Satisfaction and Performance : A Reciprocal Model

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Paper presented at the
44th Annual AIR Forum
Boston, MA
May 2004

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Abstract

Studies on satisfaction and performance have always attracted the interest of academicians. Continuing debate over whether performance precedes satisfaction or vice versa permeates the study of student satisfaction in American higher education. The purpose of this paper is to ascertain the relationship between satisfaction and performance and to identify the variables which influence them. Sex, age race, educational benefit, social integration, academic integration, enrollment status and residential setting, student level and grades were the major variables used in a sample of 296 students in a NSSE 2000 survey. AMOS was used in the statistical analysis.

Studies on satisfaction and performance have long attracted interest from academicians. The concept of dissatisfaction, which is an approximate of alienation, has dominated the field of sociology for centuries. The link between performance and satisfaction can be traced back to Marx's theory of alienation. Man alienates himself because he alienates himself from work. Performance and the working conditions precede satisfaction. In modern industrial management, research has found that increased satisfaction has led to improved performance (Organ 1977; Schwab and Cummings 1970). The continuing debate over whether performance precedes satisfaction or satisfaction precedes performance has permeated the study of student satisfaction in the American academic field**.** The purpose of this paper is to: 1. ascertain the relationship between satisfaction and performance, and to identify the variables that influence this relationship.

Theoretical Perspective

In capitalism, man is alienated in the sense that he no longer recognizes himself. According to Aron, Marx's alienation is most closely related to the meaning of "self-estrangement" (1968). The idea is that under certain circumstances, man is so overpowered by the conditions that surround him that he no longer recognizes himself in his own work. The theory concerning the alienation of the individual in society has expanded the concept of alienation developed centuries ago by Marx. Modern man is alienated not just in the economic sphere, as Marx expounded, but also in the social and psychological spheres. Man becomes self-estranged when he is no longer interested in his work or his environment. Lack of social adjustment is perceived as the starting point

of inquiry concerning the theory of alienation (Seeman, 1961). Another major influence on the theory of alienation is Durkheim's idea of "anomie". Human happiness can only be obtained when it is constrained by social norms; personal disorganization from the collapse of social norms may lead to consequences as severe as suicide. Thus, integration into society ensures satisfaction.

Marx's theory of alienation, which was linked to the general state of the society, was largely ignored in modern organization and industrial theory. Yet its relationship to productivity has become the major source of industrial management theory. The general environment is expected to influence employee satisfaction (absence of alienation), which in turn determines the output. Along similar reasoning, Bean (1980, 1983) modeled his study after Price's organization theory linking the employee's turnover to student withdrawal. Grade point average, a surrogate measure of compensation in industry, affects student satisfaction.

The general influence of Durkheim's work was sifted through Tinto and Spadys' withdrawal behavior. The conceptual schemes of social and academic integration by Tinto are analogous to Durkheim's integration, while absence of integration very much approximates the concept of alienation as used in the Marx sense. Voluntary withdrawal is a symptom of alienation in which a student no longer feels he belongs to the institution.

Experiences in the formal and informal components of the academic and social systems of the institutions exert distinct influence upon a student's well being. Substantial work

on Tinto's concept of integration has been developed and refined by Pascarella and Terenzini. (1977, 1980, 1983, 1986). In their studies, academic integration was referred to as a combination of two measurements: 1.) the student's grade point average and 2.) the frequency of interaction with faculty and peers. Satisfaction is an underlying force that unites both social and academic integration.

For Pascarella and Terenzini (1977, 1980, 1983, 1986), academic integration and social integration are inextricably linked. But Tinto argues that these two types of integration can be separated. These convincing yet highly conflicting views lead us to question the relevance of integration at large. One should focus primarily on the intriguing relationship between satisfaction and performance. In Pascarell and Terenzini's work, satisfaction is a force that brings both social and academic components together. The relationship between satisfaction and performance is only implicitly related in the operation definition; the causal relationship between satisfaction and performance has never been made. Some authors (Bean and Bradley 1986; Pike 1991; Umbach and Porter 2002) suggested that satisfaction and GPA might be recursive yet there is not much discussion of the substantive theoretical reasoning. The relationship certainly has heuristic values as well as policy implications and deserves further investigation. For the purposes of this exploration, simultaneous equation models were proposed to untangle the relationship between satisfaction and performance.

Review of Literature

Most studies concern causality between the satisfaction and performance are conducted in the industrial management. The School of Human Relations stated that employee satisfaction affects individual output (Vroom, 1964). Porter and Lawler (1967) reaffirmed the strong relationship between performance and satisfaction, but reversed the order of cause and effect. In their view, satisfaction will be lower if rewards were not directly linked to performance (1968). Siegel and Bowen (1971) designed their study to test Porter and Lawler's theory. They found that satisfaction was dependent upon performance. Shedding the light of the study of retention onto the field of higher education, the effect of dissatisfaction upon turnover and absenteeism was noted by Landy (1985) and Locke (1976), which in many ways was similar to Bean's study of retention (1980). Bizot and Goldman (1993) found that satisfaction accounted for significant variance in the prediction of performance. Validation that Satisfaction has more influence upon performance than performance upon satisfaction came from Pike's study (1989). Sanders and Burton (1996) found that compared to students who did not come back after freshmen year, returning students are more satisfied with their academic experiences and levels of personal growth . In the retention model, they found that the freshmen that were most likely to leave DePaul had lower academic performance and low institutional commitment. The exact order of the relationship between satisfaction and performance however, was not explicitly specified.

