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ABSTRACT

The relationship between locus of control (LC), grade point average (GPA), standardized achievement test scores (SAT), sex, and socioeconomic status (SES) was investigated among a sample of 174 eighth graders who responded to the Nowicki-Strickland locus on control instrument. Certain partial correlations between momentary achievement (standardized test results), continuing achievement (grade point average), sex and socioeconomic status were explicated. Utilizing sex, socioeconomic status and locus of control as independent variables, a significant interaction between sex and type of achievement was noted. When considering sex differences with LC scores, GPA was more predictable than standardized test results. However, when sex was not considered, standardized test results were as predictable as GPA. (Author)

Interrelationships amongst locus of control, socioeconomic status, sex and achievement

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Abstract

A sample of 174 eighth graders responded to the Nowicki-Strickland locus of control instrument. Certain partial correlations between momentary achievement (standardized test results), continuing achievement (grade point average), sex and socioeconomic status are explicated. Utilizing sex, socioeconomic status and locus of control as independent variables it is noted that there is a significant ($p<.05$) interaction between sex and type of achievement. When considering sex differences with locus of control scores, grade point average is more predictable than standardized test results. However, when sex is not considered, standardized test results are as predictable as grade point average. Implications regarding possible conflicting results with locus of control instruments predicting achievement are delineated.

Interrelationships amongst locus of control, socioeconomic status, sex and achievement[1]

Recent emphasis in educational psychology has focused on the need to increase achievement and provide an equal educational opportunity for all students. Associated with the high interest in these two primary objectives, many researchers have investigated the relationships which sex, intelligence, race and socioeconomic status have with cognitive achievement. Some researchers have also focused on determining how certain personality variables such as self-esteem and locus of control might have an influence upon achievement behaviors.

Locus of control is essentially Rotter's (1966) concept of internal and external control of reinforcement, a generalized expectancy regarding the causal relationship between behavior and its consequences. Rotter has hypothesized that a person who holds an expectancy of internal control perceives events or consequences as contingent upon his own behavior, but a person with an external perception fails to see the connection between his efforts and their consequences. Based on a series of studies Rotter concluded that locus of control is both a viable and measurable concept which can be used as a predictor of logical behavior patterns.

If locus of control is a generalized expectancy, then externality should result in a child's failure to perceive the relationship between his intellectual striving behavior and his achievement. Without a reason to engage in academic activities the "external child" should not exhibit the type of

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[1]We wish to acknowledge the assistance of Ms. Connie Cox in the data collection procedures.

behavior necessary for school success. Conversely, the internal child, perceiving a relationship between his efforts and achievement, should direct his efforts towards academic pursuits resulting in school achievement. The available research investigating the relationship between locus of control and achievement has yielded conflicting results. Lefcourt (1976, p. 71), after reviewing several studies which attempt to relate various locus of control measures to achievement states, "...the relationship between various measures of locus of control and achievement behaviors are often riddled with inconsistent and, as Stephens puts it, 'weird' results." Rotter (1966) and others (Harrison, 1968; Battle and Rotter, 1963; Franklin, 1963; Bartell, 1971; Wyne, 1974; Shea, 1976) suggest some reasons for such weird results noting the possible differential influence of sex and SES on locus of control. Furthermore it is a well established fact that sex and SES have a considerable moderating effect on school achievement. School achievement itself can be measured as either a continuing state, Grade Point Average (GPA), or as a momentary event, standardized achievement tests (SAT). Is it little wonder that studies looking at the relationship between locus of control and achievement obtain weird results when sex, SES, and achievement are not controlled?

It is contended that much of the previous research analyses have not been placed within a proper perspective. One clue regarding inconsistencies in the relationships found between locus of control as correlated with standardized achievement test scores and GPA might point to the question of causation: i.e., does locus of control cause achievement or does achievement cause locus of control? We have assumed that they both interact in a reciprocal fashion. Since GPA reflects a continuing state and evolving academic experience in a child's day to day school life, it is felt that it (GPA) should be of primary importance as a determinant of locus of control. Standardized achievement

scores, though more objective measures of achievement, are only a momentary event in the school experiences of children, and subject to the influence of locus of control, but it in return should not influence locus of control. Crandall, Katkovsky and Crandall (1965) have suggested that teachers' grades not only reflect achievement (acquired knowledge) but often may indicate teachers' perceptions of a child's "approach behaviors" (i.e., initiative, persistence, effort, cooperativeness). Assuming this to be correct we hypothesized a model in which interrelationships of GPA, SES, sex and locus of control are more evident than the interrelationship between standardized achievement test result and locus of control, SES and sex.

