Journal of Agricultural Education
Volume 39, Number 2, pp. 39-49
DOI: 10.5032/jae.1998.02039

INFLUENCE OF STUDENT AND SCHOOL FACTORS ON AFRICAN AMERICAN ENROLLMENT IN AGRICULTURAL SCIENCE COURSES

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Abstract

The purpose of this study was to identify factors related to African American enrollment in secondary agricultural science courses. Questionnaires were completed by 380 students from Mississippi, North Carolina, and Virginia high schools. Attitudes of students enrolled in agricultural science courses and those not enrolled (biology students) were analyzed by race. Agricultural science students were more positive than biology students on three attitudinal constructs (image of the agricultural sciences, future value of the agricultural sciences, and the role of significant others on student enrollment). Also, African Americans were more negative toward the agricultural sciences than students of other races on all three constructs.

Three variables (gender, future value, and teacher attitude) explained 24% of the variance in students' enrollment decisions. Students who were males, positive about the future value of the agricultural sciences, and who were enrolled in schools that had a agricultural science teacher with positive attitudes toward teaching tended to enroll in agricultural science courses.

Many researchers have recently sought explanations for the chronic low minority enrollments in secondary agricultural science programs (Arrington & Price, 1983; Larke & Barr, 1987; Rojewski & Miller, 1991; Bowen, 1994; Osborne, 1994; Rawls & Thomas, 1994; Talbert & Larke, 1995; Luft, 1996). The most plausible explanation is that some minorities have more negative attitudes toward the agricultural sciences than whites (Trotter, 1988; Gardner, 199 1; Talbert & Larke, 1995). For example, in two recent studies, Hispanic students perceived that agricultural sciences jobs offer limited career potential and involve low pay, poor working conditions, and only farming (Nichols, Jimmerson, & Nelson, 1993; Bechtold & Hoover, 1997).

Also, whether or not schools are located in rural or urban areas may impact minority students' decisions to enroll and their knowledge of the agricultural sciences. Most agricultural science programs are located in rural areas and small cities and towns, but a high percentage of minorities live in large cities and suburbs (Gordon, 1987). This perhaps explains why Frick, Kahler, and Miller (1991) found that inner city high school students had lower overall mean knowledge and less positive perceptions of the agricultural sciences than their rural counterparts.

Knight (1987) identified three groups of factors that influence enrollments in secondary agricultural science programs. First, a strong emphasis on production agriculture was a barrier to enrollment. Further, because of the low numbers of ethnic minorities involved in production agriculture, he recommended that programs focus more on contemporary, nonfarm areas of the agricultural sciences. Also, agricultural science programs were stereotyped as involving mostly white males with farm backgrounds (Knight, 1987). Several researchers,

including Scanlon, Hoover, and Yoder (1989a), have confirmed this finding.

Given Knight's findings and those of other researchers, Scanlon, Yoder, and Hoover (1989a) completed a study for the National FFA Organization to identify, on a national basis, factors influencing students to enroll in agricultural education and become FFA members. They found that 8th graders who planned to enroll tended to be white males. Also, 8th graders planning to enroll and 11 th graders who were enrolled had similar positive images of the agricultural sciences. Both groups perceived that the agricultural sciences would prepare them for the future and careers. These students also perceived that significant others (parents, counselors, teachers, and friends) influenced their decisions to enroll. Meanwhile, both 8th graders not planning to enroll and 11 th graders who were not enrolled had more negative images of the agricultural sciences. These students perceived that the agricultural sciences would not benefit them later in life and were not influenced by others to enroll.

