DOCUMENT RESUME

ED 365 718 TM 020 934

AUTHOR Daniel, Larry G.; And Others
TITLE Health Locus of Control and School Achievement in Middle School Students.
PUB DATE Nov 93
NOTE 26p.; Paper presented at the Annual Meeting of the Mid-South Educational Research Association (New Orleans, LA, November 10-12, 1993).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Achievement; *Attendance; Cohort Analysis; Correlation; Educational Practices; Grade 7; *Health; Junior High Schools; Junior High School Students; *Locus of Control; Middle Schools; *Student Attitudes
IDENTIFIERS California Achievement Tests; *Middle School Students; *Multidimensional Health Locus of Control Scales

ABSTRACT

The present study investigated the relationship among middle school students' self-perceived locus of control, their school achievement, and their school attendance. A cohort of 265 seventh-grade students was administered the children's version of the Multidimensional Health Locus of Control (MHLC-C) scales, which measure health locus of control across three identified subscales: powerful others, change, and internal. California Achievement Test (CAT) composite subscale scores were compiled for these same students, as was a record of the days present during the previous school year. One canonical function was interpreted which indicated the existence of a moderate relationship among the variables. Analysis of variable weights indicated that the function largely capitalized on the relationship between the MHLC-C subscales and the CAT subscales, with the attendance variable contributing little to the results. Implications of the findings as they relate to educational practice are offered. Five tables are included. (Contains 29 references.) (Author)

HEALTH LOCUS OF CONTROL AND SCHOOL ACHIEVEMENT IN MIDDLE SCHOOL STUDENTS

Larry G. Daniel

University of Southern Mississippi

Linda LeBert

Immaculate Conception Cathedral School

Juanita Haydel

St. Charles Parish Public Schools

Running Head: Health Locus of Control

Paper presented at the annual meeting of the Mid-South Educational Research Association, New Orleans, November 10-12, 1993.

ABSTRACT

The present study investigated the relationship among middle school students' self-perceived locus of control, their school achievement, and their school attendance. A cohort of 265 seventh grade students was administered the children's version of the Multidimensional Health Locus of Control (MHLC-C) scales, which measure health locus of control across three identified subscales: powerful others, chance, and internal. California Achievement Test (CAT) composite subscale scores were compiled for these same students, as was a record of the days present during the previous school year. One canonical function was interpreted which indicated the existence of a moderate relationship among the variables. Analysis of variable weights indicated that the function largely capitalized on the relationship between the MHLC-C subscales and the CAT subscales, with the attendance variable contributing little to the results. Implications of the findings as they relate to educational practice are offered.

HEALTH LOCUS OF CONTROL AND SCHOOL ACHIEVEMENT IN MIDDLE SCHOOL STUDENTS

Obviously, many motivational factors are related to student achievement, including student self esteem, student persistence, and previous student success. It is becoming a more common belief that good health habits will increase school attendance and school achievement, although these relationships have not been thoroughly tested via empirical means. In fact, the notion that these variables are related has been recognized prominently in the recommendations of the National Commission on Children (Hayes, 1991), and the importance of young adolescent health has been frequently mentioned as a corollary to student academic success in a number of comprehensive reports on the needs of young adolescents (e.g., California Department of Education, 1987; Carnegie Council on Adolescent Development, 1989, 1992). For example, the Carnegie Council on Adolescent Development (1992, p. 42) has noted:

> School failure is often itself a symptom of much else that is troubling in an adolescent's life, such as poor nutrition, lack of sleep, chronic and untreated illness, a disorganized home, or a threatening environment. Poor health in all its dimensions, including the problem of depression, clearly interferes with performance in school. It could, therefore, be misleading to rely on reports of school failure as the diagnosis of an adolescent's vulnerability. Instead, school failure may be a warning that a teenager's health needs attention, or that an unhealthy environment

rather than limited talent is the cause of poor academic achievement.

