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ABSTRACT

This study measures advertising students' attitudes toward statistics. Subjects, 275 undergraduate advertising students from two southwestern United States universities, completed a questionnaire used to gauge students' attitudes toward statistics by measuring 6 underlying factors: (1) students' interest and future applicability; (2) relationship and impact of the instructor; (3) attitude toward statistical tools; (4) self-confidence; (5) parental influence; and (6) initiative and extra effort in learning statistics. Overall, findings reveal that advertising students have a negative attitude toward statistics and introductory statistics courses, but they like working on the computer. Women report being significantly more anxious about statistics, more likely to ask questions in statistics class and see their instructor if they have questions. Implications for teachers of advertising are included. (Contains 35 references and 3 tables of data.) (Author/RS)

An Analysis of Attitudes Toward Statistics:

Gender Differences Among Advertising Majors

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This study measures advertising students' attitudes toward statistics. 275 undergraduate advertising students from two southwestern U.S. universities completed a questionnaire used to gauge students' attitudes toward statistics by measuring six underlying factors: (1) students' interest and future applicability; (2) relationship and impact of the instructor; (3) attitude toward statistical tools; (4) self-confidence; (5) parental influence; and (6) initiative and extra effort in learning statistics. Overall findings reveal that advertising students have a negative attitudes toward statistics and introductory statistics courses, but like working on the computer. Women report being significantly more anxious about statistics, more likely to ask questions in statistics class and see their instructor if they have questions. Implications for teachers of advertising are included.

An Analysis of Attitudes Toward Statistics: Gender Differences Among Advertising Majors

Do advertising students suffer from "statisticsphobia?" Or is this question a manifestation of frustrated media planning course professors?

Do women perceive they are worse at math than men? If yes, is it also true among advertising majors? Or are these questions based on unfair gender stereotypes?

There are more female advertising majors than male (Umphrey & Fullerton, 2001) and women tend to have more anxiety about math and statistics than men (Bradley & Wygant, 1998). Does this indicate gender differences among advertising majors in their attitudes toward statistics?

There is scant research to address these questions, but the answers would be helpful to advertising educators, particularly those who teach courses that include math.

Surveys of advertising professionals clearly indicate that students who intend to work in the advertising business need to have math skills and understand statistics. A recent survey of advertising media directors, planners, buyers and executives (Lloyd, Slater & Robb, 2000) revealed professionals believe that students should have a mastery of basic math, percentages and index numbers. The study also indicated that professionals were concerned that newly hired advertising graduates lacked knowledge of media math.

An earlier study (Martin & Lloyd, 1992) revealed that over half of media teachers surveyed used media planning software and were therefore spending

less time teaching skills oriented material, such as media math. Crowley (1987) interviewed several agency media directors in an attempt to identify content for the advertising media planning course. The professionals in the study mentioned statistics as a need-to-know skill.

The purpose of this study is to explore questions of anxiety about working with numbers among advertising majors and to discover if there are differences by gender.

Review of the Literature

Attitude Toward Statistics

There is research indicating that students have math anxiety. It was (Heemskerk, 1975; Dillion, 1982) research on this subject from which the term "statisticsphobia" came. Other studies have documented both "math anxiety" and "statistics anxiety" (Feinberg & Halperin, 1978; Roberts & Saxe; 1982, Adams & Holcomb, 1986; Birenbaum & Eylath, 1994). To investigate this apparent anxiety several researchers have measured college students' attitudes toward statistics (Bendig & Hughes, 1954; Roberts & Bilderback, 1980; Benson, 1989; Sutarso, 1992; Schau, et al, 1995, Tremblay, Gardner & Heipel, 2000), though no studies can be found that specifically examine the advertising majors' attitude toward math and statistics.

Bendig and Hughes (1954) constructed a scale to measure student attitude toward a statistics course and found that attitude, in part, determines student achievement. Roberts and Bilderback (1980) administered a similar scale to graduate students taking the introductory statistics course and found it to be a good predictor of statistics grades. Waters, et al (1989) later used the same scale

with a sample of 237 undergraduate college students in 8 sections of freshman statistics with similar results.

