DOCUMENT RESUME

ED 112 580 EC 073 774

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TITLE Sex Differences: Implications for Program Planning.
PUB DATE 75
NOTE 26p.; Paper presented at the Annual Meeting of the American Educational Research Association (Washington, D.C., March 30-April 3, 1975). For related document, see EC 071 914

EDRS PRICE MF-$0.76 HC-$1.95 Plus Postage
DESCRIPTORS *Acceleration; Career Planning; Comparative Analysis; Exceptional Child Research; Females; *Gifted; Grade 7; Junior High Schools; Males; *Mathematics; Performance Factors; *Program Planning; *Sex Differences; Values; Vocational Interests

ABSTRACT

To determine possible implications of sex differences that might be useful for educators planning accelerated programs for mathematically gifted students, four measures of values and career-related interests were administered to three groups (totaling 78 Ss) of gifted seventh grade girls and boys. Results indicated that male Ss showed strong theoretical and investigative orientations compatible with scientific pursuits and academic acceleration in mathematics, that female Ss exhibited stronger interests in social and aesthetic values and careers, and that female Ss were considerable less rejecting of "masculine" careers than were male Ss of "Feminine" careers. It was also found that female Ss were characterized by feelings of conflict when presented with opportunities for educational acceleration in theoretical and investigative pursuits, suggesting that gifted girls should be taught by socially oriented female mathematicians, that their course content should relate theoretical mathematics to applied problems with a social interest appeal, that they should be offered career counseling that relates classroom experience to future jobs, and that special program opportunities for mathematically gifted adolescent girls should involve a sufficient number of female students to minimize feelings of social stigma associated with appearing "different" or "unfeminine." (LH)

Paper, AERA Washington, D.C. Meeting, March 30-April 3, 1975

Subject - - - - - - - - - Sex Differences: Implications for Program Planning

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Place - - - - - - - - - - Georgetown Room East (Hilton)

Program - - - - - - - - - 26.03/College Courses and Accelerated Classes for the Gifted Adolescent (Discussion, Division C)

Sex Differences: Implications for Program Planning

Attempts by the Study of Mathematically Precocious Youth (SMPY) to foster precocious achievement and facilitate the educational development of mathematically talented adolescents have been highly successful for gifted boys. The strategies employed, including grade-skipping, college courses, early admission to college and subject matter acceleration in fast-paced mathematics classes, have not, however, proven to be equally effective for girls. SMPY has found that gifted girls are far less eager than their male cohorts to skip grades, take college courses for credit, enter college early, or participate in accelerated mathematics classes.

The few girls who do elect to take college courses or participate in special classes are less likely to be highly successful than boys of similar ability. Even girls who appear to be successful often fail to complete a full course. Girls who have successfully completed an accelerated course have been known to repeat the same subject matter later in order to avoid advance grade placement in their regular school. This differential success rate of the two sexes in these educational undertakings is not attributable to differences between the sexes on measures of aptitude for mathematics such as the Scholastic Aptitude Test (SAT-M).

In recent years there have been a number of paper presentations at meetings of the American Educational Research Association (AERA), American Psychological Association (APA), American Association for the Advancement of Science (AAAS), and Association of Women Mathematicians (AWM) concerned with the issue of sex differences in cognitive abilities, particularly mathematical aptitude. At

present the findings on the true extent and nature of sex differences in cognitive abilities related to achievement in mathematics are not conclusive. In the present discussion of program planning for the mathematically gifted adolescent the focus is on achievement, particularly precocious achievement of youngsters who exhibit superior mathematical reasoning ability. Although it is true that fewer girls than boys have been identified as precocious mathematical reasoners (Stanley 1973; Fox 1974b), many girls do exhibit considerable potential for development. What is disturbing is the fact that methods of educational facilitation for the mathematically able youngster as described by George, Stanley, and Solano and George appear to be differentially successful for gifted boys and girls.

Assuming that high aptitude scores on tests such as the SAT-M and the Academic Promise Test-Numerical (APT-N) should have similar predictive value for achievement for both sexes, we are confronted with the fact that girls do not behave as predictably as boys with regard to special accelerative educational experiences. This finding is surprising in light of the fact that women have typically been found to be more academically predictable than men (Seashore 1962, Stanley 1967). Thus, what is of concern in this presentation is the identification of affective correlates to gender identity which relate to differential achievement of the sexes in special learning situations which are intended to foster precocious achievement when measured aptitude for achievement of the two sexes is somewhat controlled.

