Ambition, Self-Concept, and Achievement: A Structural Equation Model for Comparing Rural and Urban Students

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The Western Australian School Effectiveness Study (WASES) provided this researcher with a unique opportunity to investigate the relationships between student aspirations, student self-concept, and student achievement. These relationships were estimated using structural equation modelling. The hypothesis that rural and urban students may behave differently and have different influences was also investigated using a technique called multi-sample Analysis in the LISREL software package. Results demonstrated that, while urban students had significantly higher aspirations and achievement, their self-concept was similar to rural students. Further, there were no significant differences between rural and urban students in the paths for student aspirations, student self-concept, and student achievement. The importance of student self-concept as a mitigating effect on student aspirations and achievement was also demonstrated in this research.

The ability to set goals and then to pursue these goals is sometimes referred to by educators as student aspiration. Students who choose to set difficult goals for themselves tend to become task oriented, with a sense of purpose for their lives (Quaglia & Cobb, 1996). Why is aspirations important for research on achievement? Aspirations can influence students' learning, preparation for life choices, academic motivation, and achievement. So how can student aspirations, and academic motivation, be improved? The home and school environments are possible factors influencing student aspirations (Quaglia, 1996). This study investigates additional influential factors, that have not been addressed to date.

There are three aspects of student life that, together, drive the student's expected future as a successful person: determination to achieve desired goals, belief in one's ability to achieve these goals, and the ability that matches these goals (Quaglia, 1996; Quaglia & Cobb, 1996). In this study, these three aspects are referred to respectively as ambition, self-concept, and achievement. The interrelationships among these three student outcomes are not well known or documented in the literature, so I selected structural equation modeling as the analysis of choice to adequately ac-

count for the measurement error within each of these outcomes while simultaneously estimating the effect of each outcome. The effect of the classroom learning environment upon these student outcomes also was examined.

Of singular importance is the assertion that rural students are disadvantaged by their location, culture, and lack of access to similar facilities as their counterparts living in the city. However, rural/urban differences in student outcomes are not easily understood. That rural schools may be somehow inferior has already been abandoned as a valid claim in understanding these differences. Socioeconomic problems penetrate both the city schools and the country schools, and so socioeconomic measures must be included in any analysis of these differences. In this investigation, therefore, the student's background was controlled for by including a measure of socioeconomic status.

Background Literature to Rural Education

The importance of setting up goals for behavior was first suggested and defined by Dembo (1931), who made explicit the possibility of observing goal levels, identifying determinant factors associated with fluctuating goals, and linking goal-striving behavior to other behaviors. Further, Lewin, Dembo, Festinger, and Sears (1944) demonstrated that aspirations can be linked with the seeking of success and the avoidance of failure.

Later research by Sewell and Hauser (1975) involving a large, longitudinal sample of young men found that socioeconomic status affects educational attainment, occupational status, and earnings, even when academic ability and intervening achievements were held constant.

Quaglia and Cobb (1996) conceived of aspirations as the "student's ability to identify and set goals for the fu-

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ture, while being inspired in the present to work toward those goals" (p. 130). This construct has two major underpinnings: inspiration and ambitions. Inspiration reflects that an activity is exciting and enjoyable to the individual and the awareness of being fully and richly involved in life here and now. It is depicted by an individual who becomes involved in an activity for its intrinsic value and enjoyment. An individual with a high level of inspiration is one who believes an activity is useful and enjoyable. Ambitions represent the perception that an activity is important as a means to future goals. It reflects individuals' perceptions that it is both possible and desirable to think in future terms and to plan for the future (Quaglia & Cobb, 1996, p. 130).

Quaglia and Cobb asked how the student aspirations interact with their environment, both at school and at home. How does the school climate influence student aspirations? What conditions appear to effect change in the way students view the work they do in school and the goals they set for their future? The research presented here is posited within this framework. That schools can help foster aspirations, that there remains a student characteristic which drives their goals and aspirations, and that both the home and school environments can influence these aspirations will be discussed here.