Interestingly, despite the fact that a great deal of attention has been given to building student health habits, little attention has been given to students' health locus of control (i.e., determining whether students view themselves, others, or chance as primarily responsible for their overall health), although Noland and Riggs (Noland, Riggs, & Hall, 1985; Riggs & Noland, 1984) have noted the existence of relationships between health locus of control and health behaviors of students. Moreover, VanArsdell, Roughmann, and Nader (1972) found that elementary school students' levels of dependence (a locus of control indicator), along with indicators of their classroom achievement and social involvement, accounted for 9% of the variance in the number of visits the students made to a school nurse. The researchers suggested that even though these variables' explanatory power was relatively low, it is nevertheless noteworthy due to the plethora of factors that might potentially be related to students' motivations for visiting the school nurse.

Recently, studies focusing on topics such as "health locus of control," "self-care instruction," "empowerment approach to health enhancement," and "the health belief model" have seen a steady increase in the literature (e.g., Arborelius & Bremberg, 1988; Blazek & McClellan, 1983; Fahlberg, Poulin, Girdano, & Dusek, 1991; Fors, Garrison, & Gussin, 1983; Parcel, Nader, & Rogers, 1980; Rosenstock, Strecher, & Becker, 1988; Thompson, Webber, & Berenson, 1988; Wolf, Sklov, Hunter, & Berenson, 1982).

According to locus of control theorists, individuals may be classified as either "internals" or "externals":

> Locus of control is a term used to describe the nature of the expectation held by the individual that a particular event will occur as a result of a specific act of behavior. If the person perceives that this event is contingent upon luck or upon powerful others, the person is said to have an external locus of control. If the person believes the event is contingent upon his or her own behavior, then this person has an internal locus of control. (Parcel et al., 1980, p. 32)

In addition, educational researchers have explored the links between the independent variable of either student general locus of control, learned helplessness, or causal attributions (constructs that, by definition, overlap and are roughly synonymous) and the dependent variable of academic achievement, with a growing base of extant studies justifying that at least some degree of correlation exists among these variables. For example, Wong (1989) found that students generally attributed success in their worst subjects to luck, even though in general the students were more likely to attribute their success to internal factors such as effort and ability. Similarly, Wong (1980) noted that mentally retarded individuals' tendency toward an external locus of control tends to negatively affect their achievement.

It is logical to expect that a student's health locus of control might be correlated with the student's attendance; however, this relationship has rarely been examined in previous empirical studies, and, generally, when it has been there has been relatively no relationship between the two. For instance, Parcel & Nader (1977) found that the number of days a sample of asthmatic children were absent from school did not change significantly even when their health locus of control scores became more internal or less external following a health education intervention.

Purpose

The purpose of the present study was to determine whether middle school students' perceived health locus of control is related to students' group achievement test scores and their school attendance records. The research focus of the present study is noteworthy not only from the viewpoint of increased student achievement but also from the viewpoint of educational finance, considering that educational funding is typically based on student average daily attendance (ADA) figures. Thus if students' perceptions of their overall health locus of control are related to their school attendance, there is a likelihood that interventions to address health locus of control issues might ultimately have a positive effect on educational funding.

Sample

A cohort of 265 seventh grade students from a single public middle school in Louisiana served as the sample. As to variation in ethnicity, the sample was 77% Caucasian, 21% African American, and 2% other. The sample was felt to represent a range of socioeconomic levels, with 34% of the respondents eligible for free/reduced lunch.

Methodology

Subjects were administered the children's version of the Multidimensional Health Locus of Contrc' (MHLC) Scales (Thompson, Butcher, & Berenson, 1987; Thompson, Webber, & Berenson, 1988). The instrument, hereinafter referred to as the MHLC-C, measures health locus of control across three identified subscales: powerful others, chance, and internal. It is based on the Multidimensional Health Locus of Control Scale (Wallston & Wallston, 1978; Wallston, Wallston, Kaplan, & Maides, 1976) and a similar children's health locus of control scale (Parcel & Meyer, 1978). California Achievement Test (CAT) composite subscale scores (expressed in national percentile equivalents) were compiled for these same students, as was a record of the days present during the previous school year.

Considering that the MHLC-C scales have previously been validated only with elementary school children, the present study provided an opportunity to determine whether the scales could be shown to be construct valid when used with middle school students. Exploratory principal components factor analysis of the subjects' responses to the MHLC-C was utilized for this purpose.

