
Vocational Knowledge Testing of a Deaf and Hard of Hearing Population

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Résumé

Un groupe de quarante-huit adultes complètement ou partiellement sourds participèrent à une étude visant à déterminer l'efficacité d'un test de leurs connaissances professionnelles, dans le but d'établir des directives de planification à l'intention des sourds et de ceux dont l'ouïe est diminuée. Les vingt et une femmes et vingt sept hommes sont tous de la clientèle d'un centre de l'emploi pour les personnes affligées de besoins spéciaux, à Edmonton, Alberta. Tous les participants se sont soumis à un test dérivé de l'Echelle de maturité technique à l'aide d'un questionnaire basé sur la classification des professions de Hollande (1975).

Il ressort des résultats que de tous les facteurs en ligne de compte, le type d'école à laquelle le client avait étudié constituait la plus grande influence sur ses connaissances techniques. Ceux qui suivirent des cours dans une école pour élèves d'ouïe normale possédaient des connaissances nettement plus grandes des domaines professionnels précis que ceux qui avaient fréquenté une école pour sourds. Dans la catégorie des professions dites "artistiques," les femmes obtinrent de meilleurs résultats que les hommes en ce qui concerne leurs connaissances professionnelles. Il n'y avait aucune différence quant au sexe en ce qui concerne les critères personnels sur les stéréotypes sexuels dans un emploi donné. Un questionnaire posé à l'ensemble de la population sur l'attitude envers le rapport sexe/rôle indique par des chiffres très élevés un grand désir d'accepter l'attitude de l'un ou l'autre des deux sexes dans n'importe quelle profession. Il y avait une confiance apparente quant à l'échange des données car les résultats aux tests sur la connaissance des professions précises et ceux sur les données professionnelles générales indiquaient une corrélation généralement positive et indicative de tendances précises. Lorsque les résultats sur les classes professionnelles sont normalisés par rapport à la population de l'étude présente et représentés par un graphique, les résultats d'un test objectif se rapprochaient favorablement de l'appréciation personnelle du conseiller professionnel, ce qui indique un degré élevé de validité externe.

Abstract

A total of forty-eight adults with either complete or partial hearing impairment were involved in a study to investigate the efficacy of a test of vocational knowledge to assist in decision-making and career-planning for the deaf and hard of hearing. The twenty-one women and twenty-seven men ranging in age from eighteen to fifty-three years were clientele of an Edmonton, Alberta, employment centre for those with special needs. All participants were administered a test adapted from the Scale of Vocational Maturity using a questionnaire based on Holland's (1975) classification of occupations.

Results indicated that the type of school attended by the client influenced vocational knowledge scores more than any other factor considered. Those who had attended schools for hearing populations demonstrated significantly more knowledge concerning specific occupations than those who had attended schools for the deaf. Women scored higher than men in knowledge related to occupations in the "Artistic" category. No differences due to sex were evident for values related to sex-stereotyping of jobs. High scores across the entire population tested on attitude towards sex-roles indicated a high degree of acceptance of the capability of either sex to perform any of the occupations considered. Inter-item reliability was apparent as correlations between scores of knowledge of specific occupations and overall occupational scores

were generally positive and highly significant. When occupation class scores for each individual were normed for the population in the present study and graphed on a profile, results from the objective test compared favourably with the counsellor's personal appraisal of the client's overall vocational knowledge, demonstrating a high degree of external validity.

The concept of "knowing" about aspects of the work world is one of the many factors that may influence an individual's choice of occupations. Instruments that measure vocational maturity have been used to assess concepts such as preparedness for entrance into the work force, general knowledge of training facilities, and requirements for a range of occupations of interest to the individual (Super, 1982). However, such materials are designed for hearing populations whose auditory and verbal abilities are generally adequately developed.