Evidence which suggests that scientific and mathematical achievement is highly correlated to interests and values comes from a number of sources. MacKinnon (1962) found that creative mathematicians score high on the theoretical and aesthetic scales of the Allport-Vernon-Lindzey Study of Values (SV).

In Spranger's (1966) terms, the theoretical man searches for truth and logic. The aesthetic man searches for form and harmony. In samples of adults and high school students, males typically score higher than females on the theoretical value scale, and females score higher than males on the aesthetic value.

In the 1973 talent search conducted by SMPY, gifted males scored significantly higher than gifted females on the theoretical scale of the SV. Boys who were winners in that contest scored much higher than male non-winners on the theoretical value. Thus, a theoretical value orientation in adolescence is a correlate of precocious mathematical reasoning ability (Fox, 1974c).

Milton (1957), Carey (1958), and Elton and Rose (1967) found relationships between sex role identification, masculine interests and specific mathematical interests and mathematical aptitude or problem solving abilities, respectively. In general, there appears to be a strong relationship between career interest and mathematical aptitude in young women (Astin, 1974; Astin and Myint, 1971). Girls who do pursue advanced mathematics courses in high school are those who see these courses as instrumental to their educational plans and career goals (Haven 1972).

The hypothesis of this present study is that gifted boys and girls who are matched on measures of quantitative and verbal aptitude and family background will differ significantly on measures of values and career-related interests which seem compatible with the goal of educational acceleration in mathematics.

The subjects were seventh graders who had participated in either a mathematical or a verbal talent search[1] in 1973. Twenty-six girls were chosen from Baltimore County for the first group of girls (Group I).

All but one of the girls[3] had scored at least 370 on SAT-M (a score at the 55th percentile for 11th grade girls). Each girl was matched with one boy and one girl in the contest who scored within plus or minus 20 points on SAT-M and SAT-V and whose parents had similar educational and occupational backgrounds (Fox, 1974b). The SAT-M and SAT-V scores for the matched triads are shown in Appendix A. The educational and occupational data on parents are shown in Appendix B.

Four measures of values and career-related interests were used. The first measure was the Allport-Vernon-Lindzey Study of Values (SV). This instrument describes a person's value structure with reference to six idealized types of men (Spranger, 1966). The types are theoretical, economic, aesthetic, social, political, and religious. The second measure was a one-page oocupational checklist from the Vocational Preference Inventory (VPI). This instrument categorizes 84 different occupations into six different occupational themes (Holland, 1965). The themes are realistic, enterprising, artistic, social, investigative, and conventional. The third measure was the Strong-Campbell Vocational Interest Inventory. This instrument has 23 basic interest scales organized into the six Holland themes. The fourth measure was a semantic differential rating of four feminine and four masculine careers.

Values

The students in each of the three groups (two groups of gifted girls and one of boys) were given the Allport-Vernon-Lindzey Study of Values (SV). The mean scores and rank orders of the six values for these three groups and a large normative sample of high school students (12,616) are shown in Table 1.

Insert Table 1

The highest mean value for girls in both gifted groups was social. The highest mean value for the gifted boys was theoretical.

The theoretical value means for both gifted girl groups were only slightly higher than that of the normative female high school sample. Both groups of gifted girls scored considerably higher on the social value scale than the high school girls. The gifted boys scored higher than the sample of high school boys on the theoretical scale.

Although gifted boys and girls score somewhat higher on the theoretical scale of the SV than their counterparts in a large high school sample, the sex differences among the gifted groups were highly significant. (Fox, 1974a) Thus, the typical finding that men are more theoretically oriented than women was upheld even in the samples of gifted boys and girls matched on abilities.

Career-related Interests

An Abbreviated Vocational Preferences Inventory

A one-page checklist of occupations from Holland's Vocational Preference Inventory (VPI) was administered to the girls and boys in the three gifted samples. The checklist consisted of 14 occupations in each of six categories:

artistic, investigative, social, enterprising, and conventional. The number of occupations checked in each category was computed as a percentage of the total occupations checked by the individual. The mean percentages of checks for each of the three gifted groups are shown in Table 2.