Other instruments have been developed and tested to measure attitude toward statistics (Wise, 1985; Benson, 1989; Schau, et al, 1995). All instruments showed a high correlation between a positive attitude toward statistics and high course grades. A recent study (Tremblay, Gardner, & Heipel, 2000) confirmed the relationship between anxiety and achievement in statistics.

Sutarso (1992) created the instrument used in this study, which gauges students' attitude toward statistics by measuring six underlying dimensions. Sutarso used a sample of education and business students in developing the instrument and found it to have strong reliability and validity. He also identified some variables that related to students' anxiety in learning statistics including student achievement, preknowledge of statistics, school, and current class level. Sutarso found no relationship between statistics anxiety and other variables such as gender and ethnicity.

Feinberg and Halperin (1978) also identified several variables that were related to performance in introductory statistics including anxiety about math, mathematics achievement and previous math experience. Age, gender and academic major appeared to be unrelated to students' success or failure in statistics.

Gender and Math

Gender differences were not significantly related to attitude toward statistics in a study of education majors (Cherian & Glencross, 1997). Bradley & Wygant (1998) found that while women had significantly more anxiety about taking the statistics course, they did as well as the men in their class. Elmore

and Vasu (1986) measured several sex related variables as predictors of statistics achievement and found that the most important predictor variable set was attitudes toward feminist issues.

There is also research on SAT scores that might lead one toward a conclusion that the proficiency of women in math skills is lower than that of men. Men outscored women on the SAT quantitative measures (Angoff & Johnson, 1988; Bridgeman & Wender, 1991; Grandy, 1984; Sue & Abe, 1988; Wainer & Steinberg, 1992). Numerous studies (i.e. Casey et al., 1995; Navarro, 1989; Penrock-Roman, 1994; Rosser, 1989) address reasons why there may be gender differences.

These gender differences above are not necessarily reflected in measures of performance, however. The Wainer & Steinberg (1992) study examined the SAT math scores of nearly 47,000 men and women who took the same math course. Women making the same grade as men scored an average of 33 points lower on the SAT math test. Bridgeman & Wendler (1991) used a sample of approximately 12,000 to find women made higher grades in first-year college math courses while men in the same courses had higher SAT math scores. Rosser (1987) concluded that female students consistently make higher overall grades in both high school and college.

Advertising Majors and Math

Although none of the above studies are particular to advertising students, there is research that would lean toward support of a hypothesis connecting math anxiety and advertising majors. Umphrey and Fullerton (2001) found that advertising majors had the lowest quantitative SAT scores in comparison to other

groupings of majors on a university campus. But how does this relate to attitudes about math?

Several studies have revealed a link between previous math experience and anxiety about statistics and other math courses (Heemskerk, 1975; Feinberg & Halperin, 1978; Tremblay, Gardner & Heipel, 2000). Brown & Brown (1995) reported that achievement in previous math courses influenced attitude on subsequent math courses. Low SAT quantitative scores among advertising majors may contribute to their anxiety about statistics and math.

There also have been concerns about gender stereotyping (Stocking & Goldstein, 1992) with questions aimed as to why some fields of study attract more of one gender than another, a phenomenon documented in "Are Our High School...,"1994, and by Grandy, 1984; Lovely, 1987, and Ramist, 1984. SAT scores also have been associated with the selection of a major (Angoff & Johnson, 1988; Grandy, 1984). These findings may lend credence to a notion that students--and women in particular--are attracted to advertising as a major because of math aversion.

Research Questions

Two research questions are addressed in this study.

1. Do advertising students have negative attitudes towards math and statistics?
2. Do attitudes vary according to the gender of the student?

Methodology

Sample

Data were collected during the week of February 5-9, 2001 by distributing self-administered questionnaires in advertising classes at two universities in the Southwest. One of the universities was a medium-sized, private, liberal arts

institution and the other a large, state, research institution. Both universities offer bachelor's degrees in advertising. The private institution houses its advertising department in the college fine arts, while the public university's advertising program is part of a journalism school in the college of arts and sciences.

According to instructions given in each of the classes, questionnaires were to be completed by advertising majors only. Further, individuals who had completed a questionnaire in a previous class were instructed not to fill out a second questionnaire.