In addition to student factors, several authors have documented that teachers influence students to enroll. Recently, Reis and Kahler (1997) found that agricultural science teachers were exceeded only by parents as individuals who influence students to enroll in agricultural science programs. This finding is critical because some authors suggest that African American students might relate better to a teacher of their ethnic background (Ehrenberg, Goldhaber, & Brewer, 1994; Talbert & Larke, 1995). However, in most agricultural science programs, there are few, if any, African American teachers. Camp (1995) reported only 3 3 5 African Americans among 9,5 12 agricultural science teachers. Given the key roles teachers play in students' enrollment decisions, Bell, Powers, and Rogers (1987) suggested that low African American enrollments are linked to there being few African American teachers. The enrollment problem is further complicated because agricultural science teachers, most of whom are white males, are not adequately prepared to educate students with multicultural backgrounds (Jones & Black, 1995).

With many options in the agricultural sciences, why do few African Americans enroll? This question remains largely unanswered even though many strategies have been implemented to promote ethnic diversity in secondary agricultural science programs. A similar situation exists at the bachelor's degree level even though many universities have implemented programs to increase ethnic diversity among professionals (Vaughn & Bowen, 1993; Bowen & Bowen, 1996; Wiley, 1996; Case, Birkenholz, & Campbell, 1997). Given the current knowledge base about African American enrollments in secondary agricultural science programs, the problem investigated in this study focused on the following question: To what extent can selected student, teacher, and school factors explain African American students' decisions to enroll or not enroll in agricultural science?

Purpose and Objectives

The purpose of this study was to examine factors that might explain African American enrollments in secondary agricultural science courses offered by racially balanced high schools. Such schools were targeted because they enroll a critical mass of African American students who have the option of enrolling in agricultural science courses. In this study, students' attitudes toward the agricultural sciences, their race and gender, and selected school and teacher factors were explored as barriers or incentives to enrollment. The objectives of the study were to:

1. Examine how students' attitudes toward the agricultural sciences and their race influence their decisions to enroll or not enroll in secondary agricultural science courses;

2. Identify variables related to students' attitudes toward the agricultural sciences; and

3. Determine variables that can explain enrollment in agricultural science courses.

Population and Sample

Twelve public high schools in Mississippi, North Carolina, and Virginia that (1) enroll significant numbers of African American students (40-60% for racial balance) and (2) have agricultural science programs were identified by agricultural education faculty at Mississippi State University, North Carolina State University, and Virginia Polytechnic Institute and State University. Six of the schools were to have one or more African American agricultural science teachers and six were to have no African American teacher. Also, six of the schools were to have a high percentage of African American students in the agricultural science program (25% or higher) and six were to have a low percentage of African Americans enrolled (< 25%). However, only 11 schools could be identified that came close to meeting the two selection criteria. Five schools were identified that had one or more African American agricultural science teachers and six schools had no African American (only white) agricultural science teachers. From an enrollment perspective, eight schools were in the high category because the percentage of African American students ranged from 29-79% while three schools were in the low category because they enrolled from 0-15%. The researchers chose the 25% criterion because few African American students enroll in agricultural science programs and become FFA members. The latest data (National FFA, 1993) indicate that slightly over 4% of FFA members are African Americans.

One agricultural science teacher in each of the 11 schools was asked to participate in the study and administer a survey instrument to their 10th and 11 th graders. These teachers were also asked to recruit one biology teacher to participate in the study. The biology teachers were asked to administer a parallel form of the instrument to one or more of their classes to provide a comparison group. This approach provided a comparable number of biology students based on the number of 10th and 11 th graders in the agricultural science program. Tenth and 1 lth graders were studied because freshmen may not have accurate career goals while seniors may have already decided if they will pursue agricultural careers. Many teachers participating in the study confirmed that most of their seniors were involved in internships and related experiences. Using these procedures, the study included a purposive sample of 380 students in racially balanced schools with active agricultural science programs and FFA chapters,

Of the 380 students participating in the study, 69% were 10th graders and 3 1% were 1 lth graders. Thirty-one percent were from North Carolina, 28% from Mississippi, and 41% from Virginia. Slightly over 41% of the 380 students were African American, 54% were white, and 5% were Hispanic, Native American, or biracial. Almost 55% of the students were males. The sample consisted of 55% agricultural science and 45% biology students. Table 1 contains a distribution of the schools and students based on the two selection criteria.