Occupational and educational aspirations of rural young people is of considerable importance to rural Australians. It is not enough to have the right attitude and the top tertiary entrance examination score if the student faces insurmountable barriers to accessing further education and employment. However, in conducting research with a number of rural Australian teachers previously, I found that many teachers felt that students' aspirations were too high! That is, these students were trying to sit for the tertiary examinations in Year 12 when the teachers did not feel that these students had any hope of gaining a high enough score to get into a university. Of course, this is anecdotal evidence and little research has been conducted in rural schools to follow student aspirations. Stringfield and Teddlie's (1991) exemplar research into 16 paired rural and urban schools suggested that teachers in rural schools had higher expectations for their students.

The problems faced by Australian rural students are confounded. First, when these students grow from adolescence to mature adulthood, they also must face the reality that there is little for them in their locale. In order for these students to attain their potential in life choices, they must make a choice. Either they can stay with their families in their rural location and enjoy the rural lifestyle they are accustomed to, or they must move to the city to either look for work or further their education in vocational colleges or university. It is obvious to these students that education will expand and fulfill their lives; often parents send their children to boarding schools in the city in order to prepare

them for the new changes which lie ahead. Unfortunately, some of these students who are accepted into higher education courses, become extremely lonely and disheartened and return to their rural home. Of course many others are keen to leave home and become independent. It appears that this is sometimes related to the social network that rural students develop when they arrive in the city. Hektner (1995) attempted to disentangle the rural young person's aspiration for social mobility and preferences for residing in rural locations. In his study of midwestern U.S. schools, Hektner found a substantial amount of conflict experienced by rural students in choosing to leave or stay at home. Rural students were more likely to have conflicting aspirations about wanting to live at or near home and wanting to "move out in order to move up."

Stevens' (1995) investigation of influences on vocational choices of senior high school students in a rural community demonstrated that rural students have to make career decisions at an earlier age than urban students. This study also found a significant difference between the rural working class and the rural middle class. That is, parents who are able to send their children to boarding schools in order to complete the final 2 years of high school did so from a superior financial base. In the rural school that Stevens' studied, there was negligible provision for students to complete their high school education, with the result that the working class families were disadvantaged and unlikely/ unable to send their children to boarding schools. Further, Stevens' noted a difference in the students' perceptions of the world and their ability to cope in an urban school environment. Many rural students were supplied with inadequate information and counseling in order to choose their school subjects for their chosen occupations and also experienced conflict regarding the superiority of the urban lifestyle which lay before them.

These findings are similar to those of McCracken and Barcinas (1991), whose study of rural schools in Ohio revealed that rural students tended to be more homogeneous, come from larger families, and have lower socioeconomic status. Rural parents tended to have a lower educational attainment and were less likely to expect their children to attain an education beyond high school. These researchers maintained that these parental and home influences helped to explain why rural students chose lower educational courses. However, rural youth were also more likely to select vocations that they had been able to observe or experience, such as agricultural college or technical colleges. Students in rural areas had lower income expectations and did not observe many high-income workers. Those students who were bright and capable tended to be sent away to complete their education. The discrepancy in educational aspirations between rural and nonrural students seems clear, yet the reasons for it are not.

Table 1
Description of Items in the Student Self-Concept Scale

Scale	Items
General Self-Concept Items	Overall, I have a lot to be proud of.
	Overall, I am no good.
	Most things I do, I do well.
	Nothing I do ever seems to turn out right.
	Overall, most things I do turn out well.
	I don't have much to be proud of.
	I can do things as well as most people.
	I feel that my life is not very useful.
	If I really try, I can do almost anything I want to do.
	Overall, I'm a failure.
School Self-Concept Items	People come to me for help in most school subjects.
	I'm too stupid at school to get into a good university.
	If I work really hard I could be one of the best students in my school year.
	I get bad marks in most school subjects.
	I learn things quickly in most school subjects.
	I am stupid at most school subjects.
	I do well in tests in most school subjects.
	I have trouble with most school subjects.
	I'm good at most school subjects.
	Most school subjects are just too hard for me.