Insert Table 2

Although girls in both groups checked a considerable number of investigative occupations (the scale most related to professional careers in science and mathematics), they checked significantly fewer of these careers relative to the boys. Girls in both groups checked significantly more occupations of an artistic or social nature than the boys.

When the students were asked to name their first choice occupation, less than a third of the girls and more than half of the boys listed an occupation from the investigative category. Thus, gifted girls are far less likely than gifted boys to prefer investigative careers when they are seventh graders.

Career Related Interests on the Basic Interest Scales of the Strong-Campbell Vocational Interest Inventory

The Strong-Campbell Vocational Interest Inventory (SCVII) was administered to the gifted seventh grade boys and one group of gifted seventh grade girls. Summary score data was provided by Campbell for a normative sample of ninth grade boys and girls. The mean scores for the gifted on each of the 24 basic scales are shown in Appendix C. The mean scores for the normative groups are shown in Appendix D.

Scales on which the gifted and normative groups differed, by sex, are shown in Table 3. Gifted students had more developed interests in areas

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Insert Table 3

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related to academic pursuits than the normative sample. Gifted boys and girls scored higher than the normative sample on the investigative scales of science, mathematics, and medical science, on the artistic scale of writing and on the enterprising scale of public speaking. Gifted boys were less adventure-oriented than the normative sample of adolescent boys, and gifted girls showed greater interest in law and politics and mechanical activities than the normative sample of adolescent girls. The differences on the scales were five points or more, which Campbell suggests is a difference of practical significance.

Sex differences in the two groups were similar and are shown in Table 4. Girls in both samples showed more interest in the artistic, social, and

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Insert Table 4

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conventional scales and were somewhat less interested in the investigative and realistic interest areas (except nature and medical science and medical service) than their male counterparts. Although the gifted girls scored lower than the gifted boys, they scored above average in interest on all four investigative scales whereas the normative sample of girls scored above average on only one investigative scale - medical service. Thus, the gifted

girls score higher on more typically masculine interest scales related to intellectual pursuits than the normative sample of girls.

Gifted girls, unlike the normative sample, show above average interest in both masculine and feminine areas. This suggests that in adolescence intellectually superior girls may be more likely than adolescent girls in general to entertain the possibility of careers in intellectual areas often considered more masculine than feminine. Further support of this hypothesis was seen in the study of ratings of eight occupations on a semantic differential.

Semantic Differential Ratings of Eight Careers

Boys and girls in the three gifted samples were asked to rate eight occupations on a seven point scale on 16 polar adjective pairs in the form of a semantic differential. The eight occupations were: elementary school teacher, professor of English, homemaker, nurse, mathematician, physician, professor of science, and computer programmer. The mean ratings of the occupations for each of the three gifted groups is shown in Table 5.

Insert Table 5

Girls in both groups tended to rate all occupations (except nurse for girls in Group I) above 64, which was considered a positive rating. Boys in the gifted sample were more discriminatory in their ratings. Boys rated the more typically feminine occupations of nurse, homemaker, and professor of English low and rated the four rather masculine careers of mathematician, professor of science, physician, and computer programmer fairly high.

Gifted girls in the two groups differed significantly with respect to their ratings of nurse and physician. Boys differed significantly from girls in both groups in their ratings of professor of English and homemaker, which were preferred by the girls. Thus, gifted girls do not totally reject masculine career areas whereas gifted boys show a strong tendency to reject most female occupations, except elementary school teacher.

Implications for Program Planning

What we can conclude from these analyses is that gifted boys and girls of similar aptitude and family background do indeed differ markedly on measures of values and career-related interests. On two of four measures, the SV and the VPI, boys show strong theoretical and investigative orientations compatible with scientific pursuits and the corresponding academic acceleration in mathematics. Gifted girls, however, exhibited much stronger interests in social and aesthetic values and careers than theoretical and investigative ones.

On the last two measures, the Strong-Campbell basic interest scales and the semantic differential ratings of careers, the gifted boys again show strong orientations toward academic and mathematical pursuits. Gifted girls, however, appear to favor both masculine and feminine interests and careers.

It appears that at grade seven gifted girls have not totally internalized a "feminine" orientation to the exclusion of all interest in more intellectual and "masculine" pursuits. Gifted seventh grade girls are far more interested than a more typically average group of ninth grade girls in science and mathematics. Although they rate some masculine careers and interest areas somewhat lower than the gifted boys, they are considerably less rejecting of these masculine careers than gifted boys are of feminine careers.