Instrument

Students completed a five-page questionnaire that included the STATS inventory, a recognized instrument for measuring students' attitudes toward statistics (Sutarso, 1992). The STATS inventory consists of 24 items to which students are ask to indicate the extent each item describes them from strongly agree (5) to strongly disagree (1). STATS was created for researchers and practitioners to gauge students' attitudes toward statistics. Measures include six underlying factors: (1) Students' interest in statistics and perceived future applicability; (2) relationship and impact of the instructor; (3) attitude toward statistical tools; (4) self-confidence; (5) parental influence; and (6) initiative and extra effort in learning statistics (Sutarso, 1992). All students were asked to respond to 13 of the 24 items on STATS. Only students who were currently enrolled or had completed the statistics course answered the remaining 11 items.

In addition to the STATS inventory, the questionnaire included six demographic questions, GPA, when they had selected the advertising major, whether it was their first, second, third, fourth or fifth declared major, and what

was their favorite and least favorite high school subject. The questionnaire included some other items that are not included in this study. The students completed the questionnaire in an average of six minutes and twenty-eight seconds with a range between four minutes and twenty seconds and nine minutes and ten seconds.

Completed questionnaires were coded into an Excel spreadsheet and analyzed using SPSS Version 10 for Macintosh. Statistical tools included frequencies, mean scores, t-tests and chi squares.

Results

The response rates included 179 advertising majors out of a possible 227 at the private university, accounting for 78.9% of the advertising majors and 96 out of 131 majors at the public university, a 73.2% response rate. The total sample size equals 275; a combined response rate of 76.8% was achieved.

Overall, the students participating in the study were traditional college age (96% between 18 and 23) and most were upperclassmen (77% juniors or seniors). The sample was predominantly female (64%) and white (85%). Only 5% reported being international students. The mean score of their self-reported GPA was 3.08 on a 4.00 scale. All were advertising majors, though for almost half of the total sample (44.7%), advertising was not the first major that they had selected. Business was reported most often as the major they had declared prior to advertising. Almost half (49.5%) of the students reported math as their least favorite subject in high school and more than a quarter (26.3%) indicated science. There was no significant difference between male and female advertising majors in regards to their least favorite subject.

The samples from the two universities varied significantly in regards to age, year in school, percentage of international students, ethnicity, and advertising as the first declared major (See Table 1). Students from the public university were older ($t=2.497$; $p < .013$), and higher in school year ($t=1.986$; $p < .048$). The private university had significantly more international students ($X^2=7.3$, $df=1$, $p<.007$), was more ethnically diverse ($X^2=5.8$, $df=1$,$p<.016$) and had more students for whom advertising was their first declared major ($X^2= 19.1$, $df=1$, $p<.0001$). There were no significant differences between the two schools in terms of GPA or in ratio by gender.

Eighty-five percent of the students had completed or were currently enrolled in the required statistics course (n=234), with significantly more having completed the course at the private institution (84.8%) as compared to the public university (69.8%; $X^2=8.7$, $df=2$, $p<. 013$).

Overall attitudes

As reported below, t-tests comparing mean scores between the two universities revealed only two significant differences. For this reason the sample was analyzed as a whole. Table 2 provides a listing of the statements, the mean ratings, and standard deviations for the entire sample.

From the analysis, it appears that advertising students have a predominantly negative view of statistics and the statistics course. Analysis reveals that advertising majors generally do not like statistics because the second most strongly agreed with statement was "if a statistics course were not required for my major, I would not take one" (mean score=3.92). Two of the top statements with the highest disagreement included "I study/studied statistics regularly, even when there is/was no specific assignment" (mean score = 2.33)

and "I find statistics is a very interesting subject" (mean score= 2.52). Almost forty percent of the students agreed or strongly agreed that they did not like statistics before they took the class and only 29% agreed or strongly agreed with the statement "I like statistics now."

Analysis of underlying dimensions

Student interest and future applicability. Items 10, 11, 12, 13, 14, and 18 measures students' interest and future applicability of statistics (Sutarso, 1992). The average mean score for this group of statements was 3.11 indicating that students are relatively neutral regarding their interest in statistics and may be unsure of how it will help them in the future. Item 18, "I find statistics an interesting subject" has an individual mean score of 2.52 with over half of the students either disagreeing or strongly disagreeing with the statement.

