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ABSTRACT

Using data from the High School and Beyond longitudinal study, the relationships among gender and rural, suburban, or urban setting and academic ability were examined. Data reflect the population of high school sophomores and seniors in 1980. When the influence of socioeconomic status was controlled, gender and setting each explained little or no variance in the academic and psychological measures examined. No appreciable deficits in the students were attributable to setting alone. The magnitude of gender differences was also not appreciable. (SLD)

The Relationship between Gender and Academic Abilities in Rural, Suburban and Urban Contexts: Data from High School and Beyond

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The relative contributions of gender and social background to the development of academic skills and achievement have intrigued scholars and educators for several decades. The rapid post-World War II movement to consolidated schools was justified, in part, by concerns for efficiency, not only of cost, but of program and quality of instruction. Implicit was the view that economies of scale would be translated into more curricular options and increased abilities to match students with appropriate courses and levels of instruction--in short, better education for all students. Much of the impetus for such change came, however, from research based on urban students in urban schools. Today's rural students typically are not in settings where more consolidation is a practical solution.

The role and values of the small and rural schools of America continue to interest us. As Stephens (1985, p. 167) noted, there is a "growing but nonetheless limited and still largely non-additive research base to support many of the claims of the values and benefits of small schools." Similarly, Helge (1986) reported that "rural school effectiveness" was the highest ranking research cluster with respect to its importance to the field of rural education.

The precursors of observed gender differences in academic achievement have similarly intrigued educational researchers. While few question the observation that gender differences in the verbal and quantitative domains exist, with girls and boys respectively manifesting greater abilities (Maccoby & Jacklin, 1974), the question of the roots of these differences remains. Most recently, Hogrebe, Mist, and Newman (1985) suggested that the recent research on gender differences has most often focused on mathematics achievement differences rather than measures of reading achievement. They

then reported that analysis of two national surveys using different measures of reading achievement produced opposite findings about gender differences in reading achievement. Again, ambiguity reigns.

What has been clear to educational researchers for almost two decades however, has been the power of Coleman's (1966) observation that

> Schools bring little influence to bear on a child's achievement that is independent of his (or her) background and general social context. This very lack of independent effect means that the inequalities imposed on children by their home, neighborhood, and peer environment are carried along to become the inequalities with which they confront adult life at the end of school. (in Silberman, 1971, p. 71)

The research described here was designed to assess, using the High School and Beyond (HSB) data, the relative contributions of gender and context (rural, suburban, urban settings) for explaining variability in academic abilities with socioeconomic status controlled.

Method

The HSB data were collected by the National Center for Educational Statistics "to study longitudinally the educational, vocational, and personal development of high school students and the personal, familial, social, institutional, and cultural factors that may affect that development" (National Center for Educational Statistics, 1983).

In the 1980 cohort, students were selected through a two-stage, stratified probability sample with schools as the first stage sampling units and students-within-schools as the second stage sampling unit. Strata used in the school sampling included: nine U.S. census regions; size of enrollment; racial composition; urban, suburban or rural settings; and public, private or parochial focus. The total number of schools selected for the sample was 1015 from a sampling frame of 24,725 schools. Within each school, 36 seniors and

36 sophomores were randomly selected to participate as subjects in the HSB data collections. In those schools with fewer than 36 seniors or 36 sophomores, all eligible students were included in the sample.

We conducted all analyses with the HSB sampling weights in effect (N = 3,039,959) so that the data more accurately reflected the population of high school seniors in 1980. For these weighted data, 48.4% of the students are male and 51.6% female. Regarding context, 20.0%, 49.4%, and 30.6% of these students are from urban, suburban, and rural settings, respectively.

The academic and psychological measures we employed are briefly described as follows. Reading, a 20-item test, assesses a variety of reading skills. Vocabulary, 27 items, measures vocabulary through a synonym format. Mathematics is a 33-item test calling for quantitative comparisons. Picture Number is a paired-associate memory test containing 15 items. Visualization comprises 16 items asking one to visualize the shape a flat surface might assume if folded in a specified manner. Mosaic Comparisons, an 89-item test, assesses the speed and accuracy with which one makes perceptual discriminations.