Those persons with complete or partial loss of hearing have specific problems that pose a challenge to assessment of their vocational knowledge. For example, deaf adults may often demonstrate a Grade 4 elementary school level of reading and vocabulary skills relative to their hearing peers whose reading and vocabulary knowledge is considerably greater (Strong et al., 1978). Such a discrepancy perpetuates conditions in which the deaf are more reliant upon the degree of visibility of job tasks related to an occupation to gain vocational knowledge. The combination of limited auditory communication, vocabulary, and reading ability serves to impede the deaf's resources and exposure to a job, thereby minimizing their knowledge of career choices. The issue is further compounded by the fact that there exists across Canada and the United States a variety of signing systems each of which is very colloquial in nature (Riekehof, 1978). Communication of information across regions will therefore be difficult in the absence of greater standardization of concepts and consistency in signing.¹

As a result of this situation the hearing impaired are often placed into occupations that require minimal skills learning, utilizing only a portion of the individual's intellectual abilities and ignoring potential interests. While the overwhelming majority of the deaf who find employment do so in unskilled and low-paying vocations, the opportunities for unskilled deaf workers are declining in North America (Vernon, 1981).

All of this clearly points to the need for better measurement of the vocational knowledge, career interests, and marketable skills of the deaf. A systematic program which utilizes assessment tools that permit better understanding of the deaf individual's awareness and understanding of the work world would help to overcome the disparity that exists between the deaf individual's potential and their career choice.

Certain proposals for the development of such a testing procedure need to be considered. A standardized interview format, for example,

¹ Assistance of professional staff of the hearing impaired unit at Distinctive Employment Counselling Services of Alberta is greatly appreciated.

would include a representative sample of occupations from an array of fields. Questions related to a wide range of information about the occupation may be posed through signing with a client by an agency counsellor proficient in interpreting and signing a variety of systems and familiar with concerns of hearing impaired persons. Questions would be directed at the client's attitude towards relevance of a specific vocation, and extent of his/her familiarity with the activities involved.

The test would need to recognize that different non-verbal sources of information about an occupation are crucial to the acquisition of vocational knowledge for a deaf person.

Some clients' exposure to a job may be limited to television watching, while others may observe or participate directly in a particular area of the work. Pictorial interest inventories have been used with the deaf for use in vocational training, although no procedure has yet been standardized (Vernon, 1981). Of importance also is the question of sex-role conditioning of expectations. Related biases need to be assessed as stereotypical attitudes concerning gender abilities in job performance only restrict a full exploration of careers that traditionally have been the domain of predominantly one gender.

The objective of the present pilot project was to investigate the efficacy of a test designed to assess general vocational knowledge of a deaf and hard-of-hearing population by measuring awareness of a wide range of occupations. Under examination were several factors thought to influence vocational knowledge. These included the client's sex, age, degree of hearing impairment and type of school attended (for either deaf or hearing populations), all of which may affect the extent of knowledge acquired regarding the work world. Leisure activities and past job experience were also factors for consideration that were thought to enhance vocational knowledge. The association between the client's test scores that measure vocational knowledge and the career counsellor's knowledge of the client was examined. In addition, the study explored the degree of sex-role stereotypical attitudes regarding occupations.

MATERIALS AND METHODS

Participants involved were clientele of an Edmonton, Alberta, career centre for special needs populations. As either new clients to the agency or regular clients seeking new jobs, all were invited to participate in the study. Those who volunteered were interviewed once by one of three signing counsellors. Each interview was 25 to 40 minutes in length, varying according to the time taken for the client's responses.

The forty-eight subjects comprised of 21 women and 27 men. Thirteen of the total had partial hearing impairment and thirty-five were deaf with complete loss of hearing. The onset of hearing loss was not recorded

so that the preset sample was not homogenous in this regard. Their ages ranged from 18 to 53 with a mean of 29.3 years. Forty per cent of the subjects range in age from 18 to 25 years.

THE INSTRUMENT

The assessment procedure used was adapted from the Scale of Vocational Maturity for Pre-schoolers designed by Begin et al. (1979). Eighteen occupations were presented sequentially in photograph form to each subject. Occupations were grouped into six areas as delineated by Holland's coding system (1975). Three specific occupations were classified within each of the six areas. Details of the codes, occupations, and gender of the workers presented in the photographs appear in Table 1.