Relationship and impact of the instructor. Items 20, 21, 22 and 24 measure the relationship that students have with the instructor (Sutarso, 1992). An average mean score of 2.98 for this group of statements indicates that students are ambivalent toward their statistics instructor. Students were neutral on the statements "I like my instructor's method of teaching." (mean score= 2.88) and "The instructor's friendliness in answering students' questions helps/helped me to like statistics." (mean score=3.14). A closer analysis reveals a high level of variance for these statement suggesting mixed feelings among the sample in regards to the impact and effectiveness of the instructor.

Statistical tools. Items 4,5 and 6 assess students' attitude toward the use of statistical tools (Sutarso, 1992) such as computers and calculators. The average mean score of these items at 3.26 suggests overall that students lean slightly in favor of using statistical tools. The average mean masks the fact that overall

students agreed with some items in this group, but disagreed with others. Item 6, "I enjoy working with computers," was the most agreed with statement on the inventory (mean score=3.94). However the statement, "I like working with numbers" (mean score= 2.74) was disagreed with by almost half (48%) of the student respondents. Students may not associate working on a computer with math or statistics since most advertising majors use computers in their writing and design courses.

Self Confidence. Items 1, 2, and 3 measure student's level of self-confidence about statistics and the statistics course (Sutarso, 1992). An average mean score of 3.11 indicates that student are neither confident nor lack confidence of their ability in statistics. However, the high variance scores on these three questions suggests that some students were very confident while others lacked confidence in their ability to do statistics. Over 42% of the students reported that they understood statistics better than the other members of their class.

Parental Influence. Parent's influence on student's attitude toward statistics was measured by items 7 and 8 (Sutarso, 1992). The average mean score of these two items is 2.24 reflecting disagreement with the statements "my mother likes mathematics or statistics, so I will" and "my father likes mathematics or statistics, so I will." Either students do not believe that their parents like math, or they do not believe that just because their parents like math that they will. Regardless, the findings seem to suggest that parental influence is low.

Initiative and Extra Effort. Items 15, 16 and 17 gauged student's initiative and extra effort regarding statistics (Sutarso, 1992). The average mean score of 3.07 for these items however, does not accurately reflect the attitudes prevalent in this group of items. Slightly more than two-thirds of the students disagreed or

strongly disagreed with the statement "I study statistics regularly even when there is no specific assignment" (mean score=2.33). Conversely, students expressed agreement with statements regarding seeking help with statistics. Seventy percent of the students said they asked questions in class (mean score = 3.57) and 56% admitted to seeing the instructor when they didn't understand something in their statistics class (mean score= 3.30).

Differences between universities

Significantly more students from the private institution had completed or were currently enrolled in the statistics course (X^2=8.7, df=2, p<.013). However, students from the two universities generally responded similarly to the STATS inventory. A t-test for Equality of Means revealed only two items for which the students from the two institutions differed significantly.

Students from the smaller, private university (mean score =3.42) agreed more strongly with the statement "I see/saw my statistics instructor when I do/did not understand something in that class" as compared with the students from the larger, public university (mean score = 3.05; t=-2.394, p<.017). Both groups of students disagreed with this statement "I like statistics now," with the public university students (mean score = 2.62) disliking statistics significantly more than their counterparts at the private institution (mean score = 2.90). (t=-1.916, p<.057).

Differences between genders

About two-thirds of the advertising majors in this study were women. Men and women in this study differed significantly demographically and in how they responded to the STATS inventory (See Table 3). Women were younger

(mean age = 20.75) than men (mean age = 21.34; t=2.946, p<.004), chose to major in advertising sooner (mean scores 2.56 for women versus 3.04 for men; t=3.921,p<.0001), and were more likely to have selected advertising as their first and only major in college (59.6% of the women had only majored in advertising versus 46.2% of the men; X^2=4.37, df=1, p<.037). Women also had better grades. Self-reported grade point averages between men and women varied significantly with women reporting 3.16 and men reporting 2.92 (t=-4.659, p<.0001). Men and women were not significantly different in terms of their ethnicity or international student status.

