfer)	.007	.048	.005	-.079	-.045	.058	---	.285	.095	-.033	.036	.065	-.014	.051
Opportunity (Job)	.091	-.050	-.027	-.088	-.032	.009	.260	---	.176	-.113	-.092	.089	-.079	-.038
Opportunity (Home)	.024	-.054	.028	-.063	-.091	-.029	.227	.166	---	.023	-.102	-.039	-.010	.056
Socioeconomic Status	.002	.015	-.062	-.082	.053	.128	.183	-.043	.057	---	.037	-.202	.129	.360
Performance	.046	-.006	.013	.038	.039	.108	-.004	-.199	-.101	-.004	---	.098	-.014	-.068
State Resident	.030	-.026	.012	.111	.135	-.002	-.003	-.029	-.155	-.185	.079	---	-.488	-.340
Distance Home	-.102	-.017	.058	-.026	-.358	.050	.023	-.009	.058	.063	-.076	-.466	---	.172
Hometown Size	-.028	.033	.013	-.056	-.050	.095	.121	.049	.118	.363	-.112	-.327	.105	---

MALES