TABLE 1
Details of Photographs Presented to Clients

<i>Holland Occupational Areas</i>	<i>Specific Occupation</i>	<i>Sex(es) Presented in Photos</i>
I. REALISTIC	1. Auto Mechanic	Male
	2. Janitor/Housecleaner	Female
	3. Farmer	Male
II. INVESTIGATIVE	4. Technician	Male
	5. Nurse	Female
	6. Weather-forecaster	Female
III. ARTISTIC	7. Film actor/actress	both female and male
	8. Dancer	Female
	9. Singer	Both female and male
IV. SOCIAL	10. Sports Coach	Male
	11. School Teacher	Female
	12. School Principal	Male
V. ENTERPRISING	13. Bank Manager	Male
	14. Advertiser	both female and male
	15. Salesperson	Male
VI. CONVENTIONAL	16. Accountant	Female
	17. Secretary	Female
	18. Office Clerk	Male

TABLE 2
Dialogue During the Test

Counsellor:	“This is a picture of a _____.”
Question I	- Job description: “What does ____ do?”
Score Level 1	- Client doesn’t know.
Score Level 2	- Client knows basically what they do.
Score Level 3	- Client knows and elaborates—describes a number of duties.
Question II	- Work Value: “Why is it important to have ____?”
Score Level 1	- Client doesn’t know.
Score Level 2	- Client acknowledges there is a need.
Score Level 3	- Client explains why that occupation is needed.
Question III	- Sex-role stereotyping: “Should ____ be done by men, women, or both men and women?”
Score Level 1	- Client doesn’t know.
Score Level 2	- Client responds either “man” or “woman.”
Score Level 3	- Client answers “both men and women.”
Question IV	- Attitude: “What do you think of ____?”
Score Level 1	- Client doesn’t know.
Score Level 2	- Client answers good or not.
Score Level 3	- Client answers and elaborates on response.
Question V	- Client’s exposure: “Have you seen or talked to a person in _____? If so, where?”
Score Level 1	- Client responds “no.”
Score Level 2	- Client responds “yes”—for example, has seen someone doing the job.
Score Level 3	- Client has talked to someone, explains where, and elaborates.

Questions related to the extent of general knowledge, attitudes, and experience gathered by the individual client were posed in conjunction with the display of each picture. Five specific questions were asked for each occupation. Responses were rated on a scale of one to three, indicating the degree of depth of the response. An outline of the questions asked and scoring criteria for each is presented in Table 2.

Following all interviews, results were recorded and statistically analyzed. Individual profiles were derived from the overall mean of the present population for each of the six occupational classifications. The profiles were reviewed with counsellors at the career centre who provided feedback regarding the accuracy of the profile measurement for each of the individuals assessed and anecdotal observations on overall efficiency of the testing procedure.

RESULTS

Probability levels derived from one-way analysis of variance tables are presented in Table 3 indicating the degree of significance of factors affect-

ing scores on Holland dimensions. Results indicate that age, degree of hearing impairment, and leisure activities of the clients did not significantly influence the dimension or total scores. Sex accounted for differences in the "Artistic" category ($P=0.012$) but did not appear to influence overall scores. The type of school attended accounted for more score differences than any other factor considered, reaching highest levels of significance for the "Investigative" ($P=0.017$) and "Enterprising" ($P=0.011$) dimensions. Differences in job experience scores within the "Artistic" ($P=0.033$) and "Conventional" categories ($P=0.053$) were also significant.

TABLE 3
Significance of Factors Influencing Scores of Holland Occupational Classes

<i>Occupational Classes</i>	<i>Sex</i>	<i>Age</i>	<i>School</i>	<i>Degree of Deafness</i>	<i>Leisure</i>	<i>Job Experience</i>
Realistic	.365	.680	.067*	.535	.939	.223
Investigative	.640	.377	.017*	.900	.198	.090
Artistic	.012*	.279	.126	.142	.373	.033*
Social	.440	.182	.248	.489	.972	.344
Enterprising	.173	.344	.011*	.796	.398	.095
Conventional	.160	.367	.067*	.678	.139	.053*
Total	.127	.346	.018*	.847	.440	.030*

*Probability levels derived from one-way analyses of variance tables. Significant at $P < 0.05$.

