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## Educational-Vocational Implications of Field Dependence-Independence for Secondary School Graduates

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### Résumé

Un nombre de variables traitant du métier et de la scolarité a été examiné afin de découvrir la dépendance/l'indépendance du champ des individus finissant leurs études secondaires pour entrer dans des programmes de collège ou pour entreprendre un travail. Ces variables comprennent: la sélection de cours au niveau secondaire; le succès durant leurs études; les différentes sortes d'activités entreprises immédiatement après avoir obtenue les diplômes secondaires; les sujets les plus ou les moins aimés, et ceux estimés les plus utiles dans la vie. Des données étaient disponibles pour 117 diplômés dont 68 donnèrent des détails sur leurs activités depuis l'obtention des diplômes. On peut conclure que les conseillers dans les écoles secondaires pourraient utiliser de telles recherches avec les techniques de dépendance/d'indépendance et le test de "Group Embedded Figures," spécialement avec les autres techniques développées par Holland. De plus, il apparaît que le sexe est encore un facteur clé dans le choix de cours au niveau secondaire et, par la suite, dans la décision d'embrasser certaines carrières.

### Abstract

A number of educational-vocational variables were examined in relationship to field dependence-independence of individuals completing secondary school and entering occupations or educational programs. The variables included: senior secondary school course selection; academic success in the graduation program; nature of and satisfaction with educational-vocational involvement two to three years after school leaving; and perceptions of most favored, least favored, and, career-wise, most useful school subject. Data were available for 117 who graduated, 68 of whom volunteered educational-vocational details two to three years after graduating. It was concluded that field dependence-independence as measured by the Group Embedded Figures Test does have potential for academic and vocational counselling at the secondary school level, particularly in conjunction with other procedures such as those developed by Holland. It was apparent that gender is also a potent factor implicated in the selection of school subjects and subsequent involvement in careers.

H. A. Witkin and colleagues have researched and reviewed extensive research done by others on the cognitive style "field dependence-independence" (FDI) as it relates to differential modes of human behaviour. Witkin (1978) and Witkin and Goodenough (1981) have outlined the historical development and refinement of the concept of the style and have described generally consistent behavioural patterns found to be associated with individuals whose cognitive style was characterized as field-dependent (FD) or field-independent (FI). Differences in social skills between FD and FI people were elaborated by Witkin and Goodenough (1977). A FD person was described as characteristically having social skills and an interpersonal orientation which is less evident in a FI person; alternately, a FI person was characterized as

possessing greater ability in cognitive tasks that require analysis and restructuring. Depending on the circumstances of a situation, either style could be considered advantageous.

These differences have implications for educational-vocational preferences, choices, and performance of people. In a longitudinal study of the role of FDI in academic evolution, Witkin, Moore, Oltman, Goodenough, Friedman, Owen, and Raskin (1977) found that college students tended to gravitate toward and do better in educational-vocational domains more compatible with their FDI ratings. A FI person could be expected to find compatible involvement in those "domains which emphasize cognitive restructuring skills, are primarily abstract and nonsocial in content, and tolerate an impersonal orientation" (p. 199); in contrast, FD persons would likely find more compatible involvement in "domains which are primarily social in content, require interpersonal relations for their conduct, and do not particularly call for cognitive restructuring skills" (p. 199). Witkin and Goodenough (1977) and Witkin, Moore, Goodenough, and Cox (1977) have identified a number of educational-vocational domains and specific vocations found to be generally associated with FD and FI individuals. FD individuals have been found to be associated with occupations such as clinical psychologist, rehabilitation counsellor, and social worker; social studies, business, and elementary level teacher; positions in advertising and sales; and administration roles that emphasize dealing with people. These correspond closely to occupations categorized by Holland (1973) as social, conventional, and enterprising. In contrast, FI individuals have been associated with more "creative" (Morris & Bergum, 1978), theoretical, abstract, and artistic occupations which include experimental psychologist, physician, dentist, engineer, architect, and airplane pilot; teacher of mathematics, science, industrial arts, and vocational-agricultural subjects; and practical occupations such as farmer, mechanic, and production manager. These relate to Holland's categories of realistic, intellectual, and artistic occupations.