Instrumentation

The researchers developed a 24 item instrument to assess the students' attitudes toward the agricultural sciences based on a national study conducted for the National FFA Organization (Scanlon et al., 1989b). The instrument included three of the four most important factors identified in the Scanlon (1989b) study: (1) image of the agricultural sciences, (2) future value of the agricultural sciences, and (3) the role of significant others in students' decisions to enroll in agricultural science courses. Items 1- 13 assessed image, items 14- 18 concerned future value, and items 19-24 focused on significant others. Using bi-polar statements and a 1-7 scale, parallel forms of the instrument were developed for agricultural science and biology students. Mean scores

Table 1. Categorization of Schools From Each State and the Number of Students Participating (n =380)

	African American Ag Science Teacher(s)	No African American Ag Science Teacher(s)
High Enrollment [a]	4 Schools (1 =MS; l=NC; 2=VA) (n=84 ag & 46 biology students)	4 Schools (2=MS; l=NC; I=VA) (n=97 ag &75 biology students)
Low Enrollment [b]	1 School (l=NC) (n=l 1 ag & 19 biology students)	2 Schools (l=NC; l=VA) (a=20 ag & 28 biology students)

[a] High enrollment: 25% or more African American enrollment in agricultural science program. [b] Low enrollment: <25% African American enrollment in agricultural science program.

were computed for the three constructs, The instrument also assessed the students' race, gender, and grade level.

In addition to the student instrument, one of the researchers developed an instrument to rate the quality of the facilities in each school, the quality of the agricultural science facilities, and the attitude of the teacher participating in the study. Based on a site visit to each school, these variables were rated by the same researcher using the following scales (teacher attitude: l-2=very negative; 3-5=negative; 6-8positive; 9-l O=very positive; school and agricultural science facilities: l-2= poor, 3-5=fair, 6-8=good, 9- lO= excellent).

A panel of five agricultural and extension education faculty at The Pennsylvania State University reviewed both instruments for content and face validity. The instruments were then pilot tested using a comparable school and 115 students not selected for the study. Appropriate revisions were then made on both instruments. Using data collected from the 380 students in the sample, Cronbach's alpha coefficients indicated that the three student scales were reliable: image (.76), future value (.80), and significant others (.76).

Data Collection and Analysis

After securing the commitment of the 11 agricultural science teachers to participate in the study, a data collection schedule, a sample letter of agreement to be signed by a school administrator, and student consent forms were mailed January 20, 1997 to each teacher. The teachers were instructed to give a proportionate number of consent forms to the biology teachers in order for the biology students to obtain parental consent. The teachers were called one week later to (1) verify that they had received the materials and (2) schedule a day for the researcher to visit their school. During the site visits, the data were collected as follows: North Carolina (February 10- 14); Virginia (February 17-21); and Mississippi (February 24-28).

During each site visit, the researcher met with the participating agricultural science and biology teachers at the beginning of the day. Instructions were again explained to the biology teachers before they received copies of the instrument for their students who had returned signed consent forms. After meeting with the biology teachers, the researcher spent the day in the agricultural science program surveying students who returned consent forms. All copies of the instrument were

collected at the end of the day. While on site, the researcher also interviewed each cooperating agricultural science teacher to rate his or her attitude toward teaching. The researcher also rated the overall quality of the school and agricultural science facilities based on observations made during the site visits.

All data were processed using the Statistical Package for the Social Sciences (SPSS 6.1) at Penn State. Descriptive techniques, correlational procedures, and discriminant analysis were used to analyze the data. For analysis purposes, the researchers considered the 380 students to be a "slice of life" sample of agricultural science and biology students (Oliver & Hinkle, 198 1).