TABLE 4
Means and Standard Deviations of Occupation Scores by Sex

	<i>Female (N=21)</i>	<i>Male (N=27)</i>
Realistic	38.7±3.5	37.7±4.3
Investigative	33.6±4.4	32.9±5.5
Artistic	36.0±4.0	32.4±5.1
Social	38.8±4.1	37.8±4.3
Enterprising	36.7±3.6	35.0±4.9
Conventional	37.1±3.9	35.1±5.4

Given the authors' interest in examining specific gender differences in career knowledge, scores of female and male clients were studied in greater detail. Means and standard deviations of Holland occupational scores by sex of client are shown in Table 4. Differences in the "Artistic" dimension were significant with scores of 36.0 and 32.4 for women and

men respectively. Women tended to score slightly higher in all other dimensions compared to the men, in spite of an absence of correction for unequal numbers.

Table 5 presents means and standard deviations of total vocational knowledge scores according to all factors examined in the study. Owing to large variation in numbers of observations for some of the levels within factors, valid statistical comparison is made difficult. However, results indicate important trends worthy of further investigation. Overall scores by sex were not significantly different, although females tended to score at the upper levels of vocational knowledge compared to men (220.9 vs. 210.8 respectively).

TABLE 5

Means and Standard Deviations of Total Vocational Knowledge Scores by Sex, Age, School, Degree of Deafness, Leisure, and Job Experience of Clients

<i>Factors</i>	<i>Number</i>	<i>Mean</i>	<i>Standard Deviation</i>
<i>Sex</i>			
female	21	220.9±	19.5
male	27	210.8±	23.6
<i>Age (years)</i>			
18-25	19	216.7±	24.4
26-30	14	222.6±	19.1
31-40	9	206.9±	20.4
41-53	6	206.0±	23.0
<i>School</i>			
hearing	19	225.1±	22.5
deaf	29	210.2±	18.6
<i>Degree of deafness</i>			
total	35	214.9±	22.9
partial	13	216.3±	21.4
<i>Leisure</i>			
sports	13	219.5±	15.1
art, crafts	9	206.7±	26.1
reading	2	213.0±	5.7
sports, art	11	209.6±	14.6
art, reading	5	211.6±	24.2
sports, reading	6	225.5±	39.0
sports, art, and reading	2	233.0±	7.1
<i>Job Experience</i>			
realistic	30	208.3±	20.2
social	2	222.5±	9.2
conventional	9	223.4±	24.7
combination	7	232.6±	19.8

There was a tendency for total scores to increase with age up to 30 years, then decline from a mean of 222.6 for 25- to 30-year-olds to approximately 206.5 for 31- to 53-year-olds. It is possible that younger people have had the advantage of greater exposure to a variety of jobs compared to their older peers who may be more likely to remain in a specific career for longer periods.

Score difference between persons with total and partial hearing impairment was negligible. However, those who had attended schools for hearing populations, irrespective of their degree of deafness, had significantly higher total scores, averaging 15 points above the participants who had attended schools for the deaf.

There were no significant differences between scores for various levels of leisure activity, although it appeared that those clients with a wide range of leisure activities scored in the upper levels. The largest proportion of clients were engaged in either sports or craftwork. Of note is that few of the clients chose reading as a hobby, but among those who did, greater vocational knowledge was demonstrated.

The majority of clients worked in either "Realistic" or "Conventional" occupations involving janitorial, small factory assembly-line, or clerical skills. Exposure to and experience in less visible occupations (in which tasks are not visually evident and require extensive verbal instructions) was generally very limited. Those whose experience predominated in the "Realistic" category scored lower than those with "Social," "Conventional," or a combination of occupational backgrounds by a significant 14 points.