The study's substantive research question was: To what extent is there a relationship between the predictor variables of powerful others, chance, and internal loci of control (as measured by MHLC-C subscale scores) and the criterion variables of academic achievement in reading, language arts, math, science, and social studies (as measured by the California Achievement Test) and school attendance (as measured by total days present). Canonical correlation analysis was utilized to determine the extent of this relationship.

Results

Due to missing data, the sample size varied to some degree across the analyses. For the factor analytic procedures conducted using the subjects' MHLC-C responses, usable data were available for 259 respondents. In conducting the canonical correlation analysis for testing the study's substantive research question, data were available from only 225 respondents. A detailed explanation of the results of these two analyses follows.

Factor Analytic Results

An exploratory principal components factor analysis was conducted using the SPSSx FACTOR procedure and the MHLC-C data from the respondents. The purpose of this analysis was to determine whether the factor structure of the MHLC-C using the present sample would be similar to that obtained using elementary school students in previous studies, thereby offering evidence of the construct validity of the instrument when used with young adolescents. The analysis indicated that there were six principal components meeting the eigenvalue greater than unity criterion. An inspection of the "scree" plot (Cattell, 1966) of the eigenvalues indicated a clear break between Factors III and IV, with a secondary flattening out of the eigenvalues between Factors VI and VII. Based on the scree plot, three factors were extracted and rotated to the varimax criterion. The resultant varimax-rotated factor matrix, along with the text of the 24 MHLC-C items, is presented in Table 1.

INSERT TABLE 1 ABOUT HERE

In general the structures of the three factors approximate, respectively, the powerful others, chance, and internal factors identified by Thompson et al. (1987, 1988). Seven of the expected eight "powerful others" items were highly salient (structure coefficients greater than |.35|) with Factor I. The remaining item (MHLC-C5) was not correlated to a noteworthy degree with any of the three factors. Items most salient with Factor II included six of the eight expected "chance" items. Three additional items were correlated at |.35| or greater including MHLC-C14 and MHLC-C18, which were "doublet" items (i.e., items which saturate the factor space of more than one factor--in this case, both Factors I and II), and MHLC-C12, which was expected to correlate with the "external" factor. Finally, Factor III was most highly saturated with six of the expected eight "internal" items. Of the remaining two expected internal items that were not correlated highly with Factor III, MHLC-C2 was not correlated to a noteworthy degree with any of the three factors and MHLC-C12 was correlated most highly with Factor II. One additional item (MHLC-C17) was correlated beyond the |.35| level with Factor III. This item had been expected to correlate with the "chance" factor.

Canonical Correlation Results

A canonical correlation analysis was conducted using the SPSSx MANOVA procedure and the MHLC-C data, California Achievement Test (CAT) subscale scores, and attendance data from the respondents. The purpose of this analysis was to test the substantive research question posited for the present study investigating the degree to which students' health locus of control would be correlated with their national percentile scores on five CAT subtests and their attendance (number of days present the previous school year). For the purpose of conducting this analysis, the 24 MHLC-C items were collapsed into three subscale scores according to the subscales posited by Thompson et al. (1987, 1988). The eight items designated by Thompson et al. as comprising each subscale were summed and the resultant three variables were designated as POWOTHER (powerful others subscale score), CHANCE (chance subscale score), and INTERNAL (internal subscale score).

By default the SPSSx MANOVA procedure, which is designed for performing a multivariate analysis of variance, conducts a canonical correlation analysis when no independent variables are specified and when the canonical predictor variables are specified as covariates. Canonical correlation analysis creates composites of the variables in each of the two variable sets and then computes a bivariate correlation between these two composite variables. These composites, also called canonical variates, are, in effect, synthetic variables created by the analysis via statistically weighting the variables in a set and then summing the weighted variables. The simple bivariate correlation between these two synthetic canonical variates is the canonical correlation (R_c).