Thus, gifted seventh grade boys have rather well-developed interest and value patterns consistent with academic pursuits in science and mathematics and their own high aptitude in these areas. Gifted girls, however, are better characterized by a state of conflict or ambiguity rather than total acceptance or rejection of sex-role stereotypic career-related interests. Perhaps because of their high aptitudes many are being encouraged to at least consider academic intellectual pursuits and careers. Their underlying value structure as assessed by the SV, however, already at grade seven reflects the more typically feminine interest in social and aesthetic pursuits.

Many very bright girls are naturally placed into a conflict situation when presented with opportunities for educational acceleration in theoretical and investigative pursuits. On the one hand, in light perhaps of the new wave of feminine consciousness, they may perceive such an opportunity as positive and valuable. On the other hand, the challenge of fast-paced mathematics classes or college courses taught by males to classes composed heavily of theoretically-oriented males may seem only mildly interesting to the girls and not socially appealing. In light of this apparent approach-avoidance situation, it is not surprising that girls more than boys exhibit only half-hearted efforts toward achievement and at times almost bizarre behavior.

The problem of program planning for gifted girls from this perspective can be viewed as the problem of eliminating, or at least lessening, the conflict as much as possible.

There are at least two different solutions to this problem. The first would be to eliminate conflict by not encouraging gifted girls, who have strong social and aesthetic value orientations, to pursue academic acceleration in these highly theoretical male-dominated situations. We could concen-

trate our efforts to promote high level achievement on only those boys and girls who appear as early as grades seven and eight to have interests compatible with their abilities. This approach will continue to produce far more men than women with the necessary skills for high level achievement in technical and scientific areas.

A second solution would be to devise ways of presenting accelerative educational experiences to gifted girls that would work with and not against their social and aesthetic orientations. This type of approach might lessen some of the conflict and provide opportunities for girls to explore areas of intellectual endeavor in a less threatening way.

SMPY has, on a small scale, tried a few variations which appear to have some merit. The evidence thus far suggests that the following factors should be considered and further investigated in order to formulate the exact nature of the second strategy.

First, gifted girls are more likely to persist and achieve in special accelerative educational situations in mathematics if they have some contact with female role models. Ideally, gifted girls should be taught by female mathematicians who are attractive, warm, and socially oriented themselves. Secondly, gifted girls may exhibit greater interest and enthusiasm for courses in mathematics which make concerted efforts to relate theoretical mathematics to applied mathematical problems which have a social-interest appeal.

Thirdly, gifted girls more than boys may need career counseling and exploratory activities to help them relate the experiences of the classroom to the possibilities for interesting jobs in the future. Fourthly, gifted girls may be more receptive to special programs which involve enough other

girls in such a way as to avoid a social stigma of appearing too different in an unfeminine way. Lastly, for girls more than boys, the age and grade level and specific school situation may be of some importance. Girls in upper elementary school grades or in high school may be more receptive to special opportunities than girls in junior high school.

Sex segregation and women teachers for the purpose of instructing gifted girls in mathematics may or may not be necessary in order to provide an ideal learning situation for girls. Some very recent tentative findings, however, suggest that gifted boys may be more successful in accelerated classes taught by men than in classes taught by socially-oriented feminine women. Although sex segregation is likely to be an unpopular idea in present times, it may actually be important in some settings and for some populations where achievement can be influenced by the presentation of appropriate role models.

In planning educational experiences for the gifted, particularly the mathematically gifted, some attention should be paid to the classroom atmosphere as well as the quality of instruction. Both gifted boys and girls are apt to enjoy and succeed in educational programs which adjust for interests as well as abilities. This aspect of program planning is at present more crucial for girls than boys. Most new educational alternatives tried by SMPY tend to have theoretical and investigative rather than social and aesthetic appeal. Since most gifted boys are more theoretically than socially-oriented, they usually do well in these situations. More research is needed, however, to determine how to maximize the social and aesthetic aspects of a mathematics learning experience for students, especially girls, who have ability but social and aesthetic interests and values.

References

Allport, G. W.; Vernon, P. E.; and Lindzey, G. 1970. Manual for the Study of Values: A scale for measuring the dominant interests in personality. Boston: Houghton Mifflin.