Gender (sex)- Women tend to have less satisfying experiences with college life than men (Gielow and Lee, 1988). Females rated satisfaction and the college impact on development lower than males (Adleman, 1991). Bean (1980) indicated that for males,

performance is related with satisfaction but not for females. He concluded that satisfaction is not an intervening variable in affecting retention for men yet it is important in affecting retention for women.

Age—Older women students are more satisfied than younger women students because older women regard attendance as a privilege rather than an obligation. (Sturtz, 1971). This finding highlights the heightened sense of responsibility felt by older continuing students. They always appreciate the opportunity to be educated, yet the heavy family responsibility may impede their studying. Age may be positively related to satisfaction yet negatively related to performance (Tinto, 1987).

Race—Students of all races have to make adjustments when they enter college, but minority students will face additional problems given their exclusion (Allen, 1984). Thus, European American students thus tend to have higher satisfaction scores than minority students. Social integration measured in satisfaction with faculty was found related to race (Braxton, Milem and Sullivan 2000). Minority students also tend to have lower academic performance than that of European American students with the exception of Asian students. Helm and Sedlacek (1998) found that African Americans were more susceptible to the college environment than White students .

Academic integration (acadint)—Academic integration is related to performance and satisfaction (Bean 1986). Similar findings also reported that satisfaction is related to

academic integration (Aitken, 1982; Pike, Simpson and Ellen 1997). Morstain (1977) found that academic integration is essential to student satisfaction.

Social integration (socint)—Social integration was positively related to satisfaction (Bean, 1980). In a subsequent study, he found that social life is negatively related to performance (Bean, 1983). Tinto (1987) argued that a student with poor academic performance might persist because of his strong social integration into the institution. However, a friendly atmosphere may provide a propitious environment where students can concentrate academically without being distracted because of alienation. This is especially true for minority students.

Educational benefit (educbeni)—Usefulness of education may be intrinsic or may be involved with getting a job. Liu and Jung (1980) found that the perceived educational benefits relate to satisfaction. Bean(1986) replicated the similar findings in his study.

Enrollment status (enrlstat)- It is generally agreed that full-time students are more satisfied than part-time students are because full-time students enjoy more interaction with faculty, staff and other students (Tinto, 1975). Since some part-time students only enroll for a particular purpose, their intent on their studies is no less serious than any of the full-time students, and hence their grade point average is not necessarily lower than that of full-time students. The relationship between grade point average and enrollment status remains unclear.

Residential setting (Livenow)- Residency on or off campus influences student satisfaction because the lack of on-campus interaction may lead to a sense of personal isolation. On-campus students may participate in co-curricular activities such as campus publications, student government, fraternities or sororities and intercollegiate or intramural sports, which have long been viewed as having positive effects on satisfaction and performance. Membership in social organizations is related to satisfaction (Bean, 1986). Similar findings found that the frequencies of student activities in the social organization are positively related to grades (Hartnett, 1965).

Procedure

Satisfaction surveys are conducted every other year at the University of Minnesota. Satisfaction data of this study was collected through the participation of the National Survey of Student Engagement 2000, which included a sample of 151,910 students over 276 colleges nationwide. 631 questionnaires were mailed out at University of Minnesota at Duluth and 293 questionnaires were returned. The 46% response rate was similar to the national average.

Operation definition of each variables were defined as follows:

Residence (livenow)- (0) off campus (1) on Campus.

Enrollment status (enrlstat)- (0) part-time (1) full time.

Race- (0) minority (1) European American

Sex – (0) Female (1) Male

Age- as reported in the questionnaire.

Grade- student cumulative grade point average.

Educational benefit (educbeni)- fourteen items measured on a scale from one to four, where 1=very little, 2=some, 3=quite a bit, 4=very much. 1. Acquiring a broad education 2. Acquiring job or work-related knowledge and skills 3.Writing clearly and effectively 4. Speaking clearly and effectively 5. Thinking critically and analytically 6. Analyzing quantitative problems 7. Using computing and information technology 8. Working effectively with others 9. Voting in elections 10. Learning effectively on your own 11. Understanding yourself 12. Understanding people of other racial/ethnic backgrounds 13. Being honest and truthful 14. Contributing to the welfare of your community

Social integration (socint)—five items measured on a scale of one to four: 1=very little, 2=some, 3=quite a bit and 4=very much. 1. spending a significant amount of time studying and academic work. 2. providing the support you need to succeed 3. Encouraging contact among students from different economic, social and racial or ethnic backgrounds 4.Helping you cope with your non-academic responsibilities 5. Providing the support you need to thrive socially

Academic integration (acadint)— twenty items measured on a scale of one to four: 1=never, 2=occasionally, 3=often, 4=very often. Academic Integration- 1. Asked questions in class or contributed to class discussions. 2.Used e-mail to communicate with an instructor or other students. 3. Made a class presentation. 4.Rewrote a paper or assignment several times. 5. Came to class unprepared. 6. Worked with other students on projects during class. 7. Worked with classmates outside of class to prepare class assignments. 8. Tutored or taught other students. 9. Participated in a community-based project as part of a regular course. 10. Used an electronic medium (e-mail, list-serve, chat group, etc.) to discuss or complete an assignment. 11. Discussed grades or assignments with an instructor. 12. Talked about career plans with a faculty member or advisor. 13. Discussed ideas from your reading or classes with faculty members outside of class. 14. Received prompt feedback from faculty on your academic performance. 15. Worked harder than you thought you could to meet an instructor's standards or expectations. 16. Worked with a faculty member on a research project. 17. Worked with faculty members on activities other than coursework (committees, orientation, student-life activities, etc.) 18. Discussed ideas from your reading or classes with other outside of class (students, family members, co-workers, etc.) 19. Had serious conversations with other students whose religious beliefs, political opinions, or personal values were very different from yours. 20. Had serious conversations with students of a different race or ethnicity than your own.