Findings

All but one of the 11 participating schools were located in small towns or rural areas. The remaining school was located in a city of 75,000. Eight schools had good or excellent facilities (mean of 6.91). The agricultural science facilities were of similar quality (9 of 11 were rated good or excellent with a mean of **7.27).** As a group, the teachers participating in the study exhibited positive attitudes toward teaching (mean=6.18). Three teachers exhibited negative attitudes while one demonstrated a very negative attitude. All teachers but one were males. Also, five of the 11 agricultural science teachers were African Americans.

Objective 1: Comparison of student attitudes

The agricultural science and biology students both had positive images of the agricultural sciences. However, the agricultural science students were more positive (mean of 5.54 vs. 5.09). Also, agricultural science students were substantially more positive than biology students about the future value of the agricultural sciences (5.37 vs. 4.38) and the role of significant others (3.78 vs. 3.23). From an ethnicity perspective, African American students were less positive than the other students about the image of the agricultural sciences, the perceived future value, and the role of significant others in their decisions

Table 2. Comparison of Attitudes of Agricultural Science and Biology Students by Race

Group	Image		Future Value		Sig. Others	
Ag Science	Mean	SD	Mean	SD	Mean	SD
African Am (n=8 1)	5.24	.81	5.07	1.28	3.64	1.31
Other (~=130)	5.71	.75	5.57	.98	3.90	1.49
Total (n=2 11)	5.54	.84	5.37	1.12	3.78	1.41
Biology						
African Am (n=75)	4.95	.76	4.31	1.27	2.95	1.23
Other (n=94)[a]	5.22	.74	4.53	1.27	3.58	1.43
Total (n= 169)	5.09	.78	4.38	1.30	3.23	1.36
All Students						
African Am (n=1 56)	5.10	.84	4.71	1.33	3.30	1.32
Other (n=224)[a]	5.51	.84	5.09	1.26	3.69	1.46
Total (n=3 80)	5.34	.84	4.93	1.28	3.53	1.40

' Includes white, Native American, Hispanic, and biracial students; Means on l-7 scale.

to enroll in agricultural science courses. Also, African American students who were enrolled in agricultural science courses were more positive on all three constructs than African American biology students. The same situation occurred for the other students enrolled in the two courses. As shown in Table 2, all groups were more positive about the image and future value of the agricultural sciences than they were about the importance of significant others on their decisions to enroll or not enroll in agricultural science courses.

Obiective 2: Variables related to students' attitudes toward the agricultural sciences

Eight variables were studied to determine their relationships to attitudes that students had about the agricultural sciences. The following scale was used to describe the strength of the relationships: .OO-.09=negligible; IO-.29=low; .30-.49=moderate; .50-.69 = substantial; and .70 or higher=very strong (Davis, 1971). As shown in Table 3, five variables were related to the image that students had about the agricultural sciences. However, because all relationships were of low strength, the researchers deemed such relationships to be of limited practical importance (Cohen, 1975). Also, six of the variables were related to how students perceived the future value of the agricultural sciences but five of the six were of low strength and limited practical importance. The single moderate relationship (r_{pb}=.38) focused on the course in which students were enrolled. The agricultural science students were more positive than the biology students about the future of the agricultural sciences. Finally, five of the eight variables were related to a low degree to the students' attitude about the importance of significant others on their decisions to enroll or not enroll in agricultural science courses. However, all of these relationships were of limited practical importance.

As shown in Table 3, the three attitudinal variables (Al-A3) tended to be more related to each other than they were to the independent variables (V1)-V8). Relationships among the attitudinal constructs ranged from substantial to moderate strength while relationships between the constructs and the independent variables ranged from low to negligible strength.

