Bulletin of Educational Psychology, 1981, 14, 231-240.
Taiwan Normal University, Taipei, Taiwan, China.

VOCATIONAL INTERESTS OF ELEMENTARY AND JUNIOR HIGH SCHOOL STUDENTS AS RELATED TO INTELLIGENCE AND SEX*

WU-TIEN WU, JO-LIEH HUNG

The purposes of this study were: (1) to investigate the vocational interests of the bright, the normal, and the mentally retarded students; (2) to compare vocational interests among the bright, the normal, and the mentally retarded students; (3) to seek influencial factors and effective guidelines in the area of children's career development.

The sample was drawn from ten schools in Taipei city, composed of 192 fifth graders and 288 eight graders. Based on Holland's paradigm (1973), the Vocational Interest Inventory (VII) in Chinese was devised and administered accordingly to the subjects. The VII consists of 118 items of six types of vocational interests, i.e., realistic, investigative, artistic, social, enterprising and conventional. The data obtained were treated by a principle axis factor analysis and two and three-way analysis of covariance with social economic status as covariate.

The main findings of this study were as follows: (1) The bright and normal students had similar factor structure in vocational preference, while the retarded showed less differentiation with only one factor emerged. (2) Grade effects were significant on five types of vocational interests, i.e., realistic, investigative, artistic, social and conventional. The higher grade students indicated more interests in these areas. (3) There were significant sex differences in the vocational choice: boys preferred realistic and investigative occupations, while girls preferred artistic and social ones. (4) There were significant intelligence effects: the retarded showed much fewer vocational interests in all types than the other two intelligence groups. It suggests that the retarded might be short of occupational information. On the other hand, the bright students expressed more interests in investigative and artistic domains than normal students. This is in accordance with their abilities as well as social expectations.

In 1971, when Sidney P. Marland, Jr., then U.S. Commissionor of Education, proposed that all education be thought of as preparation for a career, the term and the concept of "career education" began to attract wide attention. He then suggested that the focus from kindergarten to grade six be on "career awareness," from grade seven to grade ten on "career exploration," and from grade eleven to grade twelve or beyond on "career preparation." Thus the elementary school would help children to become better acquainted with the great variety of occupations. The junior high school would help its pupils to compare different clusters of occupations, to select a few of them for more intensive investigation, and to select one cluster for which they would begin to prepare. Vocational preferences of elementary and junior high students thus would be an interesting and importment topic for both career counselors and researchers.

* Paper presented at the 4th Asian Regional Association for Vocational and Educational Guidance (ARAVEG) Conference, Kuala Lumpur, Malaysia, September 9-12, 1980.

There are may theories of vocational choice and career development. Some explain occupational choice in terms of environmental influences (e.g., Caplow, 1954; Clark, 1931; Hollingshead, 1949; Miller and Form, 1964); Others find their explanations in the needs of the individual (e.g., Ginzberg et al., 1951; Hoppock, 1957; Roe, 1958; Super, 1953). However, according to Holland (1966, 1973), there is yet a third element to be considered, namely, the interaction of the two. Holland's theory can be summarized in these words: (1) Most persons can be categorized as one of six types—Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic; (2) There are six kinds of environments: Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic; (3) People search for envionments and vocations that will permit them to exercise their skills and abilities to express their attitudes and values, to take on agreeable problems and roles, and to avoid disagreeable ones; (4) A person's behavior can be explained by the interaction of his personality pattern and his environment. Holland (1973) has accordingly developed the Vocational Preference Inventory (VPI) for surveying six types of vocational interests. The VPI is basically construct-oriented and seems to be most appropriate for cross-cultural study.

