

## ATTITUDES OF ILLINOIS AGRISCIENCE STUDENTS AND THEIR PARENTS TOWARD AGRICULTURE AND AGRICULTURAL EDUCATION PROGRAMS

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### Abstract

*The purpose of this study was to describe the attitudes of Illinois secondary agriscience students and their parents toward the agricultural industry and educational programs in agriculture. Students were sampled based upon enrollment in science applications in agriculture courses. A corresponding number of parents was also selected (one parent per student).*

*Results indicated that approximately 90% of both students and parents perceived the science applications in agriculture courses to be of "Excellent" or "Good" quality. Both students and parents reported positive attitudes toward agriculture as a career field and toward agricultural technologies. Each expressed views classified as "uncertain" toward educational programs in agriculture, although each rated high school agriculture and science programs as high in quality. Students enrolled in BSAA/PSAA courses (and their parents) expressed more positive attitudes toward each of the constructs than did students and parents from the general population. Likewise, students' attitudes toward agriculture as a career field, agricultural technologies, and educational programs in agriculture were more positive if they rated the quality of the science applications in agriculture courses high. Whereas students expressed positive attitudes toward careers in agriculture, parents were reluctant to recommend those careers.*

### Introduction

Enrollments in colleges of agriculture have experienced steady growth in many states in the past five years. At the University of Illinois enrollment has gradually increased from a low of 1,174 students in 1989 to 1,473 students in 1995 to 2,241 students in 1999 (Office of Academic Programs, 1999). However, increasing enrollments have not always been the trend. College of Agriculture enrollment peaked in 1977 at 1,816 students, and then plummeted to 1,174 students in 1989. This represented a drop of 642 students (35%).

Decreasing enrollments in university agriculture programs across the country during the late 1970s and 1980s coincided with a more severe

decline in high school agriculture enrollments. As a result, some colleges of agriculture have successfully directed their recruiting efforts more toward suburban and urban students with little or no agricultural background in an attempt to reverse the trend of declining enrollments (Office of Academic Programs, 1995). Russell (1993) noted that for the three-year period 1983-85, 46.3% of incoming College of Agriculture freshmen at the University of Illinois had completed one or more high school agriculture courses. This percentage declined to only 32.3% during 1986-88. By 1995 only 15% of University of Illinois College of Agriculture freshmen reported completing one or more high school agriculture courses (Office of Academic Programs, 1995). These data suggest that secondary agriculture programs have become a much less

important feeder program for the University of Illinois College of Agriculture.

High school agriculture curriculum development and redesign efforts in the state in the 1990s led to major changes in course offerings and student enrollments. Due in part to the introduction of a series of four, one-semester Biological Science Applications in Agriculture (BSAA) and Physical Science Applications in Agriculture (PSAA) course, secondary agriculture enrollments in Illinois increased by over 5,000 students (more than a 40% increase) since 1990 (FCAE/ISBE, 1995). In addition, agriculture teachers reported that these courses attracted a higher percentage of the higher-achieving students in their schools. If true, high school agriculture programs in Illinois could become a more significant contributor of students to agriculture programs at the university level. These students should be more highly sought by colleges of agriculture because (1) they have agricultural backgrounds that enhance effective and efficient instruction at the university level and (2) once enrolled, they are more likely to complete a degree in agriculture than students without high school agriculture course work (Dyer, Lacey, & Osborne, 1995).

The theoretical basis for this study has its foundation in the work of Fishbein and Ajzen (1975). As adapted to this research, their theory suggests that students' and parents' personal experiences, observations, knowledge, and values about agriculture affect their attitudes about agriculture, which in turn, affect their beliefs, intentions, and decisions to participate. Thus, knowledge of students' attitudes toward agriculture and educational programs in agriculture will, theoretically, provide an indication of their interests in pursuing agriculture as a field of study and professional pursuit. In addition, students' career choices are influenced by significant others, especially parents (Scofield, 1995; Thompson & Russell, 1993). Thus, student

and parent experiences with the new agriscience courses have the potential to influence their attitudes toward agriculture and subsequent career decisions.

### **Purpose and Objectives**

The purpose of this study was to describe the attitudes of Illinois secondary agriscience students and their parents toward the agricultural industry and educational programs in agriculture. This knowledge should assist agricultural educators in determining the effectiveness of science applications in agriculture as a tool in influencing attitudes and in attracting students to agricultural programs and careers in agriculture. The following research questions were addressed:

1. What are the attitudes of BSAA students and their parents toward agriculture as a career field and agricultural technologies?
2. What are the attitudes of BSAA students and their parents toward secondary agriculture programs, agriculture program quality, and science program quality?
3. What is the influence of selected demographic variables on the attitudes and perceptions of BSAA students and their parents?