Men and women responded significantly different on almost half of the items in the STATS inventory. A complete list of mean scores by gender and significance levels are reported in Table 3. Women were more likely to agree with the statement "Statistics makes me anxious" though they were more likely to say that they liked working with numbers and using a calculator. Women were less likely to disagree with the statement, "My father likes mathematics or statistics, and so do I" but showed no significant difference from men in their mother's ability or influence in math.

Overall, women were more agreeable on the statements concerning the applicability of statistics and the influence of their statistics instructor. Women were also more apt to think that statistics would help them in their major and improve their research ability. Women were more likely to see their statistics instructor, ask questions in class and to think that the instructor's friendliness helped them understand statistics.

There was strong disagreement from both men and women when asked the statement "I feel that statistics is only for men" (mean score=1.72). However

men did not disagree with this statement quite as strongly as women did. A t-test revealed a significant difference between men and women on this statement ($p<.052$).

Male and female advertising students did not differ significantly on statements regarding their interest and liking of statistics. They equally disagreed on the on the statement "I find statistics is a very interesting subject" and equally agreed that "if a statistics course was not required for my major, I would not take one."

Discussion and Implications

Findings of this study reveal overall negative attitudes among advertising majors toward statistics. Advertising students do not like statistics, are anxious about it, and do not find it interesting. Most students would not take a statistics course if it were not required for their degree and few study statistics unless they have an assignment or a test. Students do however, like to work with computers, but they may not associate the computer with performing statistical analysis.

The findings herein are consistent with the literature documenting anxiety and even phobia toward statistics (Roberts & Bilderback, 1980; Dillion, 1982; Roberts & Saxe; 1982; Adams & Holcomb, 1986; Sutarso, 1992) and support the conventional wisdom that advertising students want to avoid math. The study may also confirm the comments of professionals that many new advertising graduates do not have good basic math skills (Lloyd, Slater & Robb, 2000).

If advertising majors, as a group, are among those with the lowest quantitative SAT scores on campus (Umphrey & Fullerton, 2001), anxiety towards statistics should be expected. Furthermore, almost half of the students in the study indicated that math was their least favorite subject in high school.

This could explain their anxiety and avoidance of math in college. According to the literature, previous math experience, mathematics achievement and anxiety about math are related to attitude toward statistics (Feinberg & Halperin, 1978). If students did not like math in high school it would be expected for them to have negative attitudes toward college math courses.

This study seemed to suggest a difference between men and women in their overall attitude toward statistics with women being generally more positive on most dimensions. This finding is not consistent with some studies in the literature, which reported no differences between genders in relation to their attitude toward statistics (Cherian & Glencross, 1997; Feinberg and Halperin, 1978, Sutarso, 1992b).

Consistent with the literature, women in this study reported feeling more anxious than men toward their ability in statistics (Bradley & Wygant, 1998). Findings in this study seem to indicate that women turn their anxiety into a positive by being more apt to seek help from their instructor and ask questions in class. As a result women may perform better in statistics class than men. Though students' grades in statistics is not known; overall women's GPA is higher, a finding which is also consistent with the literature (Rosser, 1987; Bridgeman & Wender, 1991; Umphrey & Fullerton, 2000).

Knowing that advertising majors possess negative attitudes toward statistics can help advertising educators improve their instruction and curricular content. These findings should alert advertising professors to teach basic math and familiarize students with mathematical concepts in their advertising courses. According to the literature, pre-knowledge of math helps reduce the level of anxiety toward statistics and improve statistics course grades (Brown & Brown,

1995). Media teachers need to consider teaching basic media math skills and possibly asking students to create their media plans by hand and not with the computer.

Students clearly do not understand why statistics is important for them to be successful in school and in their career. Advertising professors and academic advisors should communicate to students the advantages of mastering basic math and statistics by explaining how statistics will be a part of their future career. This could be accomplished by using case studies that require the interpretation of an advertising research problem or budget-setting activity. These types of exercises can demonstrate the need for math in the advertising business. Another way to demonstrate the importance of statistics is to remind students that as a professional, most of them will not actually perform statistical analysis on research gathered, but they must be able to understand the findings and explain them to the client.