For the present analysis, the five subscales of the CAT and the attendance variable (DAYSPRES) were specified as criterion variables and the three MHLC-C subscale scores were specified as predictor variables. Descriptive statistics for and intercorrelations among all of the variables included in the analysis are presented in Tables 2 and 3, respectively.

INSERT TABLES 2 AND 3 ABOUT HERE

As noted in Table 3, the five CAT subscale scores (READING, LANGUAGE, MATH, SCIENCE, and SOCIALST) are highly intercorrelated among themselves, with none of the bivariate correlations among these variables less than .63, a characteristic often referred to as "collinearity" or "multicollinearity." By contrast, the correlations between the attendance variable (DAYSPRES) and the CAT subscale scores are quite low, with the correlation with the CAT math subscale (r = .21) most noteworthy. Within the predictor variable set, the three MHLC-C subscales were minimally to moderately correlated with one another, with r's ranging from .16 to .41. Hence, there is also some degree of collinearity among the predictor variables. READING and SCIENCE had the highest cross-set correlations with the three MHLC-C subscales, while DAYSPRES had the lowest correlations with these subscales. Although most of the cross-set bivariate correlation coefficients were relatively small, the tendency was toward positive correlations between the six criterion variables and the two externally-oriented subscales of the MHLC-C (POWOTHER and CHANCE) and negative correlations between the six criterion variables and the internally-oriented subscale of the MHLC-C (INTERNAL).

For any given canonical analysis, the number of canonical functions, or roots, yielded by the analysis will be equal to the number of variables in the smaller variable set. Since the present analysis included three predictor variables and six criterion variables, the analysis yielded three roots. The three roots along with their associated eigenvalues are presented in Table 4. The eigenvalue for each root represents the ratio of the explained sum of squares to the error sum of squares, while the squared canonical R (R_c^2) for each root represents the ratio of the explained sum of squares to the total sum of squares (Norusis, 1985). Hence, the R_c^2 is an estimate of the magnitude of effect of the predictor variables on the criterion variables and expresses the correlation between the two variable sets in terms of a percentage of relationship.

INSERT TABLE 4 ABOUT HERE

As indicated in Table 4, of the three roots, only the first root was statistically significant ($R_c = .33$, $R_c^2 = .11$, $p < .01$). Hence, for the first root, approximately 11% of the variance in the criterion variables was accounted for by the three MHLC-C subscale scores. The remaining roots are not worthy of interpretation as they express only a negligible degree of relationship between the two variable sets (approximately 4% and 1%, respectively).

In interpreting the degree to which a given variable has contributed to a canonical function, researchers may consult both canonical function and canonical structure coefficients. Function coefficients are the derived weights applied to each of the variables in a given set in order to obtain the composite variate used in the canonical correlation analysis. Even though the absolute magnitude of the function coefficients may be somewhat reliable in determining the contribution of a variable to the composite, these coefficients are highly affected by collinearity of variables in a given set as is often the case when employing canonical correlation analysis (Daniel, 1990). Canonical structure coefficients indicate the degree of correlation of a given variable in a set with the canonical composite for the variable set; hence, "structure coefficients can be consulted to determine which variables contribute most to defining a solution and to determine the contribution of a variable to a given function" (Thompson, 1984, p. 61). Structure coefficients tend to be much less susceptible to instability due to collinearity of the variables in a given set. Hence, structure coefficients are generally considered to be more reliable than function coefficients as indicators of variable contribution in a canonical analysis.

Canonical structure and function coefficients for variables in each set across the three canonical functions are presented in Table 5. As previously noted, since only the first function accounted for a noteworthy amount of the variance between the two sets, contributions of the variables in the two sets to functions two and three will not be interpreted. An analysis of the structure coefficients for Function I indicates that all of the CAT subscale scores contributed to a relatively large degree to their canonical variate, with structure coefficients for these values ranging in absolute value from .49 (LANGUAGE) to .88 (SCIENCE). The attendance variable (DAYSPRES) did not contribute significantly to the criterion variable composite for this first function, with a structure coefficient of -.296. For the predictor set. each of the three MHLC-C subscale scores contributes to some degree to their canonical variate, with POWOTHER contributing most highly, followed in order by CHANCE and INTERNAL. Hence, Function I seems to be capitalizing on the relationship between the three MHLC-C subscale scores and the five CAT subscale scores. The MHLC-C subscale scores have a relatively negligible effect on the attendance variable when considered in the company of the CAT subscale scores.