In dealing with influencial factors, many studies on vocational choice have been focused on socioeconomic aspects and self-concept dimension. However, there is yet the intelligence factor. It is very possible that pupils of different levels of intelligence would perceive vocations differently and make different choices. Hoppock (1976) noted that there was a contrast between the reactions of children with low and high IQs. When the six-grade class with IQs of 46 to 92 visited the knife factory, nearly everyone saw at least one beginning job that he liked. When the class with IQs of 114 to 142 visited a television-antenna plant, several pupils wouldn't like to do that kind of work because "it must get very monotonous." Rice (1978) asked 111 students in grades 8, 10, and 12 to write down three kinds of their favoriate vocations and then classified their intelligence according to their preferences on the Otis Mental Ability Test. It was interesting to find out that a considerable portion of students choose professional and management vocations, especally those with lower IQs. It suggests that the less intelligent might have unrealistic life goals. On the other hand, it seems more reasonable that students with higher achievement and ability would set a higher level of vocational aspiration and proceed to prepare themselves for a more successful career than the less bright if other conditions, like motivation, responsibility, etc., are equal. What then is the role of intelligence in vocational choice? There is a contradiction which indicates the need for further study, especially in different cultural settings.

The main purpose of this study is to look at the relations between pupils' intelligence and their vocational interests. More specifically, we propose (1) to investigate the vocational preference of the bright, the normal, and the mentally retarded students; (2) to compare vocational interests among the three groups; and hopefully, (3) to find out some other influencial factors (i.e., grade level and sex) and effective guidelines in the area of children's career development.

Since it is evident that socioeconomic status (SES) is a substantial determinant in vocational choice as many studies have indicated (e.g., Hollingshead, 1949; Ginzberg, 1951; Brunkan, 1965; Wu, 1975), the SES effect is thus statistically controlled in this study rather than

used as an independent variable.

The general hypotheses of this study were as follows:

1. There are significant relations between intelligence and vocational interests; that is, vocational interests vary with different intelligence levels.
2. There are significant sex differences in vocational choice.
3. There are significant differences of vocational interests between students in grade 5 and in grade 8.

METHOD

Subjects

The subjects of this study were 480 pupils drawn from grade 5 and grade 8 from three elementary schools and seven junior high schools. There were 192 fifth graders and 288 eighth graders. As shown in Table 1, there were two intelligence levels, the bright and the normal, in grade 5; there were three intelligence levels, the bright, the normal, and the retarded, in grade 8. The cell size is 48 equally.

TABLE 1
SAMPLE DISTRIBUTION OF THIS STUDY

	Grade 5			Grade 8		
	Bright	Normal	Retarded	Bright	Normal	Retarded
Boys	48	48	—	48	48	48
Girls	48	48	—	48	48	48
Total	96	96	—	96	96	96

The retarded in grade 5 were not included for the reason that in a preliminary survey it was found that their vocaburaries were too limited to understand the wording of the inventory provided.

The subjects were randomly selected on the basis of intelligence scores. Firstly, the pupils in grade 5 were given the Standard Progressive Matrices (SPM), those with percentile over 85 were considered "bright." Similarly, the students in grade 8 were given the Chinese form of Army General Classification Test (AGCT), those with AGCT score over 120 were considered "bright." The retarded sample in grade 8 was drawn from the educable mentally retarded (EMR) class with IQs of 50 to 70 on Chinese form of Stanford-Binet Scale. The normal subjects were randomly drawn from the classes from which the "bright" were selected. The number of the bright and the normal in a given class was thus equivalent.

Instruments

In addition to the established intelligence scales, the Vocational Interest Inventory (VII) was devised based on Holland's framwork (1966, 1973). Items of the VII were derived and/or adopted from Holland's VPI (Holland, 1973) and the vocational awareness scale of the Barclay Classroom Climate Inventory (BCCI, see Barclay, 1974; Wu, 1975). A preliminary test and item analysis procedure were conducted. The final form of the VII consists of 118

items of six types of vocational interests, i.e., Realistic (23 items), Investigative (18 items), Artistic (20 items), Social (22 items), Enterprising (20 items), and Conventional (15 items). Two illustrating items are provided for practice. Below is one of them.

☐ Yes　☐ No　Librarian (to take care of books in a library)

The directions on the front page are as follows: This is an inventory of your feelings and attitudes about any kind of work. Fill out your sheet by following directions given below: (1) Show on your sheet the occupations which interest or appeal to you by checking the "Yes"; (2) Show the occupations which you dislike or find uninteresting by checking the "No"; (3) Every item should be checked, please leave no blank.

Procedure and Data Analysis

The VII was administered in group. The subjects were free to ask questions relating to the meaning of the items. There was no time limit. However, most subjects finished the inventory in 30 minutes.