There are many limitations to this study. The sample of students only represents 275 students from two universities. The STATS inventory, while recognized and tested, is admittedly not without flaws (Sutarso, 1992). Most importantly, grades in statistics were not obtained from the advertising majors and therefore it is impossible to know if negative attitudes toward statistics results in poor grades and poor performance in statistics class.

It is clear that overall attitude toward statistics among advertising students is low. Given the importance of math and statistics in the 21st century marketplace, advertising educators need to help students embrace statistics and reverse the conventional wisdom that students major in advertising to avoid math.

Table 1

Characteristics of the Students

	Public University	Private University
Mean Age	21.27	20.78*
Year in School	81% junior or senior	75% junior or senior*
Gender	38.5% male/61.5%female	33.7%male/66.3% female
Mean GPA (self report)	3.09	3.06*
% International Students	0	7.3%*
% ethnic minority	7.4%	18.2%*
% adv. as 1st major	37.2%	65.1%*

*p<.05

Table 2
Statistics for rankings of agreement with statements
Mean, Median, Mode, Standard Deviation, and Variance

	N	Mean	Median	Mode	Standard Deviation	Variance
1. Learning statistics is easy for me.	230	3.12	3.00	4	1.13	1.27
2. I understand/understood statistics better than the majority of people in my class.	230	3.19	3.00	4	1.10	1.21
3. Statistics make me anxious	274	3.01	3.00	2	1.04	1.08
4. I like working with numbers	274	2.74	3.00	2	1.17	1.37
5. I enjoy working with a calculator.	273	3.08	3.00	4	1.09	1.19
6. I enjoy working with a computer	272	3.94	4.00	4	.83	.69
7. My mother likes mathematics or statistics, and so do I.	272	2.03	2.00	2	.97	.93
8. My fathers likes mathematics or statistics and so do I.	272	2.46	2.00	2	1.13	1.27
9. I feel that statistics is only for men	273	1.72	2.00	2	.73	.53
10. Statistics is very useful in my major	273	3.16	3.00	4	1.10	1.21
11. Statistics will improve my research ability.	273	3.51	4.00	4	1.01	1.02
12. Statistics will be important for my future career.	274	3.09	3.00	3	1.03	1.06
13. I will be more competent in my subject area when I master statistics.	272	2.78	3.00	3	1.00	.99
14. I can master statistics with a great deal of effort.	273	3.26	3.00	4	.97	.95
15. I study/studied statistics regularly, even when there is/was no specific assignment.	230	2.33	2.00	2	.93	.87
16. I see/saw my statistics instructor when I do/did not understand something in that class.	230	3.30	4.00	4	1.10	1.22

17. I ask/asked questions when I do/did not understand something in my statistics course.	230	3.57	4.00	4	.99	.99
18. I find statistics is a very interesting subject.	229	2.52	2.00	2	1.11	1.22
19. If a statistics course were not required for my major, I would not take one.	271	3.92	4.00	4	1.07	1.14
20. I like/liked statistics because of my instructor's method of teaching.	228	2.88	3.00	2	1.24	1.54
21. The instructor's friendliness in answering students' questions helps/helped me to like statistics.	229	3.14	3.00	4	1.20	1.45
22. The instructor's explanations help/helped me to like statistics.	230	3.07	3.00	4	1.17	1.38
23. I did not like statistics before I took this class.	229	3.30	3.00	3	.88	.78
24. I like statistics now.	228	2.81	3.00	3	1.04	1.09

Note: Strongly Agree = 5, Strongly Disagree = 1, etc.

Table 3

T-tests for Equality of Means by Gender

	Men	Women	t	p<
1. Learning statistics is easy for me.	3.09	3.14	-.374	.709
2. I understand/understood statistics better than the majority of people in my class.	3.10	3.25	-.981	.328
3. Statistics make me anxious	2.82	3.13	-2.31	.021
4. I like working with numbers	2.50	2.89	-2.61	.009
5. I enjoy working with a calculator	2.89	3.21	-2.35	.019
6. I enjoy working with a computer	4.03	3.89	1.34	.180
7. My mother likes mathematics or statistics, and so do I.	1.91	2.10	-1.61	.108
8. My fathers likes mathematics or	2.24	2.60	-2.48	.014

