SLOVENE ADAPTATION OF HOLLAND'S SELF-DIRECTED SEARCH

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SUMMARY

Holland's Self-Directed Search (SDS) was adapted to Slovene language. The paper gives a short summary of Holland's typology, SDS description, and procedures followed in its translation, back-translation, adaptation, and psychometric analysis. A sample of 528 sophomore high-school students took SDS in 1992. Item analysis was performed and some items were discarded or changed. Descriptive statistics, interscale correlations, and alpha reliabilities are reported. Holland's hexagonal model was tested using multidimensional scaling. Disparities from the model are not greater than in most American studies. Slovene teenage sample shows somewhat different behavior of Enterprising and Conventional scales. Some proposals are given for most urgent further SDS research in Slovenia. SDS application seems easy, but the interpretation of profiles, use of norms and DHOC introduce demanding psychodiagnostic and counseling problems. It is recommended that additional interpretation of SDS (for clients needing it) should be limited to psychologists.

HOLLAND'S THEORY OF CAREER CHOICE

American psychologist John L. Holland has proposed and has for the last three and a half decade developed his theory of career, called RIASEC theory or Holland's typology also. On the base of this theory he and his associates developed some tools for occupational counselors: two interest questionnaires (VPI and SDS), a system for classification of occupations with a dictionary, and more instruments for diagnostics and career guidance. The acronym SDS stands for The Self-Directed Search.

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According to the publisher's data, SDS is now one of most frequently used instruments in the field, taken by more than ten million people all over the world in more languages (PAR, 1992, p. 58).

Holland's (1985) theory tries to unify what can be learned from data about numerous people of different occupations and work environments. The theory tries to answer two main questions:

- how the people choose their occupation, and how they decide about their career;
- how are their decisions associated to job satisfaction and occupational success.

The theory is structural-interactive or typological-interactive. It is called »structural« or »typological« because it tries to organize numerous data about people and occupations. It is »interactive« because it assumes that the career choices and individuals' behavior are the result of interaction between them and their work environment.

Holland (1985) formed the theory using the following principles:

- Career choice is an expression of personality.
- Interests are expressions of personality.
- Occupational stereotypes have psychological and sociological meaning.
- Members of an occupation have similar personalities and similar personal development.
- Due to similarity of their personalities, people in an occupational group have similar personality traits, they will respond similarly to numerous situations and problems, and they will develop a typical interpersonal environment.
- Job satisfaction, stability and success in an occupation depend on the congruence between the personality and work environment.

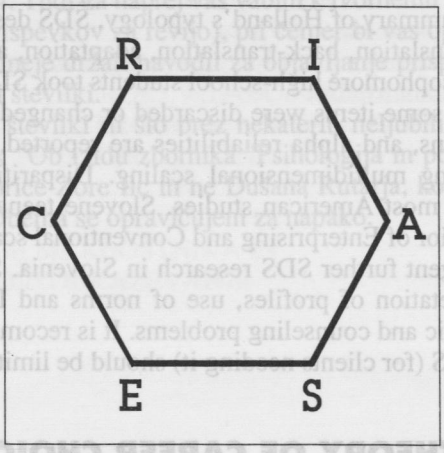

Figure 1: Holland's hexagonal model

The theory is based on the following assumptions:

1. Most people can be categorized as one of six personality types labeled realistic, investigative, artistic, social, enterprising, or conventional.

2.There are six kinds of environments: realistic, investigative, artistic, social, enterprising, or conventional.

3.People search for environments that will let them exercise their skills and abilities, express their aptitudes and values, and take on agreeable problems and roles.

4. A person's behavior is determined by an interaction between his or her personality and the characteristics of the environment.
5. The degree of congruence between a person and an occupation (environment) can be estimated by a hexagonal model (Figure 1).
6. The degree of consistency within a person or an environment is also defined by using the hexagonal model.
7. The degree of differentiation of a person or an environment modifies predictions made from a person's SDS profile, from an occupational code, or from their interaction. The degree of differentiation is defined as the difference between the highest and lowest summary scores.

THE HEXAGONAL MODEL AND DESCRIPTION OF TYPES

R: REALISTIC type prefers activities, involving unambiguous, ordered, and systematic handling of objects, tools, machines, and animals. Dislikes investigative, social, or therapeutic activities. These tendencies cause the development of manual, mechanical, agricultural, and technical aptitudes, abilities, skills, and achievements on one side - but deficits in social and educational achievements. Values concrete things, money, power, and social status. Is described as asocial, inflexible, practical, conforming, materialistic, self-effacing, frank, natural, thrifty, genuine, normal, uninsightful, hardheaded, persistent, and uninvolved.

I: INVESTIGATIVE type prefers activities, involving observational, symbolic, systematic, and creative investigation of physical, biological, and cultural phenomena in order of understanding and control. Dislikes persuasion of others, social, and repetitive activities. Values science and knowledge. Is analytical, independent, rational, cautious, intellectual, reserved, critical, introspective, retiring, complex, pessimistic, unassuming, curious, precise, and unpopular.

A: ARTISTIC type prefers ambiguous, free, and nonsystematic activities to create artistic forms in material, abstract, or human domain. Dislikes systematic or ordered activities. These tendencies cause the development of artistic abilities in the field of language, music or theater; connected with deficit in clerical and