Satisfaction (sat)—two items are measured on a scale of one to four: 1=poor, 2=fair, 3=good, and 4=excellent. How would you evaluate your entire educational experience at these institutions? If you could start over again, would you go to the same institution you are now attending?

The model consisted of two endogenous variables, grade and satisfaction, and eight exogenous variables: socint, acadint, livenow, enrlstat, age, race, sex, educbeni made up the model. Scales were computed from principal component analysis and have an alpha coefficient of .80 (NSSE, 2000). When the dependent variable in one equation is an independent variable in some other equations, one has a simultaneous system. There are two equations to estimate the parameters in the model, one for the endogenous variable of grade and the other for satisfaction. Simultaneous equation bias will yield if the parameter estimates are obtained from the ordinary least squares method. The maximum likelihood estimates were used in this non-recursive model. The two-stage least squares method involves finding the regression of each endogenous variable on all the exogenous variables of the model and then using the predicted values of the endogenous variables to estimate the structured equations of the model. Thus, this avoids the bias estimated from the ordinary least squares method (Johnston, 1972).

In order to fully understand which variable, satisfaction or performance, is the cause and which is the effect, more issues must be investigated. Casual inferences in sociology have been widely discussed (Blalock 1964; Simon 1957). Empirical research involving the ordering of the variables has been well documented (Goldberg 1966; Miller and Stokes

1963; Liu 2002). However, a feedback loop among the variables creates different empirical and theoretical problems for estimation of ordering variables. The procedure to find either X or Y as the cause or effect in a causal loop deserves further research. Both cross section studies and panel studies have provided solutions to the question and both conclude that a comparison of the regression of coefficients is the appropriate procedure to decide which is the cause or effect.

In a panel study, two highly correlated variables, height and weight in growing children, were studied by Pelz and Andrews (1964). An increase in height accompanied by larger bone density will increase weight while weight can increase because of change in fat without an increase on height, and thus they argued that height probably precedes weight rather than vice versa. They then argued that if their reasoning is correct, then the correlation of H_1W_2 should be greater than that of W_1H_2 when height and weight were measured in the different time period. One hundred students participated in the study of which the conclusion indeed indicated that height preceded weight (Pelz and Andrews, 1964). Deductive reasoning would also conclude that in cross section data analysis their logic remains valid. Imagine two regression coefficients are presented without specifying the time period, one would chose X is the cause and Y is the effect if bxy is greater than byx. If bxy is greater than byx then bxy has to stand for the regression coefficient of X_1Y_2 where byx for the regression coefficient of Y_2X_1, thereby, one can conclude that x is the cause and y is the effect.

One of the most interesting examples in the cross section study cited by Blalock to assess the cause and effect of each other is Terence Hopkins' study on small groups (1969). The major criticism about Hopkins' model is that all causal relationships in his model were assumed positive and there were loops within the model, Blalock thus accused Hopkins' of ignoring the question of the stability of the system (Blalock, 1969). Hopkin's theory stated that: if one assumed a high rank, thereby increasing his/her centrality, then observability, and conformity, which in turn helped increase influence, and then rank, centrality, observability and conformity and the process continues through the closed look. Blalock ultimately questioned when the system would ever be able to reach a point of stability. If influence increased indefinitely, so would the variables of rank, centrality and all the variables in the model. The model becomes untenable because it will explode at a given point. This is certainly unacceptable in terms of theory construction in the realm of science and but also particularly troubling in the construction of social theory.

Blalock's critique of Hopkin's theory was not entirely statistical in nature although the estimation of the parameters was problematic. (1969) The essential point is that a loop structure without any mechanism to maintain the stability will not fit the casual-functional explanation. The contentious issue is statistical as well as philosophical. Stinchombe (1968) has indicated that from Malinowski and Radcliffe-Browns' functionalism to Marx theory could all be embraced under the umbrella of causal-functional explanation if system stability is introduced into the system. Thus, the crucial point raised by Stinchombe (1968) is that the relationship between the variables within the loop must be reduced if function theory holds. And if the relationship between the

two variables within the loop must be reduced then, when the loop from X to Y is increasing then the loop from Y to X must be decreasing until the whole process cools down. In the statistical sense, it means that b_{xy} must be greater than b_{yx} rather than other way if the stability of the system is maintained. The proposition that the variable of X precedes the variable of Y is established.

As Stinchombe (1968) concluded that this line of reasoning not only fits well with sociological imagination, it also fits well with electrical circuit theory in engineering . Blalock (1969) provided the mathematical proof of the stability of the system. Condition requires that $b_{11} < 0$ in order to insure the stability in a single equation. Coleman (1968) gives further elaboration of the term, $b_{11,}$. Sociologically speaking, the term b_{11} meant that condition X existed because it had functions essential to the survival to the system. Mathematically speaking, b_{11} constituted a shortcut of equation where X2, X3 were left out of the full loop X1 → X2 → X3 → X1. The careful working of the mathematical proof and substantive reasoning indicated that using regression coefficients to decide the ordering of the cause and effect of the two variables is the correct procedure.