statistics and so do I.				
9. I feel that statistics is only for men	1.84	1.66	1.95	.052
10. Statistics is very useful in my major	2.94	3.26	-2.31	.022
11. Statistics will improve my research ability.	3.34	3.61	-2.12	.035
12. Statistics will be important for my future career.	2.96	3.17	-1.64	.101
13. I will be more competent in my subject area when I master statistics.	2.72	2.81	-.751	.453
14. I can master statistics with a great deal of effort.	3.33	3.21	.96	.337
15. I study/studied statistics regularly, even when there is/was no specific assignment.	2.36	2.30	.421	.674
16. I see/saw my statistics instructor when I do/did not understand something in that class.	3.11	3.41	-1.98	.049
17. I ask/asked questions when I do/did not understand something in my statistics course.	3.38	3.69	-2.26	.025
18. I find statistics is a very interesting subject.	2.50	2.52	-.156	.876
19. If a statistics course were not required for my major, I would not take one.	3.98	3.90	.60	.546
20. I like/liked statistics because of my instructor's method of teaching.	2.70	2.94	-1.4	.163
21. The instructor's friendliness in answering students' questions helps/helped me to like statistics.	2.86	3.28	-2.50	.013
22. The instructor's explanations help/helped me to like statistics.	2.90	3.25	-1.54	.124
23. I did not like statistics before I took this class.	3.23	3.33	-.857	.392
24. I like statistics now.	2.65	2.89	-1.64	.101

Note: Strongly Agree = 5, Strongly Disagree = 1, etc.

References

Adams, Nicholas A. and William R. Holcomb (1986), "Analysis of the Relationship between anxiety about mathematics and performance," *Psychological Reports, 59* (October), 943-948.

Angoff, William H. and Eugene G. Johnson (1988), A Study of the Differential Impact of Curriculum on Aptitude Test Scores. Princeton, N.J.: Educational Testing Service.

_____ (1994), Are Our High School Graduates Prepared in Mathematics and Science? Iowa City, IA: American College Testing Program.

Bendig, A.W. and J.B. Hughes (1954), "Student attitude and achievement in a course in introductory statistics," *Journal of Educational Psychology, 45,* 268-276.

Birenbaum, Menucha and Shoshana Eylath (1994), "Who is afraid of statistics? Correlates of statistics anxiety among students of educational sciences," *Educational Research, 36,* (Spring), 93-98.

Bradley, Drake R. and Catherine R. Wygant (1987), "Male and female differences in anxiety about statistics are not reflect in performance," *Psychological Reports, 82,* (February), 245-246.

Bridgeman, Brent and Cathy Wender (1991), "Gender Differences in Predictors of College Mathematics Performance and in College Mathematics Course Grades," Journal of Educational Psychology, 83 (June), 275-284.

Brown, Thomas S. and James T. Brown (1995), "Prerequisite course grades and attitudes toward statistics," *College Student Journal, 29,* (Dec.) 502-507.

Casey, M. Beth, Ronald Nuttall, Elizabeth Pesaris and Camilla Persson Benbow (1995), "The Influence of Spatial Ability on Gender Differences in Mathematics College Entrance Test Scores Across Diverse Samples," Developmental Psychology 31 (July), 697-705.

Crowley, John (1987), "Media directors help plan a media course," A paper presented at the Annual Meeting of the Association for Education in Journalism and Mass Communication (San Antonio, TX, August 1-4, 1987).

Cherian, Varhese I. and Michael J. Glencross (1997), "Sex socioeconomic status, and attitude toward applied statistics among postgraduate education students," Psychological *Reports, 80* (June), 1385-1386.

Elmore, P. B. and E. S. Vasu (1986), "A model of statistics achievement using spatial ability, feminist attitudes and mathematics-related variables as predictors," *Educational & Psychological Measurement, 46,*(Spring), 215-222.

Feinberg, Lawrence B. and Silas Halperin (1978), "Affective and cognitive correlates of course performance in introductory statistics, *Journal of Experimental Education, 46,* (Summer), 11-18.

Grandy, Jerilee (1984), Profiles of Prospective Humanities Majors: 1975-1983. A Study of Students Taking the College Board Scholastic Aptitude Test and the Graduate Record Examinations. Final Report, Revised Edition, Supplement I and Supplement II, Princeton, N.J.: Educational Testing Service.