Research Questions

1. Is there an effect of the classroom learning environment on student aspirations and achievement, is the effect direct, and how is this effect mitigated by student self-concept?

2. Is there an effect of socioeconomic status on student aspirations and achievement, is the effect direct, and how is this effect mitigated by student self-concept?

3. Is there an effect of self-concept on student aspirations and achievement? Does this effect work directly or indirectly?

4. Does the structural equation model fitting student aspirations, achievement, self-concept, socioeconomic status, and the classroom learning environment differ for rural and urban students?

Method

Self-Concept

The multidimensional nature of self-concept has been well documented (Byrne, 1984; Hattie, 1992; Marsh, 1990b, 1993; Marsh & Shavelson, 1985). That is, self-concept consists of a number of facets, but it is unclear how these facets aggregate into higher order factors. Marsh's facets include physical abilities and sport, physical appearance, relationship with peers, relationships with parents, reading self-concept, mathematics self-concept, and self-concept in all school subjects. We included two components of the Marsh Self Description Questionnaire (SDQII) designed to measure adolescent self-concepts (Marsh, 1992).

The relationships between self-concept, ambition, and the classroom learning environment are not well understood. While it was expected that the Classroom may influence student self-concept and student ambition, causality has not been documented. The present study sought to address these issues using a path analytic technique that did not assume causality and could cope with measurement error.

Included in this study were two measures of self-concept: general self-concept and academic or school self-concept. Both of these two measures are presented in Table 1. The general self-concept scale describes the student's feelings about himself/herself. There are both negative and positive statements related to success and failure in life. The school self-concept scale measures the student's perceptions about their academic ability and potential to be a success at school.

Table 2
Description of Scales in the CLES and Example Items

Scale	Example Item
Student cohesiveness	Friendships are made among students in this class.
Teacher support	The teacher goes out of his/her way to help students.
Student involvement	Students talk with each other about how to·solve problems.
Task orientation	Class assignments are clear so everyone knows what to do.
Cooperation	Students share their books and other resources with each other when doing assignments.

Science and Mathematics Achievement

A multiple-choice test of mathematics and science was employed to measure achievement in these areas. This test had already been validated internationally for use in the Third International Mathematics and Science Study (TIMSS) for 13-14 year old students. Three different rotated forms of the possible eight tests available were used and the open-ended/free response part of the test was not used due to time constraints. There were 18 mathematics test items and 18 science test items that had to be completed in 45 minutes.

The Classroom Learning Environment

Classes and schools clearly vary in terms of their learning environments. In the last 25 years there have been instruments developed for a variety of classroom contexts, such as individualised classrooms (Fraser, 1990) and constructivist classrooms (Taylor, Dawson, & Fraser, 1995). Recently, Fraser, Fisher, and McRobbie (1996) began the development of a new learning environment instrument, which incorporates scales that have been shown in previous studies to be significant predictors of outcomes (Fraser, 1994) and additional scales to accommodate recent developments and concerns in classroom learning (e.g., equity issues; the promotion of understanding rather than rote memorisation). The first version of the new instrument contained the 9 scales, each containing 10 items: Student cohesiveness, teacher support, involvement, autonomy/ independence, investigation, task orientation, cooperation, equity and understanding.

For the purposes of this study, we used five of these scales in the student questionnaire: student cohesiveness, teacher support, involvement, task orientation, and cooperation (see Table 2). Subsequent analyses by Fraser, Fisher, and McRobbie (1996) have demonstrated that the scales autonomy/independence and equity and understanding were not reliable. The instrument employed a 5-point Likert response scale (almost never, seldom, sometimes, often, almost always).

Socioeconomic Status

There were four observed variables that were considered indicative of socioeconomic status: mother's occupation, mother's education, father's occupation, and father's education. These are typically used as indicators of the student's home background and are used to control for socioeconomic status. The particular combination of these four variables is dependent upon the loading of each measure and the reliability of the final composite socioeconomic status. In previous research, differences in rural/nonrural student outcomes such as achievement may be accounted for by the associated differences in socioeconomic status (Haller & Vickler, 1993).