Obiective 3: Variables that explain student enrollment in agricultural science courses

The researchers constructed a stepwise discriminant analysis model to isolate variables that could classify students into the courses in which they were enrolled (agricultural science or biology).Ten independent variables were entered into the discriminant model: the quality of the school and agricultural science facilities, teacher race, future value, gender, school classification, perceived image, role of significant others, teacher attitude, and student race (see Table 4). The final model included three variables (future value, gender, and teacher attitude) which explained 24% of the variance in the dependent variable (Wilks' Lambda=.76). Students who tended to enroll in agricultural science courses were (1) males who were positive about the future of the agricultural sciences and (2) in a school with an agricultural science teacher who had positive attitudes. Those students without these traits tended to enroll in biology courses. The final discriminant model consisting of three variables (future value, gender, and teacher attitude) accurately classified 72% of the students into their respective groups (agricultural science or biology courses). In doing so, the model incorrectly classified 25% of the agricultural science students as biology students and 33% of the biology students as agricultural science students. Students classified incorrectly responded more like students in the group opposite of their actual group membership (see Table 5).

Table 3. Intercorrelations Among Eight Independent Variables and Three Attitudinal Constructs

	V1	V2	V3	V4	V5	V6	V7	V8	Al	A2	A3
Ag. Facilities (v1)	-----										
Teacher Race (V2)	-.17*	-----									
Course Enrolled (V3)	.03	.06	-----								
Student Gender (V4)	.01	.08	.33*	___							
School Class. (V5)	.20*	.04	.16*	.06	------						
School Facilities (V6)	.22*	.02	-.08	.04	-.27*	_____					
Teacher Attitude (V7)	.34*	.37*	.13*	-.08	-.35*	.07	_____				
Student Race (V8)	.08	.04	-.06	.01	.20*	.02	.14*	_____			
Perceived Image (A1)	-.04	-.01	.26*	-.03	.14*	-.29*	.13*	-.24*	------		
Future Value (A2)	-.09*	.09	.38*	.12*	.12*	-.26*	.08	-. 14*	.59*	_____	
Significant Others (A3)	-.13*	.11*	.19*	.01	.06	-.22*	.03	-.14*	.30*	.48*	___

Note. *Coding* - Race of teacher (O=white, l=Afi-ican American); Gender (O=female, l=male); Student race (O=other, l=African American); Course (O=biology, l= ag science); School class (O=low Afr American ag science enrollment; l=high Afr American ag enrollment); Teacher attitude and school and agricultural science facilities are interval data.
Coefficients - Pearson's r expresses relationship between interval variables.
Point biserial denotes relationship between interval and nominal variables.
Phi coefficient expresses relationship between nominal variables.
$p<.05$

Table 4. Discriminant Analysis Classifying Students in Agricultural Science and Biology Courses

Variables	Course: Agriculture M	Agriculture SD	Biology M	Biology SD	Standardized Discriminant Function Coefficient	Significant Status at .05 level
Ag Facilities	7.59	2.21	7.43	2.45	.02	**NS**
Race of Teacher	0.45	0.50	0.39	0.49	.20	**NS**
Future Value	5.37	1.12	4.38	1.29	.73	Signif.
Gender	0.69	0.46	0.36	0.48	.65	Signif
School Class.	0.85	0.35	0.72	0.45	.15	NS
Perceived Image	5.54	0.84	5.09	0.78	.35	NS
School Facilities	7.18	3.08	7.67	3.17	- .11	NS
Significant Others	3.78	1.41	3.23	1.36	.29	NS
Teacher Attitude	6.56	2.19	6.01	2.02	.29	Signif.
Race of Students	0.38	0.49	0.44	0.50	- .04	NS

Note. *Summary data:* Wilks' Lambda=.76; Canonical correlation (Rc)=.489: Canonical correlation $(Rc)^2$=.24, X2=103.3, p<.OOOl

Codes: Race of Teachers (O=white; l=African American); Gender (O=female; l=male)
Race of Students (O=Other; l=African American); Course (O=biology; l=ag science)
School Class. (O=low Afr American ag SC enrollment; l=high Afr American ag enrollment)
School and Ag Facilities and Teacher Attitude interval data on a l-l 0 scale.