In summary, there appears to be substantial support that illustrates compatibility between FD individuals and their engagement in those domains of occupation and study that emphasize the practice of interpersonal social skills, and FI individuals in domains that emphasize cognitive analytic and restructuring skills. In consequence, the notion has arisen of using FDI as an "early sign" for career guidance (Whitkin, Moore, Goodenough et al., 1977) and college program admissions (Wilson, Suddick, & Shay, 1981).

#### OBJECTIVE OF THE STUDY

Most of the previous research has concentrated on the relationships between FDI and educational-vocational matters at the level of college students and practicing professionals. The objective of this study was to

investigate these relationships in a younger less selected population consisting of recent graduates of a public secondary school. In this study, a number of factors have been examined in relationship to FDI: selection of secondary school courses and academic success in them; perceptions of which courses were most favoured, least favoured, and, career-wise, most useful; initial vocational/post-secondary educational selections and reported satisfaction with the selection; and desired career alternatives.

### SUBJECTS

Virtually all the grade 10 and 11 students of a suburban secondary school located in southwest British Columbia, Canada participated in another research study conducted by this author in 1978. As part of that study the *Group Embedded Figures Test* (GEFT) (Witkin, Oltman, Raskin, & Karp, 1971) was completed by 194 students. Based on the GEFT score distribution, the lower third with scores from 0-8 formed the FD group, (the FD's), the upper third with scores from 15-18 formed the FI group (the FI's), and the middle third with scores from 9-14 were termed the "field-average" group (the FA's). There was a highly significant difference in GEFT ratings between females and males: for females, GEFT  $M = 8.71$ ,  $SD = 5.17$ ; for males, GEFT  $M = 12.48$ ,  $SD = 4.40$ ;  $t(192) = 5.82$ ,  $p < .001$ . Due to this gender difference, results have been reported separately for females and males.

Five years after the earlier study, the secondary school graduation program record of each student was made available for research analysis. Of the 194 students in the original group only 117 graduated from the school. In order to graduate, each student had to complete a program of at least eight courses at the grade eleven level plus four at the grade twelve level, including five required courses. Almost all the graduates took a larger number of courses in one subject area than any other; that subject has been called the student's "concentration."

### PROCEDURE

For each of the 117 graduates, the graduation program average and program concentration type and average was related to the individual's FDI rating.

A questionnaire was sent to each person who by this time was two or three years beyond secondary school graduation. Information solicited by questionnaire included: specification of secondary school subject regarded as "most favourite," "least favourite," and "most useful career-wise"; work and study activity since graduation; perception of degree of satisfaction with current job or studies; specification of most and least satisfying element concerned with current job or studies; existence of desire to switch to another field; most desired alternate career and reason for seeking it; and importance of financial earning

relative to personal satisfaction. Questionnaires were returned by 68 individuals with 57 entirely completing the questionnaires. The educational-vocational information received was subsequently analyzed in relation to the FDI rating of the individuals.

*Classification of educational-vocational domains and School Subjects.* Current and alternate occupation and studies were categorized as being associated with either FD or FI domains. Holland's (1973) categories of social, conventional, and enterprising occupations were considered FD; realistic, intellectual, and artistic occupations were considered FI, with the exception of "writer" which has been associated with field-dependence in the FDI literature (Witkin & Goodenough, 1977, p. 677). School subjects were also partitioned according to their affinity to FD or FI vocational domains. FD school subjects included business, English, foreign languages, home economics, physical education, and social studies; FI school subjects included art, industrial arts, mathematics, music, science, and theatre. Of the 1,675 courses taken by the graduates, 59.6% were in FD subjects and 40.4% in FI subjects.

## RESULTS

*FDI and academic program selection and success.* Letter grades from each student's graduation program were converted to numerical values, A = 5, B = 4, C+ = 3, C = 2, and P = 1. Failures or incomplete courses were not listed on the program. An average was calculated for each student's program and concentration. The mean for all program averages was 2.819,  $SD = 0.857$  and the mean for all concentration averages was 3.187,  $SD = 1.100$ . The Pearson Product Moment Correlation between GEFT rating and program average was .290,  $p < .001$ . This indicated a connection between field-independence and academic success.