### **Procedures**

A descriptive survey research design was used in the study. The target populations included (1) high school students enrolled in Biological Science Applications in Agriculture (BSAA) courses and (2) parents of these BSAA students. The student population was estimated to be 1,140 students (based upon the assumption that the 76 schools offering BSAA courses had an average enrollment of 15 students per class). Each of the five Facilitating Coordination of Agricultural Education (FCAE) District Field Advisors

provided a list of schools offering BSAA courses. The parent population was assumed to equal the student population, in that data were to be obtained from one parent of each student in the sample. (This eliminated the potential sampling error resulting from participation by single-parents.) No attempt was made to control which parent received the instrument. Neither Scofield (1995) nor Thompson and Russell (1993) reported differences based upon which parent completed survey instruments.

A cluster sampling technique was used to randomly select students from the 76 schools offering BSAA courses. Twenty schools were randomly selected to participate in the study in order to achieve the desired sample size of 285 (20 BSAA classes with an average enrollment of 15 students) based upon Krejcie and Morgan's (1970) formula. Schools offering BSAA courses were selected using computer-generated random numbers.

A postcard was mailed to agriculture teachers in each of the 20 selected schools requesting their participation in the study. Three of the 20 teachers declined to participate because the course was not offered that semester. The 17 participating teachers reported a total enrollment of 384 students, or 22.6 students per class.

The mailed questionnaire was adapted from a instrument used in a previous study involving guidance counselors (Dyer & Osborne, 1994). The questionnaire consisted of five parts, including a section on demographics. Cronbach's alpha of internal consistency (reliability) for the study ranged from .63 to .82 for the student instrument and from .60 to .89 for the parent instrument on the following constructs: agriculture as a career field, agricultural technologies, high school agricultural programs, agricultural program quality, and science quality. While the reliability estimates for two constructs (attitudes toward agricultural technologies and high school

agriculture programs) were lower than desirable (.60, to .65), the researchers were reluctant to modify the questions comprising this construct, since reliability estimates of higher than .80 were found on these constructs in an earlier study with guidance counselors (Dyer & Osborne, 1994). Five-point, Likert-type scales (1 = Strongly Disagree . . . 5 = Strongly Agree; 1 = Very Low . . . 5 = Very High) were used to measure student and parent attitudes and perceptions. The 17 teachers who agreed to participate in the study were mailed packets containing copies of the student and parent questionnaires for distribution to students in their BSAA classes. Students were asked to give the questionnaire to one of their parents to complete, then to return the completed survey to their agriculture teacher. After two follow-up mailings to the participating schools, 15 of the 17 teachers returned data for BSAA students and their parents. No further follow-up of nonrespondents was conducted. Therefore, generalization of the results of the study beyond the data sample should be done with caution.

A total of 293 (76.3% response rate) student questionnaires were returned, of which 275 were usable. All of the 166 parent questionnaires (43.2% response rate) were usable. Measures of central tendency and association, as well as analysis of variance were used to summarize and analyze the data. Post hoc group comparisons were made using the Scheffe test with a .05 alpha level.

## Results

Approximately two-thirds (63.3%,  $n = 174$ ) of the participating students were male and approximately two-thirds (60.8%,  $n = 101$ ) of the responding parents were female. Whereas 30.1% ( $n = 50$ ) of the parents had taken a high school agriculture course, only 13.3% ( $n = 22$ ) had completed a college agriculture course and 4.8% ( $n = 8$ ) majored in agriculture in college. About half (52.2%,  $n = 87$ ) of the parents reported

having paid work experience in agriculture. The highest percentage of parents worked in sales and service occupations (26.5%,  $n = 44$ ). Other occupations reported included farmer (8.4%,  $n = 14$ ), teacher (7.8%,  $n = 13$ ), homemaker (10.2%,  $n = 17$ ), finance (12.0%,  $n = 20$ ), construction/manufacturing (11.4%,  $n = 19$ ), medical (5.4%,  $n = 9$ ), public service (4.8%,  $n = 8$ ), and truck driver (13.3%,  $n = 22$ ).

Over half (59%,  $n = 98$ ) of the parents reported that they were familiar with the SAA courses. Data on respondents' familiarity with the agricultural industry and perceived quality of the SAA courses are shown in Tables 1 and 2. As these data indicate, a large majority of both groups were familiar with the agricultural industry and rated the quality of the SAA courses as good to excellent.