The objective of this study was one of describing the relationship between locus of control (LC), two measures of academic achievement which are grade point average (GPA) and standardized achievement test scores (SAT), and to note the effects of sex and socioeconomic status (SES) on these relationships. Toward this end a path diagram approach was implemented (Namboodiri, Carter & Blalock, 1975).

Method

Subjects. The suburban district from which the 174 subjects were drawn is located in the Midwest and was formed in 1955 from a county ordered consolidation of several communities. In 1970 the state ordered the district, which already had a small proportion of Black students, to merge with a neighboring all Black school district. This produced a newly integrated district comprised of 30% Black and 70% White students. The students come from a variety of backgrounds including a community of poor Appalachian Whites, a Black ghetto, both middle and upper class whites as well as middle to upper-middle class Blacks. The subjects were eighth grade volunteering students attending the district's Junior high which includes grades seven and eight with an enrollment of 1440

students (67% White and 33% Black). The sample used in this study represents a heterogeneous group with respect to academic ability and contains approximately 23% Blacks and 77% Whites with 53% males and 47% females.

Instrument. Locus of control was measured by the Nowicki-Strickland scale (1968). The scale consists of 40 items which require a "yes" or "no" response. The scores could theoretically range from 0 to 40, with higher scores being interpreted as internal and lower scores as external. The scale was administered by regular classroom teachers who read the questions aloud while students read from their own copies and recorded their answers on a separate sheet.

The Stanford Achievement Test (SAT) (Madden, Gardner, Rudman, Karlesen and Merwin, 1975) served as one measure of achievement. The SAT was administered during three separate testing periods by each student's homeroom teacher. The raw score for the total battery served as the one general measure of standardized achievement. The measure of school achievement was the report card grade average for the first school quarter. This average was determined from the students' grades in the five academic areas of math, English, science, history and reading. Points were assigned to each letter grade as follows: A=4, B=3, C=2, D=1, F=0. The average of these points over the five topic areas served as the grade point average.

Socioeconomic status. Socioeconomic status was determined by using the Hollingshead Two Factor Index of Social Position (Bonejan, Hill and McLemore, 1967). To determine the social position of a person or family the head of the household's occupation and highest level of formal education were obtained. This information was requested on a cover letter seeking parental permission for their children to take part in the study. This information was then transformed into the two factors of education and occupation and individually weighted and summed to yield one index of SES which ranged from 11 to 77. The

lower one's index score the higher is his SES.

Analysis and Results. The intercorrelations of the four previously defined variables and sex were determined (see Table 1). The variable intercorrelations were then analyzed using a non-recursive path analysis model (Namboodiri, et al, 1975). In this model GPA, SAT and LC are assumed to be endogenous variables, dependent, while sex and SES are clearly exogenous, independent. Furthermore GPA and LC are assumed to be related by reciprocal causation which implies that either may be considered as exogenous when predicting the other.

Table 1 about here

In Figure 1 any variable with single-headed arrows pointing to it can be expressed as a linear function of the variables from which the arrows eminate. All path coefficients in this figure are second order partial correlations. When squared they reflect the proportion of variance of the endogenous variables that can be predicted independently of the other variables. The assumed mutual influence of LC on GPA and GPA on LC, reciprocal causation, is noted in Figure 1 by two separate arrows with heads pointing in opposite directions. SAT and GPA have an extremely high correlation, as may be noted in Table 1, but such a relationship was both logical and expected. Our interest is not in the relationship between GPA and SAT; thus, there are no connecting arrows between these two variables.

Figure 1 about here

The square of the e_1 and e_2, and e_3 values represent the proportion of variance of LC, GPA and SAT respectively that cannot be explained or predicted within the system of exogenous variables, or reciprocal causation, being considered. This particular path analysis is referred to as a non-recursive model because e_1, e_2 and e_3 are assumed to be correlated. The squared multiple correlation (R^2) of each endogenous variable is noted within the variable circle as determined by those exogenous variables connected to the variable.