Table 5. Results of Predicting Course Enrollment Based on Three Significant Discriminating Variables Predicted Groups [a]

Actual Group (n)	Agricultural Science n	Agricultural Science %	Biology n	Biology %
Agriculture (2 11)	158	74.9	53	25.1
Biology (169)	55	32.5	114	67.5

[a] 7 1.6% of cases classified correctly

Discussion and Conclusions

African American students in this study were less positive than the other students on three attitudinal constructs (image, future value, and role of significant others). However, African Americans who were enrolled in agricultural science courses tended to be more positive about the three constructs than African American students enrolled in biology courses. From an explanatory standpoint, few variables investigated in this study were strongly related to the three attitudinal constructs. Further, findings that three variables could classify students as agricultural science or biology student tended to confirm much of the existing research. For example males tended to enroll in agricultural science courses while females tended to enrolled in biology courses. Not surprising, students who were more positive about the future of the agricultural sciences tended to enroll in agricultural science courses, Also the influence of agricultural science teachers was confirmed because a positive teacher attitude was related to enrollment in agricultural science.

The findings of this study also provide new insights about several variables that the literature suggests are associated with enrollment in agricultural science courses. Although African

American students had less positive attitudes than other students toward the agricultural sciences, such attitudes had limited impact on students enrolling in agricultural science courses. Also, the race of the teacher and the quality of the school and agricultural science facilities were not related to whether or not students enrolled in agriculture science courses.

The findings of this study led the researchers to make the following conclusion:

1. Agricultural science teachers who wish to enroll more African American students in their courses must convince such students that the agricultural sciences offer them positive futures that include challenging educational experiences and rewarding careers.

2. More approaches are also needed to convince female students to enroll in agricultural science courses. Such approaches must include career and educational opportunities.

3. Agricultural science teachers who wish to enroll more African American and female students must exhibit positive, futuristic attitudes toward the agricultural sciences.

Recommendations

Based on the study's findings and conclusions, the following recommendations are made:

1. Secondary agricultural science teachers should include more non-production areas of the agricultural industry that might appeal more to African American and female students.

2. Agricultural science and biology teachers should work together to familiarize students with the similarities of their courses. This should help African American students obtain more positive perceptions of the agricultural sciences, which in turn, might result in more students developing interests in the field. Agricultural science teachers should take the lead in this effort because their courses are electives while most schools require biology courses.

3. Teacher educators, supervisors, and other professionals should help current and future teachers understand how teacher attitudes impact enrollment. Also, such individuals should help teachers practice behaviors that communicate positive, enthusiastic, and welcoming classroom and laboratory environments for African American and female students.

References

Arrington, L. P. & Price, W. L. **(1983).** Relationship of agricultural student satisfaction to selected student, school, and program variables. Report of Research, Institute of Food and Agricultural Sciences, Department of Agricultural and Extension Education, University of Florida, Gainesville, FL.

Bechtold, R. & Hoover, T. S. (1997). Perceptions of agriculture and barriers to higher education among Hispanic and non-Hispanic high school students in South Florida. NACTA Journal, **41 (2), 4-9.**

Bell, A. P., Powers, L. D., & Rogers, I. C. (1987). Commitment of 1890 land grant institutions to teacher education in agriculture. The Agricultural Education Magazine, 60 (6) 13-14.

Bowen, B. E. (1994). Reflections on the need for diversity: Desegregation vs. integration. The Agricultural Education Magazine, 66 **(12), 6-8.**

Bowen, B. E. & Bowen, C. F. (1996). Food and agricultural science summer workshop, Final report. University Park, PA: Department of Agricultural and Extension Education, The Pennsylvania State University.

Camp, W. G. (1995). Agricultural education in the United States: Teacher gender and ethnicity by region and state. The Agricultural Education Magazine, 68 (1) 22-23.

Case, D. M., Birkenholz, R. J., & Campbell, R. R. (1997). USDA summer internship programs: A case study of Lincoln University participants. Journal of Agricultural Education 38 (2) 8-14.

Cohen, J. (1975). Applied multiple regression/correlation analysis for the behavioral sciences. New York, NY: John Wiley & Sons.

Davis, J. R. (1971). Elementary survey analvsis. Englewood Cliffs, NJ: Prentice-Hall.