INSERT TABLE 5 ABOUT HERE

Discussion

The purpose of the present study was to investigate the relationship between health locus of control and the dependent variables of school achievement and school attendance. Analyses of data included (a) conducting a factor analysis of the MHLC-C items to determine the degree to which the factor structure of the instrument using data from middle school students would match that obtained by Thompson et al. (1987, 1988) using elementary school students, and (b) conducting a canonical correlation analysis to determine the degree to which the substantive relationships postulated among the variables in the two sets existed. A discussion of the results of each of these analyses follows.

Discussion of Factor Analytic Results

As noted by Comrey and Lee (1992), composition of a sample is crucial to the results yielded by a factor analytic study. Consequently, some instruments yield meaningful factors based on data from one sample, but nonsensical ones based on data from another sample. Moreover, Kerlinger (1986) notes that replication of factor analytic results across different independent samples serves as "compelling evidence of the empirical validity of the original results" (p. 593). In the present case, replication of the factor analysis of the MHLC-C items was particularly warranted considering that Thompson (1987, 1988) had used a sample of somewhat younger students than the middle school students utilized in the present study. Hence, that the factor structure yielded using the middle school data was remarkably similar to the results by Thompson et al. lends further credibility to the construct validity of the instrument and, additionally, suggests the suitability of the instrument for measuring the health locus of control of students of varying ages. As noted by Thompson et al. (1988), the instrument could be useful to program evaluators who wish to evaluate intervention programs designed to modify students' health attitudes or behaviors or to counselors and teachers who wish to diagnose and place students into health education interventions suited to their perceived needs.

Discussion of Canonical Correlation Results

The foregoing canonical correlation analysis results support the notion that health locus of control is related to academic achievement of middle school students, but not to these students' school attendance. The school attendance findings substantiate the previous findings of Parcel and Nader (1977). School attendance is an important issue, not only from the viewpoint of students' need to be in school in order to take advantage of educational opportunities but also from the viewpoint of school funding, considering that most funding models are based on school attendance. Hence. efforts to improve student attendance are worthy of educators' consideration. However, the results of the present study suggest that educational programs designed to motivate students toward a more internal health locus of control may not be the most effective way to improve students' school attendance.

Regarding the relationship between health locus of control and student achievement, the results are more promising. The findings suggest that students' overall health attitudes have a moderate but noteworthy effect on their achievement across multiple subject areas. Interestingly, higher powerful others and chance MHLC-C scores were likely to accompany higher achievement scores, while lower internal MHLC-C scores tended to be characteristic of those scoring higher on the CAT subscales, trends somewhat inconsistent with Wong's (1989) findings that students are generally more internally directed regarding their motivations for academic success and Nunn's (1987) findings that children with high internal locus of control are prone to success and those with external locus of control are prone to failure. Indeed, this may be a reflection of the conformity tendencies of young adolescents, with the implication that if they attribute their successes to significant others around them rather than to either chance or internal abilities they will be more likely to achieve success. These findings suggest that the influence of educators and parents on students at the middle school level is very important, supporting the teacher advisee programs espoused by middle school advocates and currently used in many middle level schools.

In sum, the canonical correlation results suggest that middle school students' health locus of control is clearly related to their academic achievement. Although the present study is correlational rather than causal in nature, one implication of the findings would be that health education programs designed to develop students' attitudes about their health might well be potentially useful in increasing student achievement. Experimental studies in which achievement is compared across one group of students who participate in such a program and another group who do not would be beneficial in exploring the validity of this prospect. However, one rival explanation for the findings is that the canonical results have capitalized on the students' generalized locus of control as expressed through the health-related items on the MHLC-C. In other words, locus of control in general may be related to student achievement, but the specific locus of control a student has toward health issues may not necessarily be. This possibility conjures up an old debate on how best to measure an individual's perception of control.

