DOCUMENT RESUME

ED 354 378 CE 063 111

AUTHOR Fritz, Robert L.
TITLE A Study of Cognitive Skills and Orientation among Secondary Marketing Education Students in Central Georgia.
PUB DATE 7 Dec 92
NOTE 15p.; Paper presented at the American Vocational Education Research Association Session at the American Vocational Association Convention (St. Louis, MO, December 7, 1992).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Ability; *Cognitive Style; *Critical Thinking; Employment Qualifications; Females; *Field Dependence Independence; High Schools; High School Students; Males; *Marketing; Occupational Aspiration; *Problem Solving; Sex Differences; Thinking Skills
IDENTIFIERS *Georgia (Central); Group Embedded Figures Test (Witkin)

ABSTRACT

A study examined two dimensions of higher-order problem-solving skills: the ability to solve problems in an embedded context and the attitudes and preferences toward problem solving that suggest vocational self-understanding. The variables of gender and field-dependence cognitive style were used. Subjects were 238 secondary school marketing education students in 3 central Georgia high schools who completed the Group Embedded Figures Test and a survey that called for self-reported information about attitudes toward mental tasks. The study showed that there were no gender differences in analytical demands in occupational objectives. There were statistical differences in the social demands in occupations, with female career objectives appearing to require greater social skill than was true for males. Higher thinking skills were projected to be needed for students' aspired careers than the students possessed or thought were needed. The study recommended that marketing educators need to appeal to the role that mental ability plays in career objectives. (KC)

A Study of Cognitive Skills and Orientation among Secondary Marketing Education Students in Central Georgia

Dr. Robert L. Fritz
Assistant Professor
Marketing Education
The University of Georgia
Athens, Georgia 30602

Presented at
the American Vocational Association Convention
St. Louis, Missouri
December 7, 1992

The development of higher order problem solving skill remains an important topic. Vocational goals related to it involve helping students associate "school work" to "real work" so that they learn to analyze, synthesize and evaluate complexity (SCANS, 1991). Writers reported, however, that "There is little evidence that general problem-solving skills have been taught effectively" (Pfeiffer, Feinberg, & Gelber, 1987, p. 99), while learning in schools is typically unrelated to "real life" (Rubinstein, 1979). In sum, these conditions may lead to a vacuum of relevance and vocational self-understanding.

To complicate the matter, some research suggest that schools have difficulty influencing mental skill (Gagne, 1980). This may be due to situational and ability factors outside teacher's control. Yet, these beliefs suggest a dilemma -- how to achieve an important educational goal under conditions of moderated influence.

This study examined two dimensions of this problem. One involved the ability to solve problems in an embedded context. The other addressed attitudes and preferences toward problem solving that suggest vocational self-understanding. Gender and field-dependence cognitive style relate to this study (Feingold, 1992, Witkin & Goodenough, 1981) and were used to examine the problem. By doing this, the investigator sought to determine if marketing education students were ready and properly oriented toward advanced problem solving tasks.

Background

Researchers know that extra-school and interpersonal factors play roles in the development of problem solving skill. Cronbach and Snow (1977) reported that learning includes cognitive, personality, task, and individual factors. A term that describes the sum of these parts in a working context is aptitude.

"Aptitude" is "any characteristic of a person that forecasts his probability of success under a given treatment" (Cronbach & Snow, 1977, p. 6). This definition includes personality as well as ability, and could be represented by conative factors emanating from social class, educational history, and so on. Importantly, the presence of aptitude does not guarantee its use (Ginzberg & Opper, 1979).

Messick (1987) commented on the role of personality on cognition and aptitude. He indicated that "Some abilities may signify the projection of personality factors into cognition . . . (as) part of broader temperamental trends" (p. 38). He then concluded that "flexibility of closure, or restructuring ability more generally, may largely reflect the stylistic dimension of field independence versus field dependence, which in turn reflect the temperament factor called independence versus subduedness" (p. 38).

It has been repeatedly demonstrated that problem solving ability and interest relate to flexibility of closure, or a field-independent cognitive style; lesser skill at bringing closure to tasks represents a field-dependent cognitive style (Witkin & Goodenough, 1981). Flexibility of closure appears related to what Bloom (1984) described as cognitive restructuring, an ability

essential to acceptable performance on higher-order cognitive objectives.

One's field-dependence or field-independence cognitive style orientation may be developed by child-rearing practices (Baumrind, 1971; Witkin, 1978; Witkin & Goodenough, 1981). Thus, youths need to be encouraged to develop independent interests (Biehler & Snowman, 1990, p. 109). Existing research shows that, while boys are encouraged to achieve and explore, girls are "kept under closer supervision and given more help in solving problems" (Biehler & Snowman, 1990, p. 48).