Heemskerk, Jan J. (1975), "Statisticsphobia: Structure of negative attitudes of teachers and social science students toward statistics," *Psychologie in Erziehung und Unterricht, 22(2),* 65-77.

Lloyd, Carla V. Jan Slater and Brett Robbs (2000), "The Advertising marketplace and the media planning course, *Journalism Educator,* (Autumn), 4-13.

Lovely, Richard (1987), "Selection of Undergraduate Majors by High Ability Students: Sex Differences and the Attrition of Science Majors," Paper presented at the annual meeting of the Association for the Study of Higher Education, San Diego.

Martin, D.G. & Lloyd, C. V. (1992), "Media planning courses and dedicated software. *Journalism Educator,"* (Spring), 38-47.

Navarro, Cristina (1989), "Why Do Women Have Lower Average SAT-Math Scores Than Men?" Paper presented at the annual meeting of the American Education Research Association, San Francisco.

Pennock-Roman, Maria (1994), College Major and Gender Differences in the Prediction of College Grades, College Board Report No. 94-2, New York: College Entrance Examination Board.

Ramist, L. (1984), "Predictive Validity of ATP tests." In T. Donlon (Ed.), The College Board Technical Handbook for the Scholastic Aptitude Test and Achievement Tests, New York: College Entrance Examination Board.

Roberts, Dennis M. and Edward W. Bilderback (1980), "Reliability and validity of a statistics attitude survey," *Educational and Psychological Measurement,* 40, 235-238.

Roberts, Dennis M. and Saxe, J.E. (1982), "Validity of a statistics attitudes survey: A Follow-up study. *Educational and Psychological Measurement, 42* (3), 907-912.

Schau, Candace, Joseph Stevens, Thomas L. Dauphinee and Ann Del Vecchio (1995), "The development of validation of the Survey of Attitudes Toward Statistics," *Educational & Psychological Measurement, 55* (October), 868-875.

Stocking, Vicki Bartosik and David Goldstein (1992), "Course Selection and Performance of Very High Ability Students: Is There a Gender Gap?" Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Sue, Stanley and Jennifer Abe (1988), Predictors of Academic Achievement Among Asian American and White students. College Board Report No. 88-11, New York: College Entrance Examination Board.

Sutarso, Toto (1992)a, "Students' attitudes toward statistics (STATS)," Paper presented at the Annual Meeting of the Mid-South Education Research Association (Knoxville, TN, November 11-13, 1992).

Sutarso, Toto (1992)b, "Some variables in relation to students' anxiety in learning statistics, "Paper presented at the Annual Meeting of the Mid-South Education Research Association (Knoxville, TN, November 11-13, 1992).

Task Force on the Future of Journalism and Mass Communication Education, (1989), "Challenges and opportunities in journalism and mass communication education," *Journalism Educator, 44(1)* (Spring, Special Section) A1.

Tremblay, Paul, R.C. Gardner and G. Heipel (2000), "A model of the relationships among measures of affect, aptitude and performance in introductory statistics," *Canadian Journal of Behavioural Science, 32,* (Jan.) 40-48.

Umphrey, Don and Jami A. Fullerton (2001), "An exploratory study of SAT scores, GPA and gender: A comparison of college graduates in advertising and other majors," to be presented at the American Academy of Advertising Conference (Salt Lake City, Utah, March 29-31).

Umphrey, Don and Jami A. Fullerton (2000), "An analysis of SAT scores, GPA and Gender: How do communication majors compare?" *Southwestern Mass Communication Journal,* 15(2), 38-46.

Wainer, Howard and Linda S. Steinberg (1992), "Sex Differences in Performance on the Mathematics Section of the Scholastic Aptitude Test: A Bidirectional Validity Study," Harvard Educational Review, 62 (Fall), 322-336.

Waters, L.K., Theresa Martelli, Todd Zakrajsek and Paula M. Popovich (1989), *Psychological Reports, 64,*(Feb.) 113-114.

Wise, Steven L. (1985), "The development and validation of a scale measuring attitudes toward statistics, *Educational and Psychological Measurement, 45* (2), 401-405.

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