As Thompson and Spacapan (1991, p. 10) have noted, it is unclear "whether or not perceptions of control should be seen as a personality disposition. . . or a situationally specific perception." Hence, programs aimed at developing health attitudes may have little to no effect on students' achievement.

This rival explanation offers at least two interesting ideas for future research. First, it might be useful to administer both the MHLC-C and a generalized locus of control measure to a sample of middle school students. If scores from the two instruments are highly correlated, one might assume that they are measuring basically the same construct expressed in two different ways. Second, one might wish to use both types of instruments as predictors of student achievement and, by conducting a commonality analysis, determine the degree to which the predictive power of either of the two sets of scores overlaps with that of the other, or else is, in fact, unique.

References

Arborelius, E., & Bremberg, S. (1988). "It is your decision!"--Behavioural effects of student-centred health education model at school for adolescents. Journal of Adolescence, 11, 287-297.

Blazek, B., & McClellan, M. S. (1983). The effects of self-care instruction on locus control in children. Journal of School Health, 53, 554-556.

California Department of Education. (1987). Caught in the middle: Educational reform for young adolescents in public schools. Sacramento, CA: Author.

Carnegie Council on Adolescent Development. (1989). Turning points: Preparing American youth for the 21st century. New York: Carnegie Corporation.

Carnegie Council on Adolescent Development. (1992). Fateful choices: Healthy youth for the 21st century. New York: Carnegie Corporation.

Cattell, R. B. (1966). The scree test for the number of factors. Multivariate Behavioral Research, 1, 245-276.

Comrey, A. L., & Lee, H. B. (1992). A first course in factor analysis (2nd ed.). Hillsdale, NJ: Erlbaum.

Daniel, L. G. (1990, January). Use of structure coefficients in multivariate educational research: A heuristic example. Paper presented at the annual meeting of the Southwest Educational Research Association, Austin, TX. (ERIC Document Reproduction Service No. ED 315 452)

Fahlberg, L. L., Poulin, A. L., Girdano, D. A., & Dusek, D. E. (1991). Empowerment as an emerging approach in health education. Journal of Health Education, 22, 185-193.

Fors, S. W., Garrison, P. B., & Gussin, G. (1983). Evaluation of the self-discovery health curriculum project: A case study. Health Education, 14(3), 21-24.

Hayes, C. D. (1991). Highlights of the recommendations of the National Commission on Children. Young Children, 46(6), 30-33.

Kerlinger, F. N. (1986). Foundations of behavioral research (3rd ed.). Fort Worth, TX: Holt, Rinehart and Winston.

Noland, M. P., Riggs, R. S., & Hall, J. W. (1985). Relationships among health knowledge, health locus of control, and health status in secondary special education students. Journal of Special Education, 19, 177-187.

Norusis, M. J. (1985). SPSSx advanced statistics guide. New York: McGraw-Hill.

Nunn, G. D. (1987). Concurrent validity between children's locus of control and attitudes toward home, school, and peers. Educational and Psychological Measurement, 47, 1087-1089.

Parcel, G. S., & Meyer, M. P. (1978). Development of an instrument to measure children's health locus of control. Health Education Monographs, 6, 149-159.

Parcel, G. S., & Nader, P. R. (1977). Evaluation of a pilot school health education program for asthmatic children. Journal of School Health, 47, 453-456.

Parcel, G. S., Nader, P. R., & Rogers, P. J. (1980). Health locus of control and health values: Implications for school health education. Health Values, 4(1), 32-37.

Riggs, R. S., & Noland, M. P. (1984). Factors related to the health knowledge and health behavior of disadvantaged black youth. Journal of School Health, 54, 431-434.

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the health belief model. Health Education Quarterly, 15, 175-183.

Thompson, B. (1984). Canonical correlation analysis: Uses and interpretations. Beverly Hills: SAGE.

Thompson, B., Butcher, A., & Berenson, G. (1987). Children's beliefs about sources of health: A reliability and validity study. Measurement and Evaluation in Counseling and Development, 20, 80-88.

Thompson, B., Webber, L., & Berenson, G. S. (1988). Validity of a children's health locus of control study: A "Heart Smart" study. American Journal of Health Promotion, 3(2), 44-49.