After the cause and effect have been found, one still needs to assess which fit of the under-identified models is appropriate. With the exception of exact identified models, there are almost no perfect fits of over-identified models in the real world. The traditional goodness-of-fit test depends upon the sample size, which leads to rejection of models in large samples even when they differ only trivially from perfect fit (Long, 1986; Wheaton, 1987). This anomaly leads to a series of fit measures in model testing. The Bentler-Bonett

(NFI) index was developed to help assess the model. In their experience, models with overall fit indices of less than .9 deem improvement. Wheaton (1987) noted that a perfect fit is still difficult to achieve in large samples with NFI, yet the severity of the sample problems with goodness-of-fit was alleviated.

Another index proposed to test the adequacy of the model is a stability index. Whether or not the feed back loop between the variable of performance and satisfaction will create an infinite sequence depends upon the regression weights. When the model is stable the index will fall between -1 and +1 (Fox, 1980). An unstable system is heuristically impossible and should be revised. Both IFI and stability index were employed in the model testing.

Analysis and findings

The initial model of Table 1 is the theoretical model reflected the literature reviewed. The NFI values exceed the threshold of .9 and the stability index was .032, which suggested the fit between the models and the data is reasonable. The finding indicated that satisfaction had a greater impact upon performance than performance upon satisfaction. This finding is contrary to many previous findings (Siegel and Bowen, 1971; Spady, 1970; Liu and Jung 1980) yet is consistent with the finding in Beans study (1986). The standardized regression coefficient in the model provided a necessary condition to infer the causal relationship between satisfaction and performance; if the feedback loop is

expected to converge, then the variable of satisfaction is accorded as the cause and performance as the effect (Bentler and Freeman, 1983).

If the path coefficients in the model were all significant, then model 1 would be accepted. However, some of the t values of path coefficients were not significant (at .05 level) and a revision is necessary. The relationship between the variable of residence and satisfaction, enrollment status and satisfaction seemed too tenuous to be tenable and hence the paths should be deleted from the model. The variables of residence and enrollment status were also omitted from the model. A double arrow from race to social integration was deleted because of the insignificant correlation.

An additional path was added from race to satisfaction, because the socio-cultural alienation of minority students was significantly higher than that of European American students according to Loo and Rolison (1986). Consequently, being a minority student had a negative influence on satisfaction. Slight modifications were made to the exogenous variables. Double arrow paths were linked to variables of educational benefits and age, age and academic integration, social integration and academic integration. The older the students became, the more accessible educational benefits became, and the greater the likelihood the older students would be integrated into the academic system. The relationship between academic and social integration was left incomplete in Tinto's retention theory (1987). Tinto argued that a student could be well-integrated socially but not academically. And inversely, a student could succeed in the academic arena, but not in the social arena. However, most of the students are well integrated into both since

institutions of higher education are imbued with such responsibilities. Social integration and academic integration should be linked.

Table 2 presented the variables of social integration (socint), educational benefit (ebucbeni), race, sex, age, and performance (grade). Each variable was assumed to influence satisfaction, while the variables of academic integration (acadint), social integration (socint), age, satisfaction have impact upon performance (grade). Both equations were significant at $p < .01$. The findings revealed R values of .54 for satisfaction and .25 for performance. The NFI exceeds .90 and the stability index is .030. All of these statistics indicated that model 2 provides an acceptable fit to the data.

From the results presented in the table 2, it has been observed that race has a direct effect (.10) upon satisfaction but has no direct effect (.002) upon grades. These results have been consistent with sociological theory that social class has a greater impact on academic performance than race does**.** When minority students are satisfied with their college environment, they tend to perform as well as European-American students. The same findings also applied to the educational benefit variable, which has a direct effect (.34) upon satisfaction but no direct effect upon grade. This result is consistent with the cognitive dissonance theory that people tend to adjust their attitude so that they are in agreement with their behavior (Festinger, 1957). The more educational benefits students perceived to have, the more satisfied they are with the environment. However, the performance, evaluated by objective grading, may not reflect the subjectively perceived

educational benefits. This is a well known fact that party students are very much satisfied with the institution yet have poor grades.

Age has negative effects upon grades as well as satisfaction. This finding is not surprising since the older the students are, the more likely their family responsibilities will increase. Special difficulties arise especially for women when they have to provide childcare or tend to elders in the family (Moran, 1986). Studying and socializing may conflict with the goal of providing necessary support for the family. Sex also has a negative direct effect upon satisfaction but has no effect on grades. This is consistent with Gielow and Lees' finding (1988). According to the model, the variable, academic integration, has a direct effect upon performance but no effect upon satisfaction. This finding partially supports Bean's findings (1986). In his study, Bean finds that academic integration had influence on both performance and satisfaction.

Discussion and suggestion

Statistically speaking, the methods chosen in this evaluation are appropriate. Profuse literature in the social sciences indicates that different models may fit the same set of data and assessing a model's adequacy is no simple matter. If one draws a full recursive model with no arrows omitted, the data will fit the model exactly. However, this approach leaves many undesirable consequences since not all of standardized regression coefficients are significant even when the overall model is fit. Duncan (1966) proposes

that one start with an exact identified model and eliminates all the arrows when the standardized regression coefficients were not significant.