Table 1. Frequency and Percentage of BSAA Students and Parents By Familiarity With the Agricultural Industry

Level of Familiarity	Students ( $n = 272$ )		Parents ( $n = 159$ )	
	f	%	f	%
Very Familiar	97	35.7	49	30.8
Somewhat Familiar	147	54.0	82	51.6
Not Familiar	28	10.3	28	17.6

Table 2. Frequency and Percentage of BSAA Students and Parents By Perceptions of the Quality of SAA Courses

Perception of Quality	Students ( $n = 268$ )		Parents ( $n = 96$ )	
	f	%	f	%
Excellent	105	39.2	18	18.8
Good	139	51.9	71	74.0
Fair	16	5.9	6	6.3
Poor	8	3.0	1	1.0

To better understand the demographics of the sample, students and parents were asked to report the size of the community in which they grew up and lived at the time of the study. Approximately 50% of the parents reported that they grew up in a rural setting. Over 75% of the students and parents indicated that they now live in a rural setting, with about 50% of each group living on a farm or in a rural area (not in town)

(Table 3).

BSAA students and their parents reported positive attitudes toward agriculture as a career field and toward agricultural technologies. However, they were uncertain about their attitudes toward educational programs in agriculture. Both groups rated the quality of high school agriculture and science programs as high (Table 4).

Table 3. Frequency and Percentage of BSAA Students and Parents By Community in Which They Grew Up and Now Live

Community Type	Grew Up		Now Live			
	Parents ( $n = 164$ )		Parents ( $n = 163$ )		Students ( $n = 271$ )	
	f	%	f	%	f	%
Large urban (over 100,000)	17	10.4	2	1.2	1	.4
Medium urban (25,000 - 100,000)	17	10.4	1	.6	4	1.5
Small urban (2,500 - 24,999)	32	19.5	35	21.5	55	20.3
Rural town (< 2,500)	25	15.2	43	26.4	65	24.0
Rural area, but not on a farm	22	13.4	46	28.2	86	31.7
On a farm	51	31.1	36	22.1	60	22.1

Table 4. Summated Means and Standard Deviations of BSAA Student and Parent Perceptions by Construct

Construct	# of Items	Students( $n=275$ ) <sup>a</sup>	Range <sup>b</sup>	Parents( $n=166$ ) <sup>a</sup>	Range <sup>b</sup>
Ag as a Career Field	10	40.11 (5.12)	Agree	39.27 (4.73)	Agree
Ag Technologies	9	34.44 (4.14)	Agree	34.02 (3.74)	Agree
H.S. Ag Programs	18	60.99 (8.53)	Uncertain	60.80 (8.84)	Uncertain
Ag Program Quality	8	29.62 (4.86)	High	30.25 (4.82)	High
Science Program Quality	8	28.51 (4.71)	High	28.47 (4.5 1)	High

Standard deviation shown in parentheses. <sup>b</sup>1 = strongly disagree or very low to 5 = strongly agree or very high

Question 1: *What are the attitudes of BSAA students and their parents toward agriculture as a career field and agricultural technologies?*

Both BSAA students and their parents reported positive attitudes toward agriculture as a career field and toward agricultural technologies. However, they were uncertain about their attitudes toward educational programs in agriculture. In addition, both groups rated the quality of their

high school agriculture and science programs as high (Table 4).

Students agreed ( $M = 3.50 - 4.49$ ) with all 10 items comprising the construct "Agriculture as a Career Field." The highest rated items were (1) agriculture is one of Illinois' most important industries, (2) there are numerous opportunities for employment in agriculture, (3) agriculture is a scientific area of study, and (4) the field of agriculture incorporates many applications of

scientific principles. Parents agreed with all items in this construct except “I have encouraged my son/daughter to pursue a vocation or professional pursuit in agriculture” ( $\bar{M}$  = 3.30). Parents’ highest ratings were for the following statements: (1) agriculture is one of Illinois’ most important industries, (2) agriculture as a field is a blend of scientific principles and agricultural practices, and (3) agriculture is a scientific field of study.

With regard to the nine items comprising the Agricultural Technologies construct, both students and parents agreed with all statements except “agriculture has greatly contributed to the deterioration of the environment.” Both groups were uncertain about their attitudes on this item. The highest rated items were (1) agricultural technologies have a positive impact on the U.S. standard of living, (2) agriculture should do more to publicize its scientific contributions to society, (3) sustainable agricultural practices can help protect the environment and our natural resources, and (4) science-based technologies in agriculture can help resolve environmental concerns.