Thompson, S. C., & Spacapan, S. (1991). Perceptions of control in vulnerable populations. Journal of Social Issues, 47(4), 1-21.

Wallston, K. A., & Wallston, B. S. (1978). Development of the Multidimensional Health Locus of Control (MHLC) Scales. Health Education Monographs, 6, 161-170.

Wallston, B. S., Wallston, K. A., Kaplan, G. D., Maides, S. A. (1976). Development and validation of the Health Locus of Control (HLC) Scale. Journal of Consulting and Clinical Psychology, 44, 580-585.

Wolf, T. M., Sklov, M. C., Hunter, S. M., & Berenson, G. S. (1982). Factor analytic study of the children's Nowicki-Strickland Locus of Control Scale. Educational and Psychological Measurement, 42, 333-337.

Wong, B. (1980). Motivation for learning in mildly handicapped adolescents and young adults: A review of related theories. Exceptional Education Quarterly, 1, 37-45.

Wong, L. Y. S. (1989, September). Do academic subject areas matter when making causal attributions? Paper presented at the annual meeting of the British Psychological Society, Cambridge. (ERIC Document Reproduction Service No. ED 324 340)

Table 1
Varimax Rotated Factor Matrix for MHLC-C Variables
(n = 259)

		FACTOR I[1]	FACTOR II[2]	FACTOR III[3]	h^2
MHLC-C1	I am in control of my own health.	.00720	-.03240	.62187*#	.40
MHLC-C2	My own actions mostly determine how soon I will recover from an illness.	.12034	.10230	.34319#	.14
MHLC-C3	No matter what I do, if I am going to get sick I will get sick.	-.09991	.43137*#	.05767	.20
MHLC-C4	The best way to keep from getting sick is to have regular medical checkups.	.54148*#	.00792	.29674	.38
MHLC-C5	My family has a lot to do with my becoming sick or staying healthy.	.17322#	.14476	.29729	.14
MHLC-C6	If I take the right actions, I can stay healthy.	.17106	-.06722	.61634*#	.41
MHLC-C7	The main thing which affects my health is what I do.	.18397	.17917	.36724*#	.20
MHLC-C8	My good health is mostly a matter of good luck.	.13372	.68495*#	.04876	.49
MHLC-C9	If I take good care of myself I can avoid illness.	.34841	-.09838	.50948*#	.39
MHLC-C10	Most things that affect my health happen to me by accident.	-.25078	.28099#	.32067	.24
MHLC-C11	Whenever I don't feel well, I should see a doctor or nurse.	.59395*#	.08620	.19174	.40
MHLC-C12	When I get sick, I am to blame.	-.05800	.45372*	.14324#	.23
MHLC-C13	Luck is mostly what determines how soon I will recover from an illness.	.26095	.70039*#	-.07655	.56
MHLC-C14	Doctors and nurses control my health.	.39393*#	.40489*	.03550	.32
MHLC-C15	When I get well it's usually because other people (like family, friends, doctors, or nurses) have been taking care of me.	.44991*#	.05341	.33953	.32
MHLC-C16	I am likely to get sick no matter what I do.	.27505	.39158*#	-.09493	.24
MHLC-C17	If it's meant to be, I will stay healthy.	-.02300	.33556#	.41088*	.28
MHLC-C18	I can only do what my doctor tells me to do about my health.	.54465*#	.35307*	.12312	.44
MHLC-C19	I can do many things to prevent illness.	.01430	-.08028	.66581*#	.45
MHLC-C20	Bad luck makes people sick.	.11339	.63821*#	-.00987	.42
MHLC-C21	I always go to the nurse right away when I get hurt at school.	.79105*#	.05995	.06310	.63
MHLC-C22	People who never get sick are just plain lucky.	.15398	.66953*#	-.08248	.48
MHLC-C23	I can make choices about my health.	.06640	-.09529	.62449*#	.40
MHLC-C24	Whenever I feel sick, I go to see the school nurse right away.	.77595*#	.08220	.04527	.61
Eigenvalue		4.42	2.65	1.72	
Percent of Variance Explained		18.4	11.1	7.2	

[1]Roughly equivalent to the "powerful others" factor postulated by Thompson et al. (1987, 1988).
[2]Roughly equivalent to the "chance" factor postulated by Thompson et al. (1987, 1988).
[3]Roughly equivalent to the "internal" factor postulated by Thompson et al. (1987, 1988).
*Denotes structure coefficients greater than |.35|.
#Denotes factor with which item was most salient in analyses by Thompson et al. (1987, 1988).