Difficulties arise in this approach when none of the partials may be close to zero, yet none may be large enough to cast doubt on the validity of the overall model (Namboodiri, Carter, and Blalock, 1975). How large the discrepancy between the predicted values and computed values deems to be unacceptable involves subject evaluation. Inspection of the standardized regression coefficients would be tedious, especially when there are many variables in the model as the permutation of variables increases exponentially. Yet selective inspection of a few important standardized regression coefficients is necessary to warrant the validity of the model. And attention to each specific path is just as important to the overall fit of the model. In light of this, multiple evaluation criteria, rather than a single overall test of goodness fit, is widely accepted in social sciences. The comparative fit index used in this study helped the overall evaluation of the specific link warranted. This approach is just one of the many available choices. Consequently, it is necessary to further discuss path model assessment methods. Literatures in higher education seem to have shunned this topic, which is the cornerstone for empirical research in retention and satisfaction.

When Spady (1971) and Tinto (1975) developed their theory of integration out of Durkheim's sociology, the concept of anomie dominated the field of deviance and criminology. In the mid-seventies, it began shifting towards Marx's alienation as the major link between the contemporary character and culture in other fields of sociology

(Friedrichs, 1972). It is true that the influence of European existentialism had some influence upon this shift. However, the main reason for the shift was that the concept of alienation was much better in describing the modern man's fate. The shift from Durkhiem's anomie as a structural concept to the social/psychological concept of alienation opened a further exploration of human nature. Viewing anomie as a structural concept, absence of integration is more of a social structure problem rather than personal problem yet the human consequences are phenomenal.

The same arguments may be applied to Spady and Tinto's theory of integration that the emphasis on the structural aspect of the concept results in the neglect of the humanistic aspects of the concept of anomie. In the perspective of anomie, student withdrawal is a structural problem because no institutions are so well integrated that they will enable all students to graduate. Therefore, one can only say that an institution is less integrated than the other is by comparison. From the perspective of alienation, student withdrawal becomes a symptom, which betrays human anxiety and isolation. Alienation then becomes a structural problem as well as a personal tragedy. If one is interested in a theory, which could cover a wide range of intellectual development in the field of higher education, the theory of alienation is well suited to the integration theory of satisfaction and retention. There may be no difference with regard to which frame of reference one is using to communicate with other academicians, yet to the public, raw statistics mingled with humanistic aspects will most likely ease the ability to reach a wider audience. Rediscovery of Marx's theory of alienation may provide a new paradigm, which has not only heuristic values but also practical values in disseminating the findings.

Policy implication

Institutions of higher education are academic institutions where academic excellence is touted. The question centering on whether performance precedes satisfaction or satisfaction precedes satisfaction only acts as a catalyst to learning more about the dynamic process of student learning on campus. Thomas' (2000) recent work on social network further enhances the importance of the satisfaction versus performance question. A sense of belonging and identity fostering satisfaction, which has been credited to the student personnel and counselors, should be further emphasized when the pendulum swings toward the proposition that satisfaction precedes performance. High school rank and SAT would be more emphasized when the pendulum swings toward the other proposal that academic performance precedes satisfaction. In reality, even in the most academically rigorous institutions, a sense of belonging is being fostered, while in a community college, any entrants still must maintain a minimum of academic performance such as a high school diploma. The question is how to blend the two approaches rather than focusing on one exclusively.

Adelman, C. (1991) *Women at Thritysomething: Paradoxes of Attainment*. Washington, D. C : U.S. Government Printing Office.

Aitken, N.D. (1982) College student performance, satisfaction and retention: specification and examination of a structural model. *Journal of Higher Education* 53:32-50.

Allen, W.P. (1984) Race consciousness and collective commitments among Black students on White campuses. *Western Journal of Black Studies* 8 (3): 156-66.

Aron, R. (1968). *Main Currents in Sociological Thought.* Garden Cities, New York: Basic Books.

Bean, J.P., (1980). Dropouts and turnover: The synthesis and test of a causal model of student retention. *Research in Higher Education* 12 (3): 155-187.

Bean ,J.P., (1983) The application of a model of turnover in work organizations to the student attrition process. *The Review of Higher Education* (6):129-48.

Bean, J.P. and Bradley, R.K. (1986). Untangling the satisfaction-performance relationship for students. *Journal of Higher Education* 57 (4): 393-412.

Bentler, P.M. and Freeman, E.H. (1983). Test for stability in lineal structural equation systems. *Psychometrika,* 143-145.

Bizot, E.B. and Goldmen S.H. (1993). Prediction of satisfactoriness and satisfaction: An 8-year follow up. *Journal of Vocational Behavior* 43 (1): 19-29.

Blalock, H. M., (1964) *Casual Inferences in Non experimental Research*, Chapel Hill: The University of North Carolina Press.

Blalock, H. M., (1969) *Theory Construction : From Verbal to Mathematical Formulation*, Englewood Cliffs, N.J.: Prentice-Hall.

Braxton, J.M., Milem, J.F. and Sullivan, A.S. (2000) The influence of active learning on the college student departure process: Toward a revision of Tinto's theory. *Journal of Higher Education* 71:569-590.

Coleman, J.S., (1968) The mathematical study of change (pp 428-478). In H. M. Blalock, and A. B. Blalock (eds.), *Methodology in Social Research* McGraw-Hill: New York.

Duncan, O.D. (1966) Path analysis: sociological examples. *American Journal of Sociology* 72:1-16.

Festinger, L. (1957) *A Theory of Cognitive Dissonance.* Standard, CA: Stanford University Press.