The data obtained were treated by the SPSS computer programs, including (1) The principle axis factor analysis for three intelligence groups respectively. The purpose of this procedure was to compare the factor structure of different intelligence groups rather than to test the construct of the VII; (2) Three-way analysis of covariance for the bright and the normal of both sexes in both grades, with SES as covariate and VII measures as dependent variables; (3) Two-way analysis of covariance for both sexes and three intelligence groups in grade 8, with SES as covariate and VII measures as dependent variables.

RESULTS

Factor Analysis

Using 6 subscale scores as dependent variables and utilizing principle axis factor analysis with varimax rotation, the results of each intelligence group were obtained and are here summarized in Table 2.

The factor number with eigenvalue over 1.0 was two for both the bright group and the normal group, but only one for the retarded group. Looking into the factor loadings of both the bright and the normal groups, the major components (factor loadings over .40) of them were quite similar, that Realistic and Investigative were the major components of Factor 1 and Artistic, Social, Enterprising, and Conventional were of Factor 2. For retarded group, only one factor was heavily loaded by all subscales. It appears that the retarded group was less differentiated in their vocational choice than the non-retarded.

TABLE 2
FACTOR MATRIXES ON VOCATIONAL INTERESTS OF THREE GROUPS

	Bright (N=192)		Normal (N=192)		Retarded (N=96)		Factor Loadings Bright		Normal		Retarded
	$\bar{X}$	S	$\bar{X}$	S	$\bar{X}$	S	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1
Realistic	4.02	3.82	4.20	4.67	3.60	3.80	.21	.89*	.31	.82*	.66*
Investigative	8.04	5.09	6.76	5.12	2.42	3.18	.14	.86*	.15	.91*	.79*
Artistic	6.67	4.91	5.24	4.58	2.95	2.85	.84*	-.05	.79*	.21	.73*
Social	5.68	4.19	5.99	4.44	3.84	3.37	.75*	.22	.86*	.19	.80*
Enterprising	4.61	3.77	4.71	4.11	2.82	3.24	.80*	.27	.78*	.34	.67*
Conventional	2.48	2.62	3.02	3.31	1.70	2.07	.64*	.36	.86*	.15	.69*
Eigenvalue							2.38	1.79	2.83	1.72	3.17
Total Variance Accounted							39.50	29.80	47.30	28.60	53.00

* Factor loading is over .40

ANCOVA in Both Grades

The results of three-way ANCOVA in both grades were summarized in Table 3. The SES effect had been partialed out and the means of each sub-group were adjusted as shown in Table 4. It was found that: (1) Grade effects were significant on five types of vocational interests, i.e., Realistic, Investigative, Artistic, Social, and Conventional. The pupils in the higher grade indicated more interests in these areas; (2) There were significant sex differences in the vocational choice: boys preferred realistic and investigative occupations, while girls preferred artistic and social ones; (3) There were significant intelligence effects: the bright pupils expressed more interests in investigative and artistic domains than the normal pupils. These main effects mentioned above were explained in spite of some of the significant interactions, since the interactions were all ordinal.

TABLE 3
SUMMARY OF THREE-WAY ANCOVA (SES AS COVARIATE) ON VOCATIONAL INTERESTS FOR THE GIFTED AND THE NORMAL

Source	df	F Ratio						
		Real.	Invest.	Art.	Social	Enterp.	Conv.	Total
Main Effect								
Grade(A)	1	21.19**	19.90**	14.93**	5.67*	2.90	17.70**	23.16**
Sex(B)	1	56.81**	87.17**	29.48**	11.24**	.04	1.54	2.45
Intelligence(C)	1	.12	5.16*	6.42*	.21	.00	.23	1.45
Two-way Interaction								
A × B	1	.72	3.67	4.87*	2.95	12.12**	5.93*	6.42*
A × C	1	.38	6.15*	.25	.15	.09	1.28	.53
B × C	1	.27	.00	.63	5.49*	.75	11.06**	1.34
Three-way Interation								
A×B×C	1	.00	.33	.05	.01	.36	4.73*	.35