Gender differences in problem solving, then, may have social foundations. Feingold (1992) reported that they "should not be interpreted as affording definitive evidence of biological differences" (p. 80). Fritz (1992) reported gender differences in field-dependence. While females were more field-dependent, males were moderately more field-independent. Many researchers have reported similar differences in field-dependence (Witkin & Goodenough, 1981; Witkin, Dyk, Faterson, Goodenough, & Karp, 1962).

In summary, if the conditions and abilities specified for the higher-order by Bloom (1984) are taken as a narrow specification of required aptitudes, and if congruence between aptitude and task demands predicts patterns of stable performance, then problem solving orientation may be an important predictor of attitude toward related tasks. The only mediator, however, may be self-knowledge and experience with given tasks.

The justification for this study, then, is based on the need to help more students acquire analytical skills. Prior research in

marketing education (Fritz, 1991, 1990, 1981) suggests that a large portion of students have field-dependent or non-analytical orientations. Thus, to address vocational goals that help students associate "school work" to "real work" so that they learn to analyze, synthesize and evaluate complexity (SCANS, 1991), this study addressed the following objectives..

Objectives

After initially determining if gender differences in field-dependence exist, data analysis will determine if there are gender and/or cognitive style differences in

1. the analytical demands associated with occupational objectives.
2. the social demands associated with occupational objectives.
3. attitudes toward preference for analytical or social problem solving situations.
4. attitudes toward cognitive demands in specific job tasks.

Method and Procedures

Subjects were 238 secondary school marketing education students in three central Georgia high schools. Data were collected in May, 1992. Students completed Group Embedded Figures Test and a survey which called for self-report information about attitudes toward mental tasks.

Data were then tabulated and processed through The University of Georgia Educational Research Services Laboratory. Descriptive statistics and t-tests were used to analyze the data. It was determined that there were was a statistical difference in GEFT scores based on gender (Table 1).

Table 1

t-Test: GEFT Score X Gender

	N	M	St.Dev.	t	d.f.	2-Tail Prob.
Females	150	5.9467	4.567	3.03	235	.003*
Males	87	7.9080	5.200			

*p>.025

Results

Table 2 depicts results for question one, gender differences in analytical demands in occupational objectives, showing that there were no statistical differences in the extent of analytical demand. Yet, over 85% of males and females stated occupational objectives that appear to contain high to moderate analytical demands. Only 15% of students seemed to aspire to vocations that were rated to have limited analytical demands.

For question two, data analysis on Table 3 indicates that, for gender differences in the social demands in occupations, there were statistically differences between males and females. Overall, female career objectives appeared rated to require greater social skill than was true for males.

Table 2

Cross-Tab: Analytical Demands in Occupational Objective X Gender

Actual Count / Expected Value / Col % / Tot %	Male	Female	Total
Hi	34	72	106
	42.0	64.0	
	35.1%	48.6%	
	13.9%	29.4%	43.3%
Moderate	44	59	103
	40.8	62.2	
	45.4%	39.9%	
	18.0%	24.1%	42.0%
Low	4	5	9
	3.6	5.4	
	4.1%	3.4%	
	1.6%	2.0%	3.7%
NR/Vague	6	8	14
	5.5	8.5	
	6.2%	5.4%	
	2.4%	3.3%	5.7%
Other	9	4	13
	5.1	7.9	
	3.7%	1.6%	
	3.7%	1.6%	5.3%
Column Total	97	148	245
	39.6%	60.4%	100%

	Value	DF	Sig.
Chi Square	7.8509	4	.097

Of the total, 73.7% (109) of females stated occupational objectives that appear to require high to moderate social skill, while 57.7% (55) of males seem to have this orientation.

Table 3

Cross-Tab: Social Demands in Occupational Objective X Gender

Actual Count / Expected Value / Col % / Tot %	Male	Female	Total
Hi	16	26	42
	16.6	25.4	17.1%
	16.5%	17.6%	
	6.5%	10.6%	
Moderate	39	83	122
	48.3	73.7	49.8%
	40.2%	56.1%	
	15.9%	33.9%	
Low	22	25	47
	18.6	28.4	19.2%
	22.7%	16.9%	
	9.0%	10.2%	
NR/Vague	10	9	19
	7.5	11.5	7.8%
	10.3%	6.1%	
	4.1%	3.7%	
Other	10	5	15
	5.9	9.1	6.1%
	10.3%	3.4%	
	4.1%	2.0%	
Column Total	97	148	245
	39.6%	60.4%	100%

	Value	DF	Sig.
Chi Square	9.9866	4	.041*

*p>.05

Table 4 indicates that, for question three, there were no statistical differences in preference toward preferred problem solving situation. A majority of both gender groups stated greater preference for routine rather than complex mental tasks.