Fox, J. (1980). Effect analysis in structural equation models. *Sociological Methods and Research* (9): 3-28.

Friedrichs, R.W. (1972). *A Sociology of Sociology.* Toronto, Ontario: First Free Press.

Goldberg, A. S., (1966) Discerning A Casual Pattern Among Data on Voting Behavior. *American Political Science Review* Vol. 60 pp. 913-922

Gielow, C.R., and Lee. V.E. (1988). The effect of institutional characteristics on student satisfaction with college. New Orleans, Paper presented at the American Educational Research Association Annual Meeting.

Hartnett, R.T. (1965). Involvement in extracurricular activities as a factor in academic performance. *Journal of College Student Personnel* (6): 272-74.

Helm, E.G.. and Sedlacek, W. E. (1998) The relationship between attitudes toward diversity and overall satisfaction of university student by race. *Journal of College Counseling* 1(2):111-120

Johnston, J. (1972). *Economic Methods.* New York: Mcgraw-Hill.

Landy, F.J. (1985). *Psychology of Work Behavior.* Chicago, IL: The Dorsey Press.

Lawler, E.E. and Porter, L.W. (1967) The effect of performance on job satisfaction. *Industrial Relations* 7 (1): 20-28.

Liu, R . (2002) A Methodological Critique of Tinto's Student Retention Theory. Paper presented at 2002 AIR Forum.

Liu, R. and Jung, L. (1980). The commuter student and student satisfaction. *Research in Higher Education.* (12): 215-226.

Locke, E.A. (1976) The nature and consequences of job satisfaction. In *Handbook of Industrial and Organizational Psychology* edited by M.D. Dunnette, Chicago: Rand McNally.

Loo C.M. and Rolison, G. (1986). Alienation of ethnic minority students at a predominantly White University. *Journal of High Education* 57 (1): 58-77.

Long, J. S. (1986) *Covariance Structure Models: An Introduction to LISREL*. Newbur Park, CA: Sage.

Moran, M. (1986). *Student financial aid and Women* ASHE-ERIC Higher Education Reports Washington, D.C.: ASHE.

Miller, W. E. and Stokes , D. E. (1963) Constituency influence in congress. *American Political Science Review* MARCH,:, 45-56.

Morstain, B.R. (1977) An analysis of students' satisfaction with their Academic Program. *Journal of Higher Education (48):* 1-16.

Namboodiri, N.K., Carter, L.F., and Blalock, Jr. H.M. (1975). *Applied Multivariate Analysis and Experimental Designs.* New York: Mcgraw-Hill.

NSSE. (2000) Indiana University Center for Post-Secondary Research Planning, Bloomington, IN.

Organ, D.W. (1977) As reappraisal and reinterpretation of the satisfaction-causes-performance hypothesis. *Academic of Management Review* (2): 46-53.

Pascarella, E.T. and Terenzini, P.T. (1979) Interaction effects in Spady's and Tinto's conceptual models of college dropout. *Sociology of Education* (52): 197-210.

Pasdcarella, E.T. and Terenzini, P.T. (1980) Predicting freshman persistence and voluntary dropout decisions from a theoretical Model. *Journal of Higher Education* (51): 60-75.

Pasdcarella, E.T. and Terenzini, P.T. (1983). Predicting voluntary freshman year persistence/withdrawal behavior in a residential university: a path analytic validation of Tinto's Model. *Journal of Educational Psychology* 75 (2):215-226.

Pascarella, E.T., Terenzini, P.T. and Wolfe, L.M. (1986). Orientation to college and freshman year persistence/withdrawal decisions. *Journal of Higher Education* 57(2):155-175.

Pelz D. C. and Andrews, F. M.(1964) Detecting Causal Priorities in panel study data . *American Sociological Review* 24 : 836-848.

Pike, G.R. (1989). The performance-satisfaction relationship revisited: specification and testing of a theoretical model. Research. San Francisco, CA: March. Paper presented at the April meeting of the American Educational Research Association.

Pike, G.R. (1991) The effects of background, coursework, and involvement on students' grade and satisfaction. *Research in Higher Education* 32(1):15-31.

Pike, G. R. and Simpson, E.M. (1997). The relationship between academic achievement and satisfaction: Evidence of moderating effects for academic and social integration. Paper presented at the 1997 AIR Annual Forum.

Sanders, L. and Burton, J.D. (1996). From retention to satisfaction: New outcomes for assessing the freshman experience. *Research in Higher Education* 37: 555-567.

Schwab, D.P. and L.L. Cummings (1970). Theories of performance and satisfaction: A review. *Industrial Relations* (9):408-30.

Seeman, M.(1961) On the meaning of alienation. *American Sociological Review XXVI.* p.753-58.

Siegel, J.P. and D. Bowen. (1971) Satisfaction and performance: Casual relationships and moderation effects. *Journal of Vocational Behavior* 1: 263-69.

Simon, H. A. (1957). *Models of Man*. New York: John Wiley.

Spady, W. (1971). Dropouts from higher Education: An Interdisciplinary review and synthesis. *Interchange* 1:64-85.

Stinchcombe, A.(1968). *Constructing Social Theories*. New York: Harcourt, Brace and World.

Sturtz, A.N. (1971) Age differences in College Student Satisfaction, *Journal of College Student Personnel* 12:220-223.

Tinto, V. (1975) Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research* 45 (1): 89-125.

Tinto, V. (1987) *Leaving College.* Chicago, IL: The University of Chicago Press.