*Question 2: What are the attitudes of BSAA students and their parents toward secondary agriculture programs, agriculture program quality, and science program quality?*

For agriculture programs, students and parents rated the competency of the teacher, ability of students, value and reputation of the program, quality of instruction, and overall program quality as high. By contrast, ratings of their science programs were slightly lower on some items, including competency of teachers, academic ability of students, and reputation of the science program among students. Students and parents rated science programs as average in these areas and high in the remaining areas (Table 5).

Student and parent responses were very similar on the 18 items pertaining to attitudes toward high school agriculture programs. Both

disagreed that agriculture courses are better suited for male students. Students expressed uncertainty about whether agriculture courses are too vocational, rigor of courses, effectiveness of agriculture courses with students of differing ability levels, the need for high school agriculture courses to become more science based, and the preparation of agriculture teachers in science. However, they felt that BSAA courses make scientific principles more meaningful, represent a good approach to learning science, and should receive lab science credit. They also agreed that high school agriculture courses prepare students for college and employment after high school, that most high school students should take some course work in agriculture, college-bound students should be encouraged to enroll in agriculture courses, stronger ties should be made between high school science and agriculture curricula, and science applications in agriculture are best taught by agriculture teachers.

Parents agreed ( $\bar{M}$  = 3.50 - 4.49) with 9 of the 18 statements regarding high school agriculture programs, with the highest mean score for the item “high school agriculture courses should prepare students for college study in agriculture” ( $\bar{M}$  = 3.92). Other statements with which they agreed included: most high school students should take agriculture course work, stronger ties should be made between agriculture and science curricula, science applications are best taught by agriculture teachers, courses like BSAA make scientific principles more meaningful and are appropriate for lab science credit, lab instruction in agriculture should be more science based, and basic study in science, followed by applications of science in agriculture, is a good approach for learning science. Parents were uncertain ( $\bar{M}$  = 2.50 - 3.49) about agriculture teachers’ preparation in science, whether agriculture curricula should become more science based, the rigor of agriculture courses and their appropriateness for students with differing achievement levels,

Table 5. Means and Standard Deviations of Agriculture and Science Program Quality Rating By BSAA Students and Parents

Item	Agriculture Program Quality				Science Program Quality			
	Students ( <u>n</u> =275)		Parents ( <u>n</u> =166)		Students ( <u>n</u> =275)		Parents ( <u>n</u> =166)	
	<u>M</u>	SD	<u>M</u>	SD	<u>M</u>	SD	<u>M</u>	SD
Competency & preparation of teachers	3.77	.88	3.79	.82	3.57	.90	3.44	.82
Academic ability of students	3.52	.83	3.63	.75	3.40	.83	3.39	.80
Value of the program to students who plan to work upon graduation	3.72	.91	3.75	.81	3.54	.90	3.56	.82
Value of the program to students who attend college	3.75	.96	3.83	.84	3.69	.91	3.82	.76
Quality of instruction	3.79	.90	3.73	.85	3.66	.88	3.57	.80
Reputation of the program among faculty and administration	3.61	.95	3.73	.91	3.51	.83	3.61	.85
Reputation of program among students	3.51	.96	3.64	.85	3.38	.92	3.44	.77
Overall quality	3.93	.97	3.96	.79	3.72	.94	3.61	.77

Note. 1 = Very Low, 2 = Low, 3 = Average, 4 = High, 5 = Very High

whether agriculture courses are too vocationally oriented, if agriculture courses should be primarily offered in rural communities, and whether college-bound students should be encouraged to enroll in high school agriculture courses. Correlational analysis showed that student attitudes toward agriculture as a career field ( $r = .31$ ), agricultural technologies ( $r = .30$ ), and high school agriculture programs ( $r = .54$ ) correlated positively with perceived quality of BSAA courses.

*Question 3: What is the influence of selected demographic variables on the attitudes*

*and perceptions of BSAA students and their parents?*

Analysis of variance results showed student attitudes toward agriculture as a career field, agricultural technologies, and agricultural education programs significantly higher if they were familiar with the agricultural industry (Table 6). Parents familiar with the Biological Science Applications in Agriculture course rated the quality of agricultural education programs significantly higher (Table 7).