Table 2
Descriptive Statistics for Variables Included in the Canonical Analysis

VARIABLE	MEAN	STD DEV	MINIMUM	MAXIMUM	VALID N
READING	59.662	24.749	5	99	225
LANGUAGE	69.022	22.629	12	99	225
MATH	65.360	22.697	12	99	225
SCIENCE	62.520	24.298	4	99	225
SOCIALST	50.631	24.753	1	99	225
DAYSPRES	169.307	6.661	129	180	225
POWOTHER	21.493	6.275	9.00	40.00	225
CHANCE	26.284	5.723	10.00	40.00	225
INTERNAL	17.182	4.692	9.00	40.00	225

Table 3
Correlations Among the Variables Included in the Canonical Analysis

	READING	LANGUAGE	MATH	SCIENCE	SOCIALST	DAYSPRES	POWOTHER	CHANCE	INTERNAL
READING	1.0000	.7623	.6336	.7908	.7751	.0216	.2246	.1635	-.0321
LANGUAGE	.7623	1.0000	.6959	.6627	.6751	.1246	.1208	.0526	-.0542
MATH	.6336	.6959	1.0000	.6871	.6892	.2056	.1424	.0402	-.1310
SCIENCE	.7908	.6627	.6871	1.0000	.7711	.0943	.1854	.1451	-.1118
SOCIALST	.7751	.6751	.6892	.7711	1.0000	.0811	.1511	.0917	-.1281
DAYSPRES	.0216	.1246	.2056	.0943	.0811	1.0000	.0305	-.0455	-.1084
POWOTHER	.2246	.1208	.1424	.1854	.1511	.0305	1.0000	.3254	.4148
CHANCE	.1635	.0526	.0402	.1451	.0917	-.0455	.3254	1.0000	.1597
INTERNAL	-.0321	-.0542	-.1310	-.1118	-.1281	-.1084	.4148	.1597	1.0000

NUMBER OF VALID OBSERVATIONS (LISTWISE) = 225.00

Table 4
Eigenvalues and Canonical Roots
($\underline{n}$ =225)

Root No.	Eigenvalue	Pct.	Cum. Pct.	Canon. Cor.	Squared Cor.
1	.125	70.402	70.402	.333*	.111
2	.046	25.650	96.052	.209	.044
3	.007	3.948	100.000	.083	.007

*Statistically significant at $\underline{p} < .01$.

Table 5
Canonical Function and Structure Coefficients

Standardized canonical function coefficients for DEPENDENT variables

Variable	Function I	Function II	Function III
READING	-.610	-1.444	-1.020
LANGUAGE	.606	.238	-.210
MATH	-.288	.489	-.794
SCIENCE	-.478	-.019	1.330
SOCIALST	-.132	.794	.534
DAYSPRES	-.244	.345	-.273

Structure coefficients for DEPENDENT variables

Variable	Function I	Function II	Function III
READING	-.815	-.344	-.223
LANGUAGE	-.494	.045	-.332
MATH	-.721	.345	-.360
SCIENCE	-.880	-.022	.225
SOCIALST	-.781	.186	.058
DAYSPRES	-.296	.507	-.316

Standardized canonical function coefficients for PREDICTOR variables

Variable	Function I	Function II	Function III
POWOTHER	-.892	.021	-.722
CHANCE	-.283	-.609	.817
INTERNAL	.778	-.715	-.304

Structure coefficients for PREDICTOR variables

Variable	Function I	Function II	Function III
POWOTHER	-.661	-.473	-.582
CHANCE	-.449	-.716	.534
INTERNAL	.363	-.803	-.473