Thomas, S.L. (2000) Ties that bind: A social Network approach to understanding student integration and persistence. *Journal of Higher Education* 71: 591-615.

Umbach P.D. and Porter S. R. How do academic departments impact student satisfaction? Understanding the contextual effects of departments. *Research in Higher Education* 43(2):209-234

Vroom, V.H. (1964) *Work and Motivation*. New York: Wiley.

Wheaton, B. (1987) Assessment of fit in over-identified models with latent variables. *Sociological Method and Research* 16(1): 118-154.

Maximum Likelihood Estimates for Model 1

Regression Weights

		Estimate	S.E.	C.R.
sat	livenow	0.003	0.116	0.023
sat	enrlsat	0.071	0.189	0.378
sat	acadint	0.001	0.029	0.032
grade	acadint	0.016	0.008	1.932
sat	socint	0.145	0.046	3.148
sat	educbeni	0.054	0.019	2.840
grade	age	-0.226	0.072	-3.133
sat	age	-0.021	0.391	-0.054
grade	socint	-0.052	0.028	-1.895
grade	race	0.166	0.308	0.539
sat	sex	-0.189	0.133	-1.419
grade	sat	0.191	0.137	1.393
sat	grade	0.170	1.619	0.105

Standardized Regression Weights

		Estimate
sat	livenow	0.001
sat	enrlsat	0.018
sat	acadint	0.006
grade	acadint	0.113
sat	socint	0.381
sat	educbeni	0.337
grade	age	-0.178
sat	age	-0.015
grade	socint	-0.156
grade	race	0.030
sat	sex	-0.078
grade	sat	0.218
sat	grade	0.149

Squared Multiple Correlations

grade	0.080
sat	0.290

Stability index for the following variable is .032

grade
sat

Correlations

acadint	socint	0.267
socint	race	-0.042
error1	error2	-0.202

Maximum Likelihood Estimates for Model 2

Regression Weights

		Estimate	S.E.	C.R.
sat	socint	0.147	0.021	7.142
sat	educbeni	0.056	0.010	5.835
sat	race	0.659	0.319	2.062
grade	acadint	0.016	0.009	1.899
sat	sex	-0.195	0.121	-1.618
sat	age	-0.027	0.128	-0.214
grade	socint	-0.052	0.029	-1.800
grade	age	-0.227	0.076	-2.997
grade	race	-0.027	0.323	0.082
grade	sat	0.187	0.136	1.379
sat	grade	0.159	0.512	0.310

Standardized Regression Weights

		Estimate
sat	socint	0.380
sat	educbeni	0.344
sat	race	0.104
grade	acadint	0.116
sat	sex	-0.080
sat	age	-0.019
grade	socint	-0.158
grade	age	-0.182
grade	sat	0.217
sat	grade	0.136