Astin, H. S. 1974. Sex differences in mathematical and scientific precocity. In J. C. Stanley, D. P. Keating, and L. H. Fox (Eds.), Mathematical talent: Discovery, description and development. Baltimore, Md. 21218: The Johns Hopkins University Press. Pp. 70-86.

Astin, H. S., and Myint, T. 1971. Career development and stability of young women during the post high school years. Journal of Counseling Psychology, 19 (4): 369-394.

Campbell, David. Assessing vocational interests: A manual for the Strong-Campbell Interest Inventory. A draft copy not as yet submitted for publication.

Carey, G. L. 1958. Sex differences in problem-solving performance as a function of attitude differences. Journal of Abnormal and Social Psychology, 56: 256-260.

Elton, C. F., and Rose, H. A. 1967. Traditional sex attitudes and discrepant ability measures in college women. Journal of Counseling Psychology. 14: 538-543.

Fox, L. H. 1974a. Facilitating the development of mathematical talent in young women. A dissertation submitted to The Johns Hopkins University in conformance with the requirements for the degree of Doctor of Philosophy. Baltimore, Md.

Fox, L. H. 1974b. The mathematically precocious: Male or female? Paper presented at the 1974 annual meeting of the American Educational Research Association (AERA). Chicago, Illinois.

Fox, L. H. 1974c. The values of gifted youth. In D. P. Keating (Ed.) Intellectual talent: Research and development. Baltimore, Maryland 21218: The Johns Hopkins University Press, in press.

Haven, E. W. 1972. Factors associated with the selection of advanced mathematics courses by girls in high school. Research Bulletin, 72 - 12. Educational Testing Service.

Holland, J. L. 1965. Manual for the Vocational Preference Inventory. Palo Alto, California: Consulting Psychologists Press.

MacKinnon, D. W. 1962. The nature and nurture of creative talent. American Psychologist 17(7): 484-95

Milton, G. A. 1957. The effects of sex role identification upon problem solving skill. Journal of Abnormal and Social Psychology, 55: 208-212.

Seashore, H. G. 1962. Women are more predictable than men. Journal of Counseling Psychology, 9(3): 261-270.

Spranger, E. 1966. Types of men: The psychology and ethics of personality. New York: Johnson Reprint, 1928.

Stanley, J. C. 1967. Further evidence via the analysis of variance that women are more predictable academically than men. Ontario Journal of Educational Research, 10: 49-55.

Stanley, J. C. 1973. Accelerating the educational progress of intellectually gifted youths. Educational Psychologist 10: 133-146.

Footnotes

[1] Two talent searches (one for mathematical and one for verbal talent) were conducted in 1973 by SMPY and the Study of Verbally Gifted Youth (SVGY) at The Johns Hopkins University. These contests were cooperative so that a student would be eligible for prizes for either area, regardless of the contest entered. Both mathematical and verbal parts of the Scholastic Aptitude Test (SAT) were used for both contests.

[2] For details of the selection procedure and rationale see Fox (1974a).

[3] One girl in Group I scored 350 but was included because of special considerations explained in Fox (1974a).

Table 1: Mean Scores and Rank Orders[1] of the Six Values for the Three Gifted Groups and a Large Sample of High School Students

	Gifted Group[2]						High School[3]			
	Group I Girls		Group II Girls		Boys		Girls		Boys	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Social	47.0	1	46.5	1	38.7	4	43.3	2	37.5	5
Aesthetic	43.3	2	38.9	5	34.7	5	38.2	4	35.1	6
Political	40.9	3	39.3	2	44.4	2	39.1	3	43.2	2
Theoretical	39.1	4	38.9	4	47.5	1	37.0	6	43.3	1
Religious	35.8	5	39.0	3	34.2	6	43.8	1	37.9	4
Economic	33.7	6	37.6	6	40.7	3	38.2	5	42.8	3

[1] Rank orders were based on means carried to two decimal places.

[2] Students were tested on the SV at both the Verbal and Mathematical Talent Searches in 1973. Test booklets were available for students in the mathematics contest only. Summary scores only were available for students in the verbal contest. One girl in Group I and one boy, had errors in their total profile scores of four and two points, respectively. Thus, the total for Group I girls and boys in the gifted groups is less than 240. N = 26 in each of the three gifted groups.

[3] In the high school sample there were 7296 girls and 5320 boys.