Ambition

Two observed variables were considered in the construction of the ambitions variable: reported education level and reported occupation.

Sample

This investigation is part of a larger longitudinal study, the Western Australian School Effectiveness Study [WASES], involving 28 Western Australian high schools. Sampling techniques used in this study were developed by Kish (1965) and further refined by Ross (1976, 1987). An important feature of this study involves the inclusion of Non-government schools. These included Catholic, Anglican, and other types of nongovernment schools, although no stratification was used for these school types. There were 3397 students in the achieved sample of students from 28 schools (see Table 3), with representation from five rural categories: Perth (metropolitan/urban/suburban), small rural centres, other rural areas, remote centres and other remote areas. This resulted in an urban/rural dichotomy for the analyses below.

Table 3
Sample Size by Rural Location

Sample Size	Perth	Small Rural Centre	Other Rural Area	Remote Centre	Other Remote Area	Total Students
Students	619	747	1013	633	385	3397
Schools	4	6	9	5	4	28

Analyses and Results

Stage 1. One-Factor Congeneric Measurement Models

In this study, there were a total of 78 manifest variables to be analysed in order to construct a structural equation model. As most of these variables were ordinal, it was not possible to estimate the complete structural equation model simultaneously using all variables. For this reason, the first step was to prepare composite variables from well tested instruments, the classroom learning environment scales and the self-concept scales. Each scale was prepared separately, factor regression scores generated for each set of items and then these used to construct the composite scale by weighting each item proportionately using the factor regression score. This technique is well documented by Holmes-Smith and Rowe (1994). Results of this stage of the analysis are not presented here for brevity; further information is available from the author upon request and documented elsewhere (Young, in press). Once the composite scales were created, two sets of confirmatory factor analysis (Stages 2a and 2b) were estimated prior to joining these two models into a single structural equation model (Stage 3).

Stage 2a. A Three-Factor Confirmatory Factor Analysis Model: Ambition, Self-Concept, and Achievement

In this analysis, six observed variables were used to estimate the three latent traits. Ambition was a latent trait estimated by two ordinal indicator variables, expected level of education (Ed) and expected occupation (Expocc). Self-concept was estimated by the continuous observed variables school self-concept (Selfsch) and general self-concept (Selfgen). Achievement was estimated by the continuous measures mathematics achievement (Maths) and science achievement (Science).

The polychoric correlation matrix for both ordinal and continuous dependent observed variables are found in Table 4. Further, rural and urban students were compared for these dependent observed variables using t-tests and six ANOVA's with the F-test (Table 5). These tests did demonstrate that there were significant differences between rural and urban students' aspirations (expected education

expected occupation) and achievement (mathematics and science).

Stage 2b. A Two-Factor Confirmatory Factor Analysis Measurement Model: Socioeconomic Status and Classroom Learning Environment

Here, nine observed variables were used to estimate two more latent traits. Socioeconomic status was a latent trait estimated by four ordinal indicator variables, mother's education (Med), father's education (Fed), mother's occupation (Mocc), and father's occupation (Focc). Classroom learning environment was estimated by the five continuous composite variables: student cohesiveness, teacher support, involvement, task orientation, and cooperation.

The correlations for both ordinal and continuous observed variables are found in Table 6.[1] There were two sets of observed variables, with their intercorrelations, which were used to estimate the two factors, socioeconomic status and classroom learning environment. Correlations among cohesiveness, teacher supportiveness, involvement, task orientation, and cooperation were strong. There was evidence that these variables formed two latent traits that did not correlate with one another.

Stage 3. A Structural Equation Model for Rural Schools

The intercorrelations have already been described in Tables 4 and 5 for the measured variables, with the results of the complete structural equation model (SEM) for rural schools provided in Figure 1. The bottom middle section of the figure shows the fit indices used to evaluate the adequacy of this model. With a χ^2 of 65.53 and $p = .99$, the probability that this model fits the population was good (i.e., models with a $p > .05$ are more likely to fit the population).