Table 4

Cross-Tab: Preferred Problem Solving Situation X Gender

Exp Value Row % Tot %	Complex	Routine	Row Total
Females	54.9 33.6% 21.2%	94.1 66.4% 41.9%	149 100.0% 63.1%
Males	32.1 42.5% 15.7%	54.9 57.5% 21.2%	87 100.0% 36.9%
Column Total	87 36.9%	149 63.1%	236 100%

Chi-Square	Value	DF	Sig.
Pearson Chi Square	1.8996	1	.168

Table 5

Cross-Tab: Least Preferred Job Tasks X Gender

Exp Value Row % Tot %	Vague/ Study	Clear/ Familiar	Row Total
Females	85.7 62.0% 39.1%	64.3 38.0% 23.9%	150 63.0%
Males	50.3 48.9% 18.1%	37.7 51.1% 18.9%	88 37.0%
Column Total	136 57.1%	102 42.9%	238 100%

Chi-Square	Value	DF	Sig.
Pearson Chi Square	3.908	1	.048*

*p>.05

For question four on Table 5, data analysis revealed statistical differences in gender toward least preferred job task. More females (62%) than males least preferred job tasks that

involved working in vague situations that required study to solve. About half of the Males (48.9%) shared this perspective.

Thus, of the four research questions, two were rejected due to statistically significant differences and two were not rejected. The three rejected questions revealed gender differences in the social demands in occupational objectives, least preferred job tasks, and predicted group membership based on gender and selected attitudes toward problem solving.

Discussion

With regard to the problem addressed by the study, data analysis suggested that, with some exceptions, the marketing education students in this study had somewhat limited readiness for the demands associated with higher-order problem solving tasks. The social orientations reported by the investigator in other studies (Fritz, 1991, 1990, 1981) were confirmed here, as was the gender difference in field-dependence (Fritz, 1992).

Students' GEFT scores suggest incompatibility between their restructuring ability and the cognitive demands Bloom (1984) associated with higher-order cognitive tasks. Based on levels of analytical ability predicted for their occupational objectives, it appeared that limited self-knowledge or experience may limit understanding of the mental skills required by them. Finally, as may be predicted by field-dependence theory (Witkin & Goodenough, 1981), females seemed to select objectives that had higher social demands than did males.

Finally, most students preferred routine problem solving situations and wanted to avoid job tasks that were vague and may

require them to study to derive solutions. Field-dependence theory would predict this finding. The field-dependent tends to dislike tasks that involve a vague context, possibly because of limited restructuring skill (Witkin & Goodenough, 1981). Fritz (1981) found that field-dependent vocational students predictably selected courses that more often had a social rather than analytical emphasis.

In sum, the data for this study examined two dimensions of this problem. One involved the ability to solve problems in an embedded context. The other addressed attitudes and preferences toward problem solving that suggest vocational self-understanding. For the first, most students had limited to moderate ability to solve the embedded problem solving tasks. On the second item, attitudes and preferences suggest, for most students, limited self-understanding about relationships between problem solving skill and the need for predicted analytical requirements in stated career objectives.

Implications

Vocational goals emanating from SCANS (1991) are intended to help students associate "school work" to "real work" so that they learn to analyze, synthesize and evaluate complexity. The data reported in this study predicts important challenges to marketing education to achieve these objectives.

Many students, perhaps due to experience, have not developed a positive orientation toward higher-order problem solving. While females may more often have restructuring limitations, so do many males in this sample. In addition, perhaps as a reflection of this

orientation, they prefer situations that involve limited cognitive skill. This suggests limited aptitude for complex cognitive tasks.

Findings like these may explain why Gagne (1980) reported that schools have difficulty influencing mental skill. Some behavioral patterns resist change. This could be due to the belief that cognitive style orientation is developed through child-rearing practices (Baumrind, 1971; Witkin, 1978; Witkin & Goodenough, 1981). Thus, if youths need to be encouraged to develop independent interests (Biehler & Snowman, 1990, p. 109), this data suggests the consequences when boys are encouraged to be independent and girls are encouraged to be dependent (Biehler & Snowman, 1990).