Squared Multiple Correlations

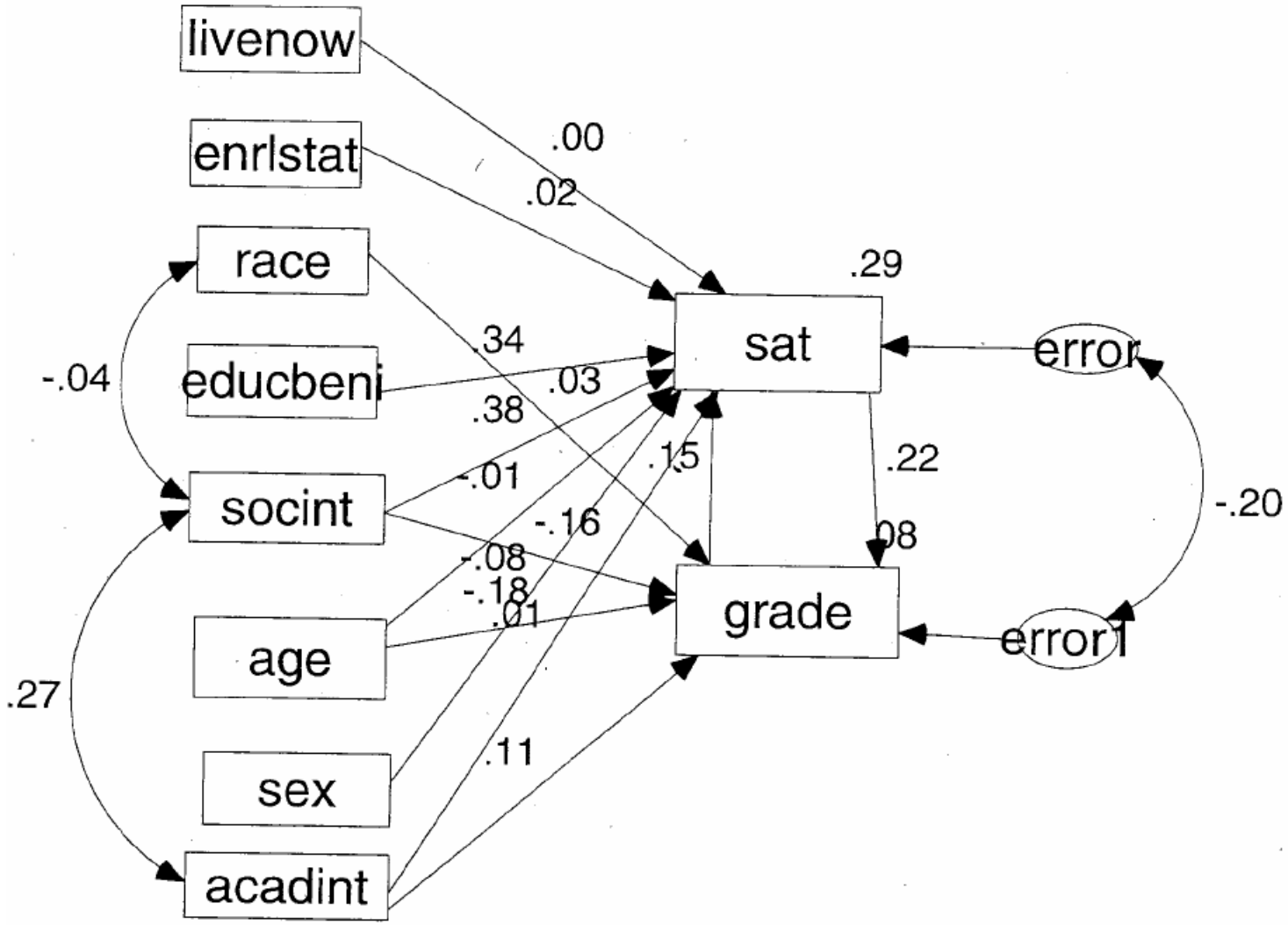
grade	0.062
sat	0.307

Stability index for the following variable is .030

grade
sat

Correlations

socint	acadint	0.269
educbeni	age	0.160
acadint	age	0.161
socint	age	-0.248
error1	error2	-0.189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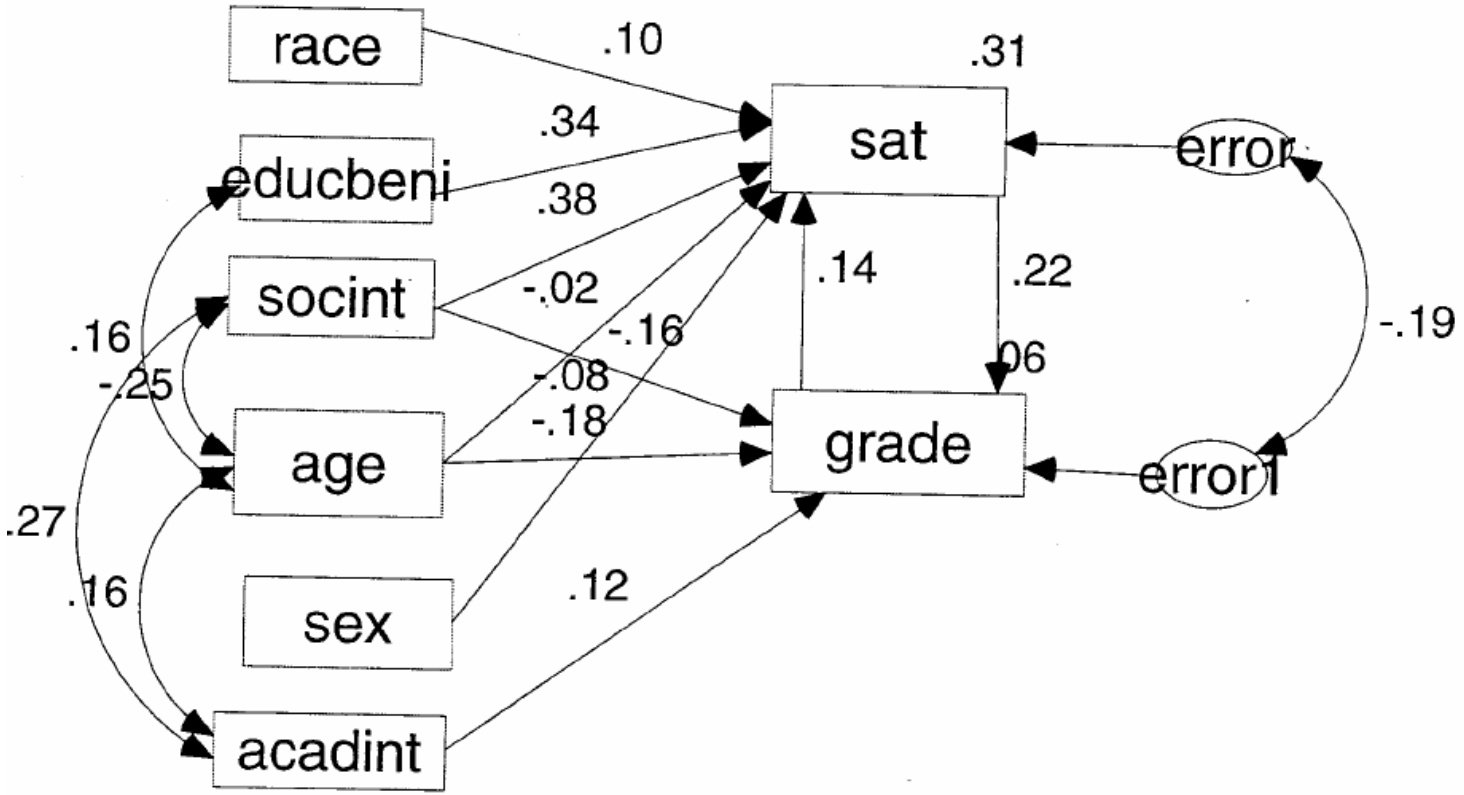
MODEL 1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Model 2