Further measures of fit were examined including the Goodness of Fit Index (GFI = .99) measuring the relative

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[1]These correlations were polychoric according to the ordinal nature of the variable polychoric correlation coefficient for two ordinal variables, polyserial correlation coefficient for one ordinal and one continuous variable or Pearson product moment correlation coefficient for two continuous variables.
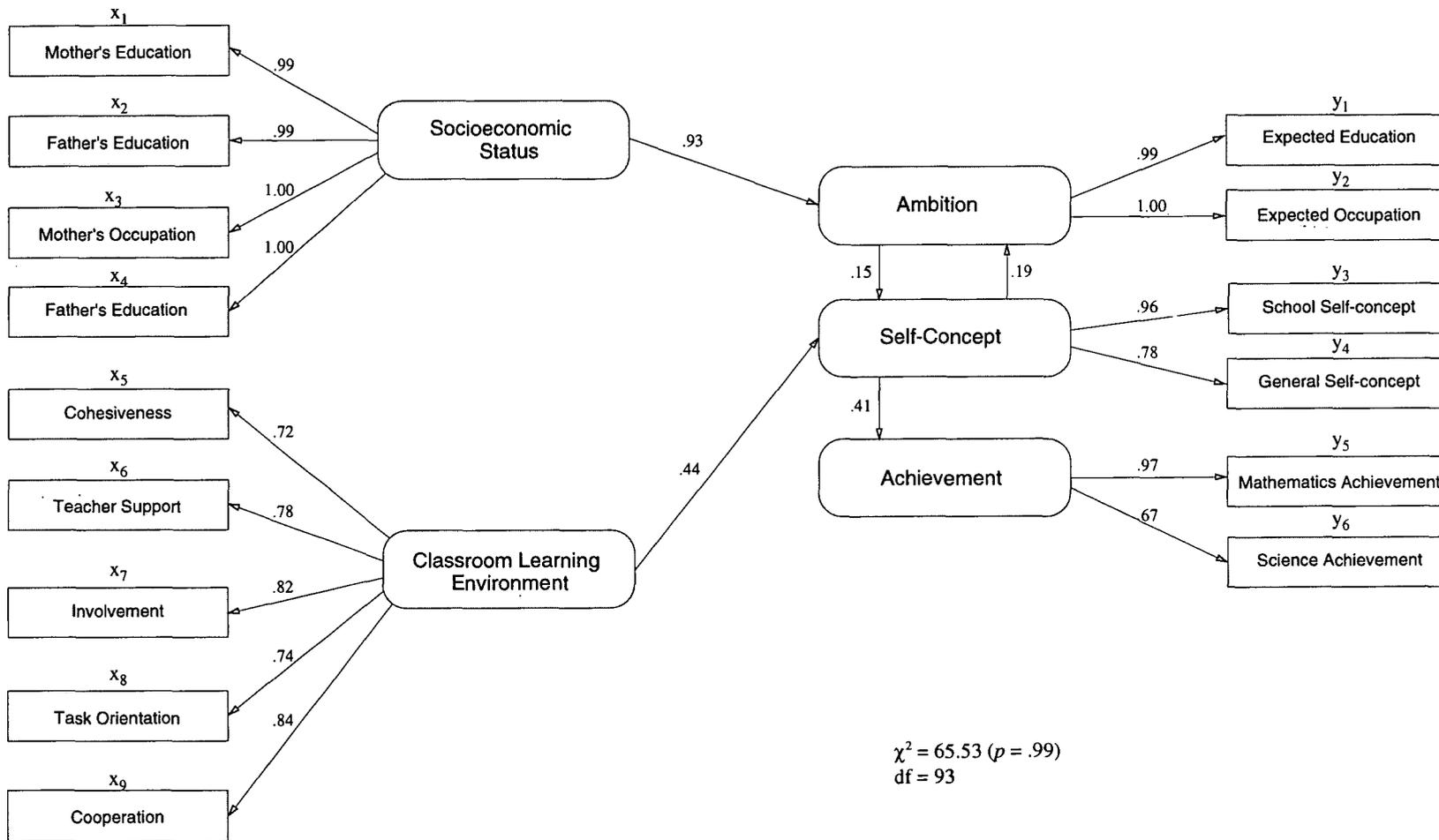
Figure 1. A structural equation model of ambition, self-concept, achievement, classroom learning environment, and socioeconomic status.