Of the 117 graduates, 112 completed a concentration. There were 31 FD's (24 female, 7 male), 48 FA's (29 female, 19 male), and 33 FI's (11 female, 22 male). FD concentrations were completed by 20 FD's (17 female, 3 male), 26 FA's (17 female, 9 male), and 10 FI's (5 female, 5 male). FI concentrations were completed by 11 FD's (7 female, 4 male), 22 FA's (12 female, 10 male), and 23 FI's (6 female, 17 male). The GEFT mean of the 56 individuals who completed an FD concentration was 10.29,  $SD = 4.37$ , comprising 39 females with GEFT  $M = 9.33$ ,  $SD = 4.26$  and 17 males with GEFT  $M = 12.47$ ,  $SD = 3.91$ . The GEFT mean of the 56 individuals who completed an FI concentration was 12.32,  $SD = 4.55$ , comprising 25 females with GEFT  $M = 10.88$ ,  $SD = 4.43$  and 31 males with GEFT  $M = 13.48$ ,  $SD = 4.37$ . The average GEFT of people completing concentrations in the two areas differed significantly,  $t(110) = 2.4143$ ,  $p < .01$ . FD's and FI's tended to select concentrations matching their style ( $X^2(1, N = 64) = 7.5135$ ,  $p < .01$ ), while FA's were about as likely to select a concentration of either type. Females with FI concentrations had a GEFT mean higher by 1.55 than the females with FD

concentrations; similarly, the relative difference for males was 1.01. However, the females with FI concentrations had a lower GEFT mean than males with FD concentrations, 10.88 and 12.47, respectively. This disparity might well be due to the relatively great difference in GEFT ratings between the genders in the study population, as well as the influence on course selection exerted by social pressures and stereotypical notions.

Did a student who selected a concentration matching his or her FDI style achieve higher marks than a student with a mismatched concentration? The program average was compared with the concentration average for each of the 43 matched and the 21 mismatched individuals. Because many differences were very small, averages were considered the same if they varied by less than 0.5 (about five percentage points). FD's and FI's with matching concentrations had a higher concentration average in 12 cases and higher program average in 5 cases (no major difference in 26 cases); those with mismatching concentrations achieved a higher concentration average in 13 cases and higher program average in 1 case (no major difference in 7 cases). It appears that academic achievement in a school subject concentration was independent of matching or mismatching with an individual's FDI style.

*Favoured, disfavoured, and useful school subjects.* More specific data were elicited from the 68 (37 females, 31 males) who responded to the questionnaire. They volunteered information about personal educational-vocational events two or three years after secondary school graduation as well as retrospective judgements about the secondary school courses they had taken. Responses concerning the subject regarded most favourite, least favourite, and, career-wise, most useful, have been related to GEFT ratings as well as to gender, as responses by males and females varied considerably. Response categories made by only one person have been omitted, so the percentage of responses reported for each group may not total 100%. The subject *most favoured* by females was social studies (18.9%) followed by English and physical education (each 16.2%), science (13.5%), music (10.8%), art (8.1%), and business (5.4%); for males, industrial arts (35.5%) was a strong favourite, followed by social studies (16.1%), mathematics and physical education (each 9.7%), and business and English (each 6.5%).

The subject *least favoured* by females and males alike was mathematics, which elicited almost 40% of all responses (43.2% of females and 32.3% of males). For females, science (24.3%) followed by English and foreign languages (each 10.8%), and social studies (5.4%) were also disfavoured; for males, it was English and social studies (each 19.4%), science (16.1%), and foreign languages (6.5%).

The subject considered *most useful*, career-wise, by females was business (29.7%), followed by English (21.6%), mathematics and science (each 5.4%); for males, it was mathematics (25.8%) followed by industri-

al arts (22.6%), and business, English, and social studies (each 6.5%). In this category, no response or "Nothing!" was given by 13.5% of the females and 19.3% of the males.