Of note is that across the entire sample, scores for question three regarding sex roles of workers were consistently high. Results indicate that in the present sample surveyed, traditional notions of sex-stereotyping were not prevalent, insofar as 60% of the clients, irrespective of gender and all other factors, responded that both men and women were capable of performing job skills in at least fifteen out of eighteen of the occupations presented.

All inter-correlations between scores for each of the six occupational classes and total client scores were high, averaging $r=0.70$. Such results indicate a high degree of inter-item reliability for questions on the test.

Individual client profiles were constructed based on the mean of total scores for each of the six occupational categories. Upon review of the profiles with the agency counsellor during the validation meeting, it was evident that there was approximately 50% accuracy between the counsellor's personal appraisal of the client and the client scores. It was suggested that any discrepancy may be a reflection of the counsellor's perception of the client's knowledge based only on the client's experience within a vocation. The counsellors felt that high scores were not indicative of the client's interest or ability *per se* in a specific work setting, although they agreed that clients with lower scores required more sessions to achieve placement.

Generally the agency counsellors reported that the conceptual framework for the test was helpful in gaining new insights into vocational counselling and assessment of the hearing impaired. The validity of presenting pictures of workers in occupations demanding highly verbal skills such as singing, selling, and weather-forecasting was questioned. Whether presentation of these occupations is rejected or questions related to them are revised for future testing requires more investigation for the development and refining of similar vocational scales for the deaf.

DISCUSSION

Results from the present pilot study have revealed some interesting observations that warrant further study. The method employed, involving a combination of the client's background history in questionnaire form combined with a signing interview presents itself as viable if time constraints are not an issue.

The fact that clients of both sexes responded similarly to knowledge concerning occupations considered to be traditionally the domain of one or the other gender (e.g., mechanic, farmer, nurse, or secretary) in addition to high scores throughout the sample tested regarding sex-stereotypical attitudes (questions 3 of the interview) lends itself to some speculation about the degree of sex-stereotyping beliefs held by the deaf. It appeared that sex-role stereotyping of careers was virtually absent from the adult clients in the present study although how these results would compare with those of hearing adults needs further clarification. Whether some trends reflected in the current study are a function of deafness or of maturity is unclear. Cook and Rossett (1975) noted that deaf women tested on a *Likert Attitude Scale* were significantly more traditional in the perceptions of sex roles than their hearing peers. These workers suggested that the isolation of hearing-impaired women from societal attitude changes is further compounded by the effects of residential living in schools for the deaf.

While it may be possible that lack of auditory communication precludes the inculcation of beliefs inherent in patriarchal society concerning the roles of the sexes, it is clear that more study is required to investigate the impact of social values in the world of the deaf. For example, we could ask whether those hard of hearing persons who have attended schools for hearing populations exhibit a greater degree of traditional stereotypical values concerning sex roles than those who have attended only schools for the deaf.

It would appear that attendance at many schools for the deaf limited the students in their interaction with others in the work world. Of note is that the degree of hearing impairment did not affect vocational knowledge test scores as significantly as the type of school attended. Such results underscore the important role played by integrating the hearing-impaired

with hearing persons in educational environments. According to the agency counsellors, it was apparent that the more social and articulate clients who had attended hearing schools were generally more self-aware and had a greater sense of knowledge of the dynamics of the work world.

RECOMMENDATIONS

Future research into the methods for assessment of vocational maturity among the deaf is needed to refine and continue the development of the procedure outlined above. Pictures presented to the clients require revision to better reflect a range of occupations potentially available to the deaf. Questions related to the degree of sex-role expectations may need to be excluded or scored separately from the interview protocol to avoid introduction of confounding social bias. To gain a clearer understanding of the extent of knowledge exhibited in the broader population of the hearing-impaired, samples need to be cross-validated with deaf persons employed in all six of the Holland Code occupations. Finally in a larger sample, records of school achievement and reading level could be examined to clarify their interaction with school environments as additional factors influencing vocational awareness among the hearing impaired.

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