Table 4
Correlation Matrix For The Three-Factor Congeneric Measurement Model

Observed Variables	1	2	3	4	5	6
Ambition						
1. Expected Education	1.00					
2. Expected Occupation	.38*	1.00				
Self-Concept						
3. Self-concept (School)	.43*	.26	1.00			
4. Self-concept (General)	.35*	.21	.72*	1.00		
Achievement						
5. Mathematics	.33*	.22	.36*	.27*	1.00	
6. Science	.29*	.17	.30*	.24*	.63*	1.00

$*p < .001.$

amount of variances and covariances accounted for by the model (Tanaka & Huba, 1984, 1985) and the Comparative Fit Index (CFI = 1.00) comparing the model with a null model which assumes that the variables are uncorrelated. As the GFI and CFI approach 1.00, the fit improves. This model appeared to fit well enough, with the GFI and CFI both greater than .90. The Goodness of Fit index adjusted for degrees of freedom (AGFI = .99) was also an indicator that the model fit well. These fit measures do not depend on sample size and measure how much better the model fits as compared with no model at all.

There appeared to be a causal relationship with ambition driving self-concept (weak) and self-concept driving achievement (strong). That is, students with greater career and educational aspirations seemed to have higher self-concept and achievement. These relationships were further influenced by the student's socioeconomic status, with a strong effect on ambition. Further, the classroom learning environment had a strong and significant effect on self-concept, which in turn affected student achievement.

Stage 4. Does the structural equation model fitting the paths between ambition, achievement, self-concept, socioeconomic status, and the classroom learning environment differ for rural and urban students?

In order to compare the fit of the structural equation model for rural and urban students, the multi-sample analysis technique was used to test whether the covariance matrices and structural relations were invariant over the two groups of students (Jöreskog & Sörbom, 1996, pp. 277-296); also see Bollen, 1989, pp. 355-3655; Dauphinee, Schau, & Stevens, 1997). The first test investigated whether the model fitted both rural and urban students equally well.

The pattern of relationships between latent variables was the same for both groups, which is to say the model fitted rural and urban students equally well. The estimation of gamma and beta coefficients was identical for both groups and did not demonstrate any further differences in paths. Further, the factor variances and covariances were constrained, with no significant differences demonstrated between rural and urban students. For each of these tests, the goodness of fit was acceptable with no invariance found between rural and urban students. (Further details of the results of these invariance tests are available from the author.)

Summary of Research Findings

What is the effect of the classroom learning environment on student aspirations and achievement? The classroom learning environment had a strong, positive effect on student self-concept, which in turn had an indirect effect on student ambition. So while the effect of the classroom learning environment was observed, it was only through self-concept that it was able to act.

What is the effect of socioeconomic status on student ambition and achievement? Socioeconomic status had a strong, positive effect on ambitions, but not directly on self-concept. The effect on ambition was very strong; the effect on achievement was weak, but positive. Overall, socioeconomic status had an overwhelming impact on these student outcomes.

What is the effect of self-concept on student ambition and achievement? Student self-concept had a direct, strong, and significant effect on both ambitions and achievement.

Does the structural equation model fitting student ambition, achievement, self-concept, socioeconomic status, and the classroom learning environment differ for rural

Table 5
Comparison of Mean Differences in Observed Endogenous Variables for Rural and Urban Students

Observed Variables	Urban	Rural	t-value	p	F
Ambition					
1. Expected Education	4.78	4.48	4.53	.000	19.87*
2. Expected Occupation	6.44	6.17	2.88	.004	7.26*
Self-Concept					
3. Self-concept (School)	3.81	3.74	1.88	.060	3.44
4. Self-concept (General)	4.00	3.97	.98	.329	.96
Achievement					
5. Mathematics	1.25	1.02	3.63	.000	12.64*
6. Science	1.22	1.10	2.07	.039	4.00*

*$p < .01$.

and urban students? There were no significant differences between rural and urban students in the latent traits relationships investigated here. The effects found were similar for both groups of students.