* $p < .05$
** $p < .01$

TABLE 4
ADJUSTED MEANS OF VOCATIONAL INTERESTS OF THE BRIGHT AND THE NORMAL IN GRADES 5 AND 8

	Real.	Invest.	Art.	Social	Enterp.	Conv.	Total
Grade 5	3.18	6.35	5.05	5.31	4.31	2.13	25.94
Grade 8	5.04	8.49	6.87	6.35	5.01	3.37	35.18
Boys	5.60	9.54	4.71	5.12	4.62	2.57	31.97
Girls	2.60	5.24	7.22	6.55	4.70	2.93	29.14
Bright	4.19	7.98	6.61	5.94	4.65	2.67	31.77
Normal	4.03	6.82	5.31	5.72	4.67	2.83	29.35

ANCOVA in Grade Eight

The results of two-way ANCOVA in grade 8 were summarized in Table 5. The SES effect had also been controlled and the adjusted means were calculated as shown in Table 6. The findings were the following: (1) Similar to the findings of Table 3, boys showed more preferences for artistic and investigative vocations, while girls showed more interests in artistic and social ones. The new findings were that girls tended to be more interested in enterprising and conventional vocations; (2) In terms of intelligence, the retarded showed much fewer vocational interests in all types than the other two intelligence groups; on the other hand, the bright students again expressed more interests in investigative and artistic domains than normal students.

TABLE 5
SUMMARY OF TWO-WAY ANCOVA (SES AS CAVORIATE) ON VOCATIONAL INTERESTS FOR THE 8TH GRADERS

Source	df	F Ratio						
		Real.	Invest.	Art.	Social	Enterp.	Conv.	Total
Main Effect								
Sex(A)	1	39.91**	31.37**	27.41**	11.89**	4.67*	5.11*	.01
Int.(B)	2	5.11**	47.01**	20.84**	13.54**	9.53**	15.74**	28.69**
Two-way Interaction								
A×B	2	.39	1.66	2.74	2.51	1.93	8.02**	1.41

* $p<.05$
** $p<.01$

TABLE 6
ADJUSTED MEANS OF VOCATIONAL INTERESTS OF 8TH GRADERS

	Real.	Invest.	Art.	Social	Enterp.	Conv.	Total
Boys	6.19	7.81	4.22	4.73	3.81	2.47	29.12
Girls	3.01	5.01	6.88	6.45	4.77	3.25	29.28
Bright	5.20	9.56	7.73	6.77	5.15	3.33	37.62
Normal	5.28	7.19	6.01	6.51	5.00	3.85	33.67
Retarded	3.33	2.49	2.91	3.49	2.72	1.40	16.31

DISCUSSION

Do Vocational Interests Vary with Intelligence?

It seems quite clear in this study that vocational interests varied with intelligence in many aspects. It is also obvious that the retarded pupils were not only retarded in intelligence development but also in career development in terms of the awareness of occupational information. Career education obviously includes occupational information and vocational choice in a given time could be an important index of career awareness. The less differentiation and fewer interests in vocational choice of the retarded as indicated by the results of factor analysis and analysis of covariance showed that the retarded might be far behind the normal in their vocational maturity. On the other hand, they did not show unrealistic vocational imagination as indicated by Rice (1978). There might be culture differences in this regard. The present writers would suspect that the less cognitive differentiation might account for their obscure factor structure of vocational interests. The failure in perceiving new data and the failure-oriented anticipation might be related to the reluctancy of choosing occupations.

The differences between the bright and the normal in vocational choices were not so salient as the differences between the retarded and the non-retarded. However, the fact that the bright were more interested in investigative and artistic vocations than the normal is centainly significant. Investigative vocations such as anthropologist, engineer, physician and artistic vocations such as English teacher, artist, architect are mostly professional and need high level of ability. In addition, there is a social expectation for the intelligent to do more sophisticated work. In coping with the intelligence-role ideology, it is no wonder that the bright had higher self-expectation and, in turn, higher vocational imagination than the normal. To sum up, it seems that the results of this study in this respect are in full accordance with pupils' abilities as well as social expectations.

Do Vocational Interests Vary with Sex and Grade?