The school subject *most favoured* by FD's (N = 12) was physical education (25.0%) followed by business and music (each 16.7%); FI's (N = 23) on the other hand favoured industrial arts (21.7%) followed by English, mathematics, music, and social studies (each 13.0%).

The school subject *least favoured* by both FD's and FI's was mathematics, although FD's named it almost twice as often as FI's (58.3% to 34.8%). FD's also named English (16.7%), while FI's named English and science (each 21.7%), social studies (13.0%), and foreign language (8.7%).

The school subject considered *most useful* by FD's was business (41.7%); FI's selected mathematics (21.7%), English (17.4%), business and industrial arts (each 8.7%), and 17.4% gave no response.

A pattern emerged that linked the FDI of individuals and school subject selections: FD's named a FD school subject more often as favourite (66.7%) and useful (72.7%), and a FI subject as least favourite (66.7%); FI's named a FI school subject more often as favourite (65.2%) and useful (52.6%), but also named FI subject least favourite (56.5%). Selections made by FA's fell between those made by FD's and FI's. They tended to name a FD school subject favourite (61.3%) and useful (55.6%), and a FI subject least favourite (62.5%).

Generally students tended to favour and perceive as useful subjects matched to their FDI styles, and to disfavour mismatched subjects; students with mid-range GEFT ratings selected subjects less predictably. Greatest agreement was reached on the school subject deemed least favourite. Mathematics was named least favourite by all groups, garnering 38.8% of all responses, even though only 7.6% of all courses taken by the graduates were mathematics courses. It was named least favourite by 58.3% of the FD's, but by only 34.8% of the FI's. This relative difference was anticipated, but the magnitude of disfavour directed at this subject is noteworthy. Although there was not the same degree of agreement in naming a particular school subject the most useful, business was most popular, principally to FD's and FA's. Mathematics and English were named almost as often, but almost exclusively by FI's and FA's. Some of the questionnaire respondents added unsolicited reasons justifying their selections. The reasons often referred to the value of mathematics in practical vocational applications or the value of English in communication, especially for written assignments required in post-secondary programs.

*Career choices.* The educational-vocational domain in which each person was involved at the time of completing the questionnaire was classified in association with either FD or FI. Holland's (1973) classification of occupations was utilized, with social, enterprising, and conventional occupations linked with FD and realistic, investigative, and

artistic occupations linked with FI. FD vocations were characterized as those emphasizing social contact and interaction, “people-oriented” situations; FI vocations were characterized as emphasizing abstract problem solving and relatively independent effort.

Data were available for 67 of the 68 people who responded to the questionnaire. Of the 12 FD's, 58.3% were involved in FD vocations; of the 22 FI's, 54.5% were involved in FI vocations; of the 33 FA's, 48.5% were involved in FD vocations, and 51.5% in FI vocations. Considering in addition the factor of school subject concentration, only 33.3% of FD's and 45.5% of FI's completed a matching concentration and then entered a matching educational-vocational domain. Although there was a slight tendency for individuals to end up selecting an educational-vocational domain that matched their FDI style, there was a higher proportion (64.2%) of individuals who entered educational-vocational domains related to the school subject concentration they completed.

A somewhat stronger association is involved with gender. Females more often were involved with FD vocations (64.9%), while males were involved with FI vocations (70.0%), regardless of FDI style. Only 27.8% of the females and 56.3% of the males completed concentrations *and* entered an educational-vocational domain that matched the FDI style of the individual. Generally, FI females tended to enter FD vocations, especially the social occupations—those stereotypically “appropriate” for females; on the other hand, the males, who in this population were more FI, tended to enter FI vocations, especially the realistic occupations.