Ehrenberg, R. G., Goldhaber, D. D., & Brewer, D. J. (1994). Do teachers' race, gender, and ethnicitv matter? (Working Paper no. 4669). Cambridge, MA: National Bureau of Economic Research, Inc.

Frick, M. J., Kahler, A. A., & Miller, W. W. (1991). A definition of the concepts of agricultural literacy. Journal of Agricultural Education, 32 (2), 49-57.

Gardner, C. D. (1991). An early outreach initiative in agriculture. NACTA Journal, 25 (2) 12-13.

Gordon, H. R. D. (1987). Participation of minority youth in urban horticulture: A New York City high school project. The Agricultural Education Magazine, 60 (6) 8-9.

Jones, K. H. & Black, R. S. (1995). Teacher preparation for diversity: A national study of certification requirements. Journal of Vocational and Technical Education, 12 (1) 42-5 1.

Knight, J. (1987). Recruiting and retaining students: A challenge for vocational agriculture. The Agricultural Education Magazine. 60 (1) 9-10.

Larke, A., Jr. &Barr, T. P. (1987). Promoting minority involvement in agriculture. The Agricultural Education Magazine,60 (6) 6-7.

Luft, V. D. (1996). Extent to which cultural diversity is addressed in secondary agricultural education. The Journal of Agricultural Education 37 (3) 67-75.

National FFA (1993, July). Gender, ethnicitv, and age: National FFA membership preliminary report. Alexandria, VA: National FFA Organization.

Nichols, T. J., Jimmerson, R., & Nelson, C. (1993). Young Hispanics' views of agriculture create barriers in recruiting. NACTA Journal, 37 (4) 12-14.

Oliver, J. D. & Hinkle, D. E. (1981). Selecting procedures for agricultural education research. Paper presented at the Eighth Annual National Agricultural Education Research Meeting, Atlanta, GA.

Osborne, E. (1994). A long way to go. The Agricultural Education Magazine, 66 (12), 3.

Rawls, W. J. & Thomas, S. (1994). Analysis of student educational levels on knowledge of and interest in clusters of work-traits related to selected food and agricultural science careers. Summary of research series No. 3. Baton Rouge, LA: Southern University and A&M College, Department of Vocational Education.

Reis, R. & Kahler, A. (1997). Factors influencing enrollment in agricultural education programs as perceived by Iowa secondary agriculture education students. Journal of Agricultural Education, 38 (2) 38-48

Rojewski, J. W. & Miller, R. J. (1991). Involvement of minority youth in vocational education. The Journal of Vocational Special Needs Education, 14 (1), 25-27.

Scanlon, D. C., Yoder, E. P., & Hoover, T. S. (1989a). Enrollment trends in agricultural education programs and FFA membership. Proceedings of the Sixteenth National Agricultural Education Research Meeting, 335-342.

Scanlon, D., Yoder, E., Hoover, T., & Johnson, S. (1989b). Factors affecting past and prospective enrollments in secondary school agricultural education programs and FFA membership. Paper presented at the meeting of the National FFA Board of Directors, Alexandria, VA.

Talbert, B. A. & Larke, A (1995). Factors influencing minority and non-minority students to enroll in an introductory agriscience course in Texas. Journal of Agricultural Education. 3 6 (1) 38-45.

Trotter, E. (1988). Minority apprenticeship program boosting agriculture and natural resources enrollments. NACTA Journal, 32 (4) 16-17.

Vaughn, P. R. & Bowen, B. E. (1993). The Institute for Future Agricultural Leaders. In Enhancing Diversitv in Agricultural Education monograph. University Park, PA: The Pennsylvania State University, Department of Agricultural and Extension Education, and the AAAE Diversity Population Work Group.

Wiley, Z. Z. (1996). Influence of a food and agricultural sciences summer workshop on participant and nonparticipants. Unpublished doctoral dissertation, The Pennsylvania State University, University Park, PA.