Discussion

In the present examination of Quaglia and Cobb's (1996) theory of aspirations, a number of internal and external influences on the student which appear to affect the student's level of aspirations and achievement were investigated. These included the student's socioeconomic status, the classroom learning environment, and the student's self-concept. Here I have demonstrated the relationships that these variables have on the student's career and education choice—ambition or aspirations in the present discussion. These relationships were positive and worked mainly through the student's self-concept.

The importance of student self-concept in rural (and urban) schools is the most serious issue raised in this study. When comparing rural and urban schools, there were little differences found in the way these variables interrelated. It was important to note that paths not drawn were negligible. That is, there did not appear to be any direct relationship between student aspirations (ambition) and student achievement. Rather, these variables appeared to be connected by student self-concept. If this is indeed the case, and rural students do appear to have lower aspirations and achievement, the conclusion is clear and imperative.

Rural students who apparently underachieve and have lower goals must be provided with programs that enhance their self-concept (both academically and personally) if we as a community are committed to improving rural education and rural youth.

So what are the implications for research? Given the relationship between self-concept and student aspirations, particularly in rural locations, it would be useful to explore the characteristics of schools that have high levels of student self-concept. Further, does the teacher's own self-concept make a difference?

It was also an impressive finding that the classroom learning environment was so powerful a determinant of student ambition, along with achievement, even when socioeconomic status was controlled. It will be an important step forward to investigate these relationships while controlling for prior achievement.

In further research, the importance of aspirations in determining life choices of students must be considered in the context of the school environment. The conclusion reached by Quaglia and Cobb that "educators and researchers need to examine and measure key school conditions that affect student aspirations" should become a fundamental part of any school effectiveness research.

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Table 6

Correlation Matrix for the Two-factor Confirmatory Factor Analysis Model: Socioeconomic Status and Classroom Learning Environment.

Observed Variables	1	2	3	4	5	6	7	8	9
Socioeconomic Status									
1. Mother's Education									
2. Father's Education	.58*								
3. Mother's Occupation	.26*	.10*							
4. Father's Occupation	.18*	.20*	.21*						
Classroom Learning Environment									
5. Cohesiveness	.08	.09	.08	.08					
6. Teacher Supportiveness	.09	.10	.05	.08	.44*				
7. Involvement	.12	.10	.05	.06	.57*	.62*			
8. Task Orientation	.08	.08	.01	.05	.43*	.57*	.54*		
9. Cooperation	.09	.09	.05	.05	.62*	.50*	.62*	.57*	

*$p < .001$.

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Appendix
Variables and Coding

Latent Trait Variables	Observed Indicator Variables	Coding
Ambition	Occupational Aspirations	1 – 10
	Educational Aspirations	1 – 6
Self-Concept	General Self-Concept	1 – 5
	School Self-Concept	1 – 5
Achievement	Mathematics Achievement	-3 – +4
	Science Achievement	-3 – +4
Socioeconomic Status	Father's Occupation	1 – 10
	Mother's Occupation	1 – 10
	Father's Education	1 – 6
	Mother's Education	1 – 6
Classroom Learning Environment	Student Cohesiveness	1 – 5
	Teacher Support	1 – 5
	Involvement	1 – 5
	Task Orientation	1 – 5
	Cooperation	1 – 5
Rural	Rural	Rural = 2, Urban = 1

Multilevel Structural Equation Modeling (MSEM) evaluates measurement and structural models at more than one levels in the analysis when nesting is in place (Geldof et al., 2014; Heck and Thomas, 2015). Â If person level math achievement and university level math achievement do not match, measurement—wise, then the most optimal factor structure at each level in the analysis needs to be estimated and applied.