Table 6. Summary Data and Analysis of Variance for Student Attitudes by Antecedent Variable

Variable	n	<u>M<sup>a</sup></u>	SD	SE
<u>Ag as a Career Field Attitudes by Familiarity with Ag Industry</u>				
Very familiar	95	42.20 <sup>A</sup>	4.90	.50
Somewhat familiar	145	39.44 <sup>AB</sup>	4.37	.36
Not familiar	28	36.36 <sup>AB</sup>	6.56	1.24
(F = 18.77, p < .001)				
<u>Ag Technologies Attitudes by Familiarity with Ag Industry</u>				
Very familiar	94	35.30 <sup>A</sup>	4.14	.43
Somewhat familiar	146	34.20	3.98	.33
Not familiar	27	32.41 <sup>A</sup>	4.03	.78
(F = 5.77, p < .01)				
<u>Ag Program Quality Perceptions by Familiarity with Ag Industry</u>				
Very familiar	95	30.86 <sup>A</sup>	4.81	.49
Somewhat familiar	143	29.49 <sup>B</sup>	4.80	.38
Not familiar	27	25.96 <sup>AB</sup>	5.13	.99
(F = 11.65, p < .001)				

<sup>a</sup>Means with the same letter superscript within categories are significantly different.

Table 7. Summary Data and Analysis of Variance for Parent Attitudes by Antecedent Variable

Variable	n	<u>M<sup>a</sup></u>	SD	SE
<u>Ag as Career Field Attitudes by Familiarity with SAA</u>				
Very familiar	7	38.71	5.71	2.16
Somewhat familiar	89	40.36 <sup>A</sup>	4.57	.49
Not familiar	65	37.83 <sup>A</sup>	4.52	.56
(F = 5.74, p < .01)				
<u>Ag Program Quality Perceptions by Familiarity with SAA Courses</u>				
Very familiar	6	32.67	6.50	2.65
Somewhat familiar	69	31.07 <sup>A</sup>	4.87	.59
Not familiar	50	28.80 <sup>A</sup>	4.21	.60
(F = 4.17, p < .05)				

<sup>a</sup>Means with the same letter superscript within categories are significantly different.

## Conclusions and Recommendations

Students enrolled in the BSAA courses and their parents hold positive attitudes toward agricultural technologies and agriculture as a career field. Both groups believe agriculture is a scientific field with numerous career opportunities. However, parents are uncertain as to whether they would encourage their son/daughter to pursue a career in agriculture. This finding parallels one from in a previous study with Illinois high school science teachers (Osborne & Dyer, 1995). In that study, science teachers also reported positive attitudes toward the agricultural industry but were unsure if they would encourage their students to pursue an agricultural career. Further research is needed to determine the basis for these discrepant attitudes. Agricultural educators should increase their efforts to inform parents and others about the career opportunities in agriculture.

BSAA students and their parents perceive that agriculture can help protect the environment and resolve environmental concerns, yet they are uncertain as to whether agriculture has contributed to environmental deterioration. Given their positive attitudes toward agriculture and agricultural technologies, a good opportunity may exist to incorporate more environmental science as it relates to agriculture in the high school agriculture curriculum.

BSAA students and their parents perceive the quality of agriculture and science programs to be high. BSAA students and their parents hold positive views of BSAA courses in terms of quality and fit (as a lab-based science applications course) within the school's science curriculum. Many parents are familiar with the SAA courses, and those parents regard the current agriculture program to be of higher quality than did parents unfamiliar with the courses. In addition, students who perceived BSAA courses to be of higher quality expressed more positive attitudes toward agriculture as a career field and agricultural

technologies, as well as more positive views of their own agriculture program. Perhaps some of the most effective public relations devices agricultural educators can employ are high quality science-integrated courses. Agricultural educators should continue to implement SAA courses in local agriculture programs to further build on their potential to positively influence career decisions and strengthen local programs.

BSAA students and their parents are uncertain about several key dimensions of high school agriculture programs in general. These include rigor, vocational emphasis, need for more of a science basis, preparation of the agriculture teacher in science, and other areas. Given the curricular transformations that have taken place in Illinois high school agriculture programs during the past decade, agricultural educators need to clearly and continually communicate these changes and their benefits to local citizens, educators, the business community, and other groups. Some clarification of new directions may also need to be done within the profession. In addition, teacher educators and state staff should continue to provide inservice and preservice courses and programs that boost the expertise and confidence of agriculture teachers in science.

Most BSAA students and their parents perceive that they are familiar with the agricultural industry. Most student and parents live in a rural setting. Students and parents who are familiar with the agricultural industry have more positive attitudes towards agriculture as a career field and agricultural technologies. They also believe their agriculture program is of higher quality. Agriculture teachers should work with university faculty and the agricultural industry to develop informational programs aimed at further increasing students and parent's familiarity with the agriculture industry.

The people who exert the most influence on BSAA students' career plans include the

agriculture teacher, parents, other teachers, siblings, and guidance counselors (Scofield, 1995). Educators and agricultural industry representatives should continually direct informational programs toward these groups in an attempt to strengthen their attitudes toward agriculture. This may enhance efforts to recruit students into the agricultural industry and postsecondary educational programs in agriculture.

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