Results

Because the use of the HSB sampling weights essentially produce population data, we do not report any inferential statistics here.

First, intercorrelations among the independent variables were examined. Strong positive correlations (rs .62 to .71) are found among the Vocabulary, Reading, and Mathematics measures (Table 1). Moderate positive correlations (rs .18 to .34) are observed among the Mosaic, Picture Number, and Visual measures. Similar correlations are found between the three academic measures and the three psychological measures (rs .21 to .49).

To assess the relative contributions of SES, context, and gender, we performed on each independent variable a two (gender) by three (context) analysis of variance with SES as a covariate. We determined the proportion of the total sum of squares that is accounted for by (a) SES, (b) each main effect, and (c) the interaction between gender and context (Table 2).

Between 11 and 14 percent of the total variability in Vocabulary, Reading, and Mathematics is accounted for by SES; gender and context independently account for negligible variability in these measures. Further, SES accounts for slightly more than 5 percent of the variability in Visualization, 4 percent for Mosaic, and 2 percent for Picture Number. Gender independently accounts for 1.6 percent of the variability in Mosaic. Interestingly, for no other measure does either gender or context account for more than one percent of the total variability. Similarly, the interaction between gender and context independently accounts for no variability in any measure, as well.

The negligible contribution of gender and context is illustrated further by the adjusted means in Table 3. Here, we present the means for gender and context after adjusting for SES and the other main effect. (For example, the male/female mean difference is adjusted for both SES and context.) As can be seen, these adjusted-mean differences are small. For context, the greatest difference is found for Mosaic, where suburban students outperform rural students by roughly one-tenth of one standard deviation. Adjusted-mean differences are slightly larger by gender, with males scoring higher on Mathematics and Visualization and females on Mosaic and Picture Number.

Conclusions

The results of our research suggest that when the pervasive influence of socioeconomic status is controlled, gender and context (rural, suburban, urban settings) independently explain negligible to little variance in the academic and psychological measures we examined. The implications of these findings for the organization and funding of public schools are considerable. For example, predominately rural regions of the country too often are data-poor in presenting their educational needs. Further, schools in these regions too often are assumed to be inferior in both instructional quality and student achievement. In contrast, our results tentatively suggest that no appreciable deficits in students can be attributed to setting alone.

Similarly, traditional views regarding gender and academic performance perhaps should be reexamined in light of our data. While gender differences emerged in our analyses, their magnitude was not appreciable.

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Table 1

Means, Standard Deviations and Intercorrelations

Measure	M	SD	Range	Intercorrelations 1	2	3	4	5
1. VOCAB	50.07	9.25	26 - 74					
2. READING	50.04	10.02	23 - 72	.71				
3. MATH	50.19	9.06	26 - 70	.62	.63			
4. MOSAIC	50.10	9.19	5 - 75	.28	.31	.37		
5. PICT-NUM	50.10	9.94	18 - 60	.21	.22	.28	.29	
6. VISUAL	50.04	10.01	25 - 77	.41	.44	.49	.34	.18

Table 2

Proportion of Total Sum of Squares Accounted for by SES, Context and Gender, and The Context by Gender Interaction

Measure	SES	Main Effects Context	Gender	Context X Gender
VOCAB	14.11%	.06%	.03%	.05%
READING	11.01%	.02%	.04%	.14%
MATH	14.11%	.04%	.80%	.02%
MOSAIC	3.87%	.26%	1.60%	.08%
PICT-NUM	1.87%	.03%	.06%	.09%
VISUAL	5.25%	.09%	1.00%	.11%

Table 3

Adjusted Mean Scores on Six Dependent Academic Measures

Measure	Context			Gender	
	Urban	Suburban	Rural	Male	Female
VOCAB	50.10	50.47	49.94	50.39	50.09
READING	49.97	50.32	50.25	50.02	50.41
MATH	50.13	50.53	50.18	51.18	49.59
MOSAIC	49.85	50.68	49.67	49.01	51.28
PICT-NUM	50.01	50.07	50.41	49.38	50.89
VISUAL	49.76	50.45	49.87	51.18	49.17

Note: Each mean is adjusted for SES and the other main effect.