In reviewing the theoretical and research literature on career development and sex-role expectation, it can be found that both males and females have been limited in their career development by pervasive sex-role stereotyping in all aspects of society. The limiting effects have been cumulative and developmental, starting at home and reinforced at every level of the educational spectrum from elementary years through college, over the life span. (Hansen, 1980) It is also evident in this study that boys and girls expressed their vocational preferences differently even in the elementary level, i.e., boys favored realistic and investigative occupations, while girls preferred artistic and social ones. Using Holland's (1973) words, boys' behavioral tendencies might lead to the acquisition of manual, mechanical, agricultural, electrical, and technical competencies and to a deficit in social and educational competencies. These tendencies might also lead to an acquisition of scientific and mathematical competencies and to a deficit in persuasive competencies. Girls' behavioral tendencies, on the other hand, might lead to an acquisition of artistic competencies—language, art, music, drama, writing—and to a deficit in clerical or business system competencies. These tendencies might also lead to an acquisition of human relations competencies such as interpersonal

and educational competencies and to a deficit in manual and technical competencies. These results are quite congruent with sex-role expectations existing in Chinese culture setting.

On theoretical ground it seems possible that occupational information may have something to do with age or grade level. Marland (1971) suggested that from kindergarten to grade six is the stage of "career awareness," from grade seven to grade ten is the stage of "career exploration," and from grade eleven to grade twelve or beyond is the stage of "career preparation." Super and Overstreet (1960) concluded that".... the typical ninth-grade boy has not yet reached a stage at which wisdom of vocational preference can be expected." It also showed in this study that grade made differences in pupils' vocational choices. In general, pupils in higher grade indicated more interests in almost all vocational domains except the Enterprising. This does not necessarily lead to the conclusion that the students increased the accuracy and the adequacy of the occupational information with their age. However, it is most probable that the students increased their vocational awareness with age. As grade increased, they became more acquainted with the variety of occupations and became more eager to explore a wide range of occupations.

It should also be noted that although "vocational choice is a process rather than event," (Super, 1957) it does not deny the fact that every individual must someday decide that he will or will not accept a job that has been offered. One may, indeed, have to make several such decisions. Each decision will be affected by one's development up to that point. (Hoppock, 1976) Therefore, the findings of this study are highly congruent with the concept of career development.

Implication of This Study

Based on the premise that career education obviously includes occupational information and that career awareness is the first phase of career development, the findings of this study yield the following implications:

1. It is necessary to provide a wide variety of occupational information for elementary and junior high school students in order to enrich their knowledge for career development.
2. As bright students preferred investigative and artistic occupations and showed earlier differentiation in career development, it would be wise to provide them with more information and opportunities for/of development in these fields in time. It is, of course, also important to encourage the bright to development wholesome attitudes toward all useful work.
3. While education or guidance can do very little to improve the intelligence of the mentally retarded children, it is still important to increase their awareness in the area of daily living and personal-social affairs which they are capable of doing and then to provide them with better learning environment.
4. Since there is strong sex-role orientation in our society which might inhibit the development of individual's capacity for both sexes, it would be better at the beginning of educational career not to stress how society would perceive individual's role as masculine or feminine. Rather, the individual as him or herself per se should be

emphasized. The first concern of teachers or career counselors should be his or her ability and/or interest rather than his or her sexuality.

REFERENCES

Barclay, J.R. *The Barclay Classroom Climate Inventory: A users manual.* Lexington, Ky.: Educational Skills Development Inc., 1974.

Brunkan, R.J. Perceived parental attitudes and parental identification in relation to field of vocational choice. *Journal of Counseling Psychology,* 1965, **12**, 39-47.

Caplow, T. *The Sociology of Work.* Minneapolis, Minn.: The University of Minnesota Press, 1954.

Clark, H.F. *Economic Theory and Correct Occupational Distribution.* New York: Teachers College Press, Columbia University, 1931.

Ginzberg, E., Ginzbeag, S.W., Axelrad, S., & Herma, J.L. *Occupational Choice: An Approach to a General Theory.* New York: Columbia University Press, 1951.

Hansen, L.S.S. Born Eree: career development, sex roles, and social change. Paper presented at the International Association for Educational and Vocational Guidance, 10th World Congress, Manila, Philippines, September 1-5, 1980.