In Figure 1 SES and sex are intercorrelated for unknown reasons. This intercorrelation is noted by a curved double-headed arrow connecting sex and SES. The associated path coefficient is set equal to the zero-order correlation between sex and SES and does not represent a second order correlation.

Discussion

It is seen in Figure 1 and Table 1 that there are no substantial interrelationships amongst SES, Sex and LC. Therefore there is no differential influence of Sex or SES on LC. We do find significant ($p<.05$) second order partial correlations between LC and GPA, SES and GPA, and Sex and GPA. In a somewhat similar fashion, we found significant ($p<.05$) second order partial correlations between LC and SAT, LC and SES, but not between Sex and SAT. The multiple correlation on GPA ($R=.83$; $R^2=.49$) is larger than the multiple correlation on SAT ($R=.56$; $R^2=.32$). Thus, GPA appears to be more predictable than SAT.

However, the greater predictability of GPA is not primarily a function of any single variable, but is a function of all three independent variables (Sex, LC and SES). In particular, the second order partial between Sex and GPA is significantly greater than the second order partial between Sex and SAT ($Z=4.62$, $p<.05$). Additionally, the second order partial between SES and

GPA is tentatively larger than the second order partial of SES and SAT (Z= 1.44; p=.08). The second order partial between LC and GPA is tentatively larger than the second order partial between LC and SAT (Z=1.44, p=.08). Though these later two comparisons have minimal statistical significance, it must be noted that GPA remains generally more predictable than SAT.

Thus, SES, Sex, and LC show non-significant ($p<.05$) partial intercorrelations with each other. However, SES, LC and especially Sex did show a differential relationship between achievement measures. The weird results alluded to in previous studies by Lefcourt (1976) reviewing Crandall, 1962, Chance, 1972, Crandall et al, 1965, Franklin, 1963, James, 1965, McGhee & Crandall, 1968, Lessing, 1969, Harrison, 1968, Katz, 1967, Nowicki & Roundtree, 1971 and Stephens, 1973, are most likely a function of the authors' failure to consider the nature of achievement, momentary vs continuing. Those authors investigating continuing achievement would find achievement considerably more predictable than those investigating momentary achievement especially if both sets of authors were to consider the effects of sex in their analyses. Alternatively, if neither set of authors considered the effects of sex they would arrive at generally the same conclusions regarding the predictability of achievement as is evidenced by the zero order correlations in Table 1 between locus of control and either achievement measure.

In retrospect it might have been informative to obtain LC measures using more than one instrument with more than one general age. There is a body of research suggesting that LC is developmental (Wichern and Nowicki, 1976; Crandall, 1973; Chance, 1972), changing with age, yet we have provided no information regarding the possible moderating effects of age with our complex of variables. Logically when considering age the R^2 of the two achievement measures would increase if LC were developmental. Yet, there seems to be no

basis for assuming that the partial correlations between LC and achievement will change unless the reliability of the two achievement measures change, which is a consideration beyond the scope of this paper. The use of different LC measures would completely vichiate the findings of this study. We have no way at this time of logically predicting what might occur with other LC instruments other than different results might be obtained.

In conclusion, researchers looking at the relationship between Locus of Control and achievement would be well advised to consider the interaction that will occur between sex and type of achievement and possible differential effects of various measures of locus of control. The Nowicki-Strickland instrument appears to be predictive of achievement. But, like the term "intelligence" the term "locus of control" may be too ambiguous to be generalized from one environmental context to another.

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Table 1. Intercorrelations and descriptive statistics of exogenous and endogenous variables; n=174.

	GPA	SES	SEX[b]	LC	SAT
GPA	1.00				
SES	-.44[a]	1.00			
SEX	.18	.10	1.00		
LC	.48	-.19	.00	1.00	
SAT	.81	-.46	.02	.48	1.00
Mean	2.60	38.57	.53	28.18	312.60
S.D.	.82	15.69	.50	4.74	84.43

[a]All correlations greater than .14 are considered to be significantly ($p<.05$) different from zero.

[b]Males were coded as zero while females were coded as unity.

Figure 1. Non-recursive path analysis diagram