*Career satisfaction.* The satisfaction with educational-vocational involvement that was being experienced by each of the individuals was reported as either *high*, *moderate*, or *low*, rated as 3, 2, or 1. Mean satisfaction ratings for all groups were above moderate, FA's most satisfied at 2.43, FD's at 2.36, and FI's least satisfied at 2.22. While only one person in each category reported low satisfaction, many indicated that they would like to switch to another job or program. About one-third of the FD's, just under one-half of the FA's, and just over one-half of the FI's indicated that they wished to switch. FD's expressed greatest uncertainty about switching. Of those individuals who indicated the type of position into which they would like to switch, there was no trend to move to unrelated jobs; most individuals expressed a desire to assume more responsible positions in their present field. Those few who wished to switch to different fields often as not were prepared to forsake a domain compatible with their FDI style for an incompatible as the reverse. Of the 13 FD's and FI's indicating the field they would switch to, 9 would end up in matching fields and 4 in mismatching fields. Although this could be construed to indicate a trend, 9 of the individuals started from a matching field; however, half the individuals in each group who were initially matched remained matched. The situation with FA's was

almost identical, with no net change, as might be expected. In all, there did not appear to be any tendency for individuals to gravitate toward domains compatible with their FDI styles.

Factors reported as contributing to job satisfaction and dissatisfaction were quite varied and were generally situation-specific. Many related to problems associated with young people without much job experience entering the work force in times of a generally sagging economy. Interestingly, the importance of financial earning relative to personal satisfaction with the job was perceived generally as of little consequence. Data about earnings and vocational satisfaction/dissatisfaction were considered too limited to provide significant enlightenment regarding the relationship between career choices and FDI; consequently they have not been reported in more detail.

#### GENERAL SUMMARY AND CONCLUSIONS

This study supports the notion that the cognitive style *field dependence-independence* as rated with the Group Embedded Figures Test has utility in career guidance. There appears to be potential for its use in educational-vocational counselling of students in senior secondary school, as well as for individuals making career decisions at a later stage of life.

A significant positive correlation was found between field-independence and secondary school graduation average, in contrast to the findings of Renninger and Snyder (1983). However, academic success in those courses in which an individual concentrated studies was independent of the FDI style of the individual. Students tended to complete concentrations in subjects matching their FDI styles, namely, field dependent individuals selected business, English, foreign language, home economics, physical education, or social studies; field independent individuals selected art, industrial arts, mathematics, music, science, or theatre. Two or three years after graduating, they recalled the school subject that was their favourite, their least favourite, and one they perceived as most useful, career-wise. The general pattern of response was naming a subject matched to their FDI style as favourite and useful, and one mismatched as least favourite. A concentrated response directed at one subject, mathematics, as least favourite was responsible for an aberration in the general pattern—field independent individuals by a narrow margin selected field independent subjects as their least favourite.

There appeared to be a close relationship between groups of occupations proposed by Holland (1973) and vocations found to be associated with differing levels of FDI—namely, Holland's social, enterprising, and conventional occupations related to field dependence, and his realistic, investigative, and artistic occupations with field independence. With minor adjustments to Holland's groupings, occupations of the study participants were classified with respect to FDI theory and related

to various factors. Overall, individuals became involved in educational-vocational domains kindred to their FDI styles, but no trend to gravitate towards occupations in compatible fields was noted in those individuals who originally selected mismatching fields. Job or training program satisfaction appeared to be moderate or better, and those who anticipated switching to other fields tended to consider ones that were closely related. Financial rewards were considered less important than personal satisfaction.

Gender differences were notable, from the FDI composition of the sample population to educational-vocational school preparation and career choices that could have been influenced by notions of sex-role stereotypes.

The promising line of research taken in this study should be extended by pursuing longitudinal study of a greater number of individuals. This should yield knowledge that can be applied to improving career guidance and counselling in secondary schools and postsecondary institutions.

Data about a person's FDI style, easily obtained with the GEFT, can be used along with other approaches, such as Holland's theory of careers, in alerting students to naturally compatible vocations and associated academic coursework. However, FDI style should be considered just another piece of information in the repertoire of a counsellor's data gathering. A caveat must be made explicit on the dangers inherent in placing too much faith in too few instruments supported by too little empirical evidence. Counselling advice based on psychological differentiation theory refined in field research will promote greater contentment and receptiveness in students in the school system, and will benefit the work force and ultimately society at large.

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