Holland, J.L. *The Psychology of Vocational Choice.* Waltham, Mass.: Blaisdell Publishing Company, 1966.

Holland, J.L. *Making Vocational Choices: A Theory of Careers.* Englewood Cliffs, N.J: Prentice-Hall, Inc., 1973.

Hollingshead, A.B. *Elmtown's Youth.* New York: John Wiley & Sons, Inc., 1949.

Hoppock, R. *Occupational Information.* 4th ed. New York: McGraw-Hill Book Company, 1976.

Miller, D.C., & Form, W.H. *Industrial Sociology.* 2nd ed. New York: Harper & Row, 1964.

Rice, F.P. *The Adolescent: Development, Relationship, and Culture.* Boston: Allyn & Bacon, Inc., 1978.

Super, D.E. A theory of vocational development. *American Psychologist,* May 1953, p. 185.

Super, D.E. *The Psychology of Careers.* New York: Harper & Row, 1957.

Super, D.E., & Overstreet, P.L. *The Vocational Maturity of Ninth Grade Boys: Career Pattern Study Monograph 2.* New York: Teachers College Press, Columbia University, 1960.

Wu, Wu-tien *Classroom Climates in Chinese and American Elementary Schools: A Cross-Cultural Study.* Unpublished Doctoral Dissertation, University of Kentucky, 1975.

國立台灣師範大學教育心理學系
教育心理學報, 民70, 14期, 231-240頁

國民中小學學生的職業興趣與其智力和性別之關係

吳武典　洪若烈

摘　要

本研究的目的有三：(1)探討資優學生、普通學生與智能不足學生的職業興趣所在；(2)比較三組學生的職業興趣之異同；(3)探討兒童生涯發展的影響因素及有效指引。

研究樣本取自臺北市三所國小和七所國中，包括 192名國小五年級學生和 288名國中二年級學生。男女學生人數均衡，惟就智力水準而言，國小組僅有資優與普通二組，國中則包括三組，各組人數亦均相等。根據 Holland (1973) 的職業類型架構，並參照 Barclay (1974) 的班級氣氛問卷中之職業覺知量表，自編職業興趣問卷 (VII) 一種，經預試、項目分析後，正式題目共 118 題，包括下列六種職業興趣：實用的 (realistic)、研究的 (investigative)、藝術的 (artistic)、社會的 (social)、企業的 (enterprising)、日常的 (conventional)。職業興趣問卷施測後所得結果，藉 SPSS 電腦程式首先進行主軸因素分析，以探討三組受試職業興趣因素結構之異同，然後以社經地位 (SES) 爲共變項，實施雙向與三向共變數分析，以探究智力、年級、性別的主效果及其交互作用情形。

本研究的主要發現如下：(1)資優學生與普通學生有相似的職業興趣因素結構，即各有二項因素出現，智能不足組則只出現一項因素，顯示其職業興趣的分化程度較低；(2)在實用的、研究的、藝術的、社會的與日常的等五種職業興趣上，有顯著的年級差異，即國中組學生較國小組學生顯示較多的興趣；(3)性別差異亦很顯著：男生較喜愛實用性與研究性職業，而女生則較喜愛藝術性與社會性的職業；(4)不同智力水準的職業興趣有顯著差異：智能不足組在所有六種職業類型上的興趣均低於其他兩組，這可能意味着智能不足學生較缺乏職業訊息。此外，資優學生在研究性與藝術性兩類職業興趣上，顯示比普通學生有較高度的喜愛，這亦與其本身能力和社會期望相符。

本研究的主要涵義如下：(1)應爲國民中小學學生提供廣泛的職業訊息，以充實其生涯發展所需的知識；(2)對資優學生應提供較多研究性與藝術性的職業訊息與學習機會，並培養對工作的正確態度；(3)對智能不足學生應設法增進其對日常生活事務的了解，並提供較佳的學習環境；(4)社會對性別角色的過度强調可能影響個人能力的發展，在教育生涯的初期，似乎不宜强調社會對男女職業角色的期待，而應首先考慮學生的能力與興趣的發展。