Table 2: Mean Percentages of Preferences for Occupations in the Six Holland Categories of the VPI for the Three Groups

Holland Category	Group I Girls	Group II Girls	Boys
Artistic	26.7	28.3	16.5
Investigative	21.6	22.0	30.6
Social	21.1	18.5	9.0
Enterprising	13.9	12.6	13.9
Realistic	9.9	8.8	19.1
Conventional	6.9	9.8	10.8

	Significance Level	
Investigative	Group I girls vs. boys	$p < .025$
	Group II girls vs. boys	$p < .025$
Social	Group I girls vs. boys	$p < .005$
	Group II girls vs. boys	$p < .01$
Artistic	Group I girls vs. boys	$p < .01$
	Group II girls vs. boys	$p < .01$

Table 3: Strong-Campbell Basic Interest Scales which Differed Significantly[1] between the Gifted and Normative Groups in Order of Decreasing Magnitude of Differences[2]

GIRLS			BOYS		
Gifted Scored Higher		Normative Scored Higher	Gifted Scored Higher		Normative Scored Higher
Writing	(11.8)		Science	(12.6)	Adventure (5.6)
Mathematics	(10.3)	None	Mathematics	(12.3)	
Science	(10.1)		Writing	(7.5)	
Public Speaking	(6.4)		Public Speaking	(6.3)	
Medical Science	(6.0)		Medical Science	(5.5)	
Law & Politics	(5.8)				
Mechanical Activities	(5.2)				

[1] Significance is based on practical significance of 5 points or more as recommended by Campbell.

[2] Size of difference is shown in parenthesis.

Table 4: Strong-Campbell Basic Interest Scales Which Differed Significantly for the Sexes in the Gifted and Normative Groups in Order of Decreasing Magnitude of the Differences[1]

Gifted				Normative			
Girls Scored Higher[2]		Boys Scored Higher		Girls Scored Higher[3]		Boys Scored Higher	
Domestic Arts	(20.5)	Mechanical Activities	(8.8)	Domestic Arts	(19.9)	Mechanical Activities	(13.0
Art	(10.9)	Science	(8.6)	Social Service	(12.0)	Adventure[5]	(10.2
Social Service	(9.3)			Office Practice	(11.1)	Military Activities[5]	(8.8
Music/Drama	(9.0)			Art	(10.7)	Science	(6.1
Teaching[4]	(8.6)			Medical Service	(10.6)		
Writing	(8.2)			Teaching	(10.3)		
Office Practice	(7.7)			Music/Drama	(10.1)		
Nature	(7.0)			Nature	(6.5)		
Religious Activities[4]	(6.2)						
Medical Service	(4.9)						

1 Differences are shown in parenthesis.

2 Significance tests based on Tukey tests of mean comparisons.

3 Significance based on five point practical significance recommended by Campbell.

4 Scales which differed only in the gifted sample.

5 Scales which differed only in the normative sample.

Table 5: Mean Ratings of Eight Careers on a Semantic Differential for the Three Gifted Groups[1]

Careers	Group I	Group II	Boys
Elementary School Teacher	75.8	82.3	70.2
Professor of English	75.1	77.1	55.9
Mathematician	74.9	80.7	85.8
Homemaker	72.1	81.4	56.6
Physician	68.8	79.8	78.8
Computer Programmer	68.7	66.4	77.4
Professor of Science	67.7	71.2	79.8
Nurse	60.9	76.3	48.7
Total Male Careers	70.0	74.5	80.4
Total Female Careers	71.0	79.3	57.9

[1] N = 26, for each of the three groups.

Appendix A

Triad Number		SAT-M Scores Girls Group I	Girls Group II	Boys	SAT-V Scores Girls Group I	Girls Group II	Boys
14	1	550	560	550	380	410	360
18	2	530	520	550	470	490	490
25	3	500	490	490	410	400	420
3	4	490	480	510	290	290	290
17	5	490	460	470	490	460	490
23	6	470	490	490	500	490	510
5	7	470	460	460	360	350	350
24	8	460	480	480	360	370	380
12	9	460	460	470	540	470	520
11	10	450	450	460	330	340	330
7	11	440	450	430	330	320	310
22	12	440	430	460	340	330	350
6	13	440	430	440	430	430	430
4	14	440	420	430	390	380	390
10	15	430	460	440	420	390	400
20	16	430	430	430	340	360	350
16	17	420	440	440	450	450	450
21	18	410	420	420	380	380	380
8	19	410	390	420	340	360	350
13	20	390	380	410	370	350	370
15	21	390	360	370	340	320	360
2	22	370	370	410	440	350	330
1	23	370	370	380	460	430	460
19	24	370	350	370	370	350	330
26	25	370	330	380	390	380	370
9	26	350	370	370	460	490	460
Mean		436	433	443	399	390	393