To achieve SCANS objectives, marketing educators may need to examine social expectations in their classrooms. While recognizing the power of reinforced experience on individual expectations, marketing education professionals must make direct appeal to the role that mental ability plays in valued career objectives that are predicted to include considerable cognitive demands.

Recommendation for Further Study

Based on findings from this study, it is recommended that research be conducted to address the following:

1. Relationships between social expectations in the marketing education classroom to student's problem solving orientation.
2. The role that higher-order problem solving plays on jobs students enter for on-the-job learning experiences.
3. The cognitive structure students acquire through the secondary marketing education curriculum.

References

Baumrind, D. (1971). Current patterns in parental authority. In R. F. Biehler & J. Snowman Psychology applied to teaching. (pp. 107-109). Boston: Houghton Mifflin.

Biehler, R. F. & Snowman, J. (1990). Psychology applied to teaching. (6th Ed.). Boston: Houghton Mifflin.

Cronbach, L. J. (1963). Educational psychology. (2nd Ed.). New York: Harcourt, Brace & World.

Cronbach, L. J. & Snow, R. E. (1977). Aptitudes and instructional methods. New York: Irvington Publishers.

Feingold, A. (1992). Sex differences in variability in intellectual abilities: A new look at an old controversy. Review of Educational Research. 62 (1), 37-60.

Fritz, R. L. (1992). A study of conative gender differences on the educational style preference inventory among secondary marketing education students. In H. H. Williams (Ed.), National research conference report (pp. 80-104). Houston, TX: College of Technology, University of Houston.

Fritz, R. L. (1991). The association of selected conative variables to field-dependence with inferences for reasoning characteristics in marketing education. Marketing education research proceedings: Volume I, 1991 (pp. 71-94). Columbus, OH: Marketing Education Association.

Fritz, R. L. (1990, December). Field-independent cognitive styles in the secondary marketing education classroom, with implications for application-level reasoning and problem solving behavior. Research paper presented at the Marketing Education Research Session of the American Vocational Association's Annual Convention, Cincinnati, Ohio.

Fritz, R. L. (1989, December). A survey of North Carolina secondary marketing education teachers: Cognitive development and personal style. Paper presented at the Marketing Education Research Session of the American Vocational Association's Annual Convention, Orlando, Florida.

Fritz, R. L. (1981). The role of field-dependence and field independence in secondary school students' re-enrollments in vocational education and their attitudes toward teachers and programs. (Doctoral dissertation, Auburn University, April) (University Microfilms, Number 81-19,563).

Gagne, R. M. (1980). Learnable aspects of problem solving. Educational Psychologist. 15, 84-92.

Ginzburg, H. & Opper, S. (1979). Piaget's theory of intellectual development (2nd Ed.). Englewood Cliffs, NJ: Prentice-Hall.

Messick, S. (1987). Structural relationships across cognition, personality, and style. In R. E. Snow & M. J. Farr (Eds.) Aptitude, learning, and instruction volume 3: Conative and affective process analyses. (pp. 35-75) Hillsdale, NJ: Lawrence Erlbaum Associates.

Pfeiffer, K. Feinberg, G., & Gelber, S. (1987). Teaching productive problem-solving attitudes. In D. E. Berger, K. Pezdek, & W. P. Banks Applications of cognitive psychology: Problem solving, education, and computing. (99-107). Hillsdale, NJ: Lawrence Erlbaum Associates.

Rubinstein, (1979). Attitudes productive in problem solving. Patterns of problem solving vignette #36. Los Angeles: UCLA.

SCANS report urges "contextual learning." (July 15, 1991). Vocational education weekly. pp. 3-4.

Witkin, H. A., Dyk, R. B., Faterson, H. F., Goodenough, D. R. & Karp,S. A. (1962). Psychological differentiation: Studies in development. New York: John Wiley.

Witkin, H. A. & Goodenough, D. R. (1981). Cognitive styles: Essence and origins -- Field dependence and field independence. New York: International Universities Press, Inc.

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC , or, if you wish ERIC to cite the availability of this document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents which cannot be made available through EDRS.)

Publisher/Distributor	
Address	
Price Per Copy	Quantity Price

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant reproduction release is held by someone other than the addressee, please provide the appropriate name and address.

Name and address of current copyright/reproduction rights holder:

Name

Address

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

Acquisitions Coordinator
ERIC Clearinghouse on Adult, Career, and Vocational Education
Center on Education and Training for Employment
1900 Kenny Road
Columbus, OH 43210-1090

If you are making an unsolicited contribution to ERIC, you may return this form (and the document being contributed) to