Appendix B

Percent of Mothers and Fathers by Level of Education for the Three Groups

	Percent of Mothers			Percent of Fathers		
	Girls			Girls		
	Group I	Group II	Boys	Group I	Group II	Boys
1. Less than High School	4	15	4	8	0	11
2. High School Diploma	50	27	50	23	19	15
3. Some College	19	27	23	23	15	15
4. Bachelor's Degree	8	15	19	19	39	27
5. More than Bachelor's Degree	19	15	4	27	27	32
Total	100	99*	100	100	100	100
Mean	2.9	2.9	2.7	3.3	3.7	3.5

Percent of Fathers by Holland Type of Occupations for the Three Groups

	Girls		
	Group I	Group II	Boys
Enterprising	50	38	32
Investigative	27	32	27
Realistic	19	15	27
Social	4	8	4
Conventional	0	4	11
Artistic	0	4	0
Total	100	101*	101*

* Does not total 100 percent due to rounding

Appendix C

Scores on the 23 Strong-Campbell Basic Interest Scales for the Sample of Gifted Students

General Occ. Scale Theme	Basic Interest Scale	Girls	Boys	Difference[1]
Realistic	Adventure	55.19	56.85	-1.66
	Nature	54.58	47.58	7.00***
	Agriculture	54.50	50.73	3.77
	Military Activities	52.12	55.77	-3.65
	Mechanical Activities	44.58	53.35	-8.77***
Investigative	Medical Service	53.77	48.92	4.85*
	Mathematics	53.62	58.08	-4.46
	Medical Science	51.69	51.73	-0.04
	Science	50.58	59.15	-8.57***
Artistic	Writing	52.96	44.77	8.19***
	Art	52.89	41.96	10.93***
	Music/Dramatics	50.08	41.12	8.96***
Social	Domestic Arts	59.58	39.04	20.54***
	Social Service	52.77	43.46	9.31***
	Athletics	52.19	54.42	-2.23
	Teaching	50.62	42.04	8.58***
	Religious Activities	50.15	43.96	6.19**
Enterprising	Public Speaking	48.92	50.23	-1.13
	Sales	47.23	45.31	1.92
	Law/Politics	46.00	48.04	-2.04
	Merchandising	45.81	44.12	1.69
	Business Management	43.54	44.12	-0.58
Conventional	Office Practice	52.54	45.50	7.04***

[1] Levels of significance based on Tukey test of mean comparisons

* $p < .05$

** $p < .01$

*** $p < .005$

Scores on the 23 Strong-Campbell Basic Interest Scales for the Sample of Average Ninth Grade Students

General Occ. Scale Theme	Basic Interest Scale	Girls	Boys	Difference
Realistic	Adventure	52.2	62.4	-10.2*
	Nature	50.7	44.2	6.5*
	Agriculture	54.2	55.6	-1.4
	Military Activities	49.0	57.8	-8.8*
	Mechanical Activites	39.4	52.4	-13.0*
Investigative	Medical Service	57.3	46.7	10.6*
	Mathematics	43.3	45.8	-2.5
	Medical Science	45.7	46.2	-0.5
	Science	40.5	46.6	-6.1*
Artistic	Writing	41.2	37.3	3.9
	Art	50.6	39.9	10.7*
	Music/Dramatics	47.5	37.4	10.1*
Social	Domestic Arts	62.6	42.7	19.9*
	Social Service	53.4	41.4	12.0*
	Athletics	53.3	56.4	-3.1
	Teaching	48.1	37.8	10.3*
	Religious Activities	45.8	41.5	4.3
Enterprising	Public Speaking	42.5	43.9	-1.4
	Sales	48.2	48.8	-0.6
	Law/Politics	40.2	44.8	-4.6
	Merchandising	46.8	44.1	.2.7
	Business Management	44.0	44.5	-0.5
Conventional	Office Practice	56.0	44.9	11.1*

* Differences greater than five points = 1/2 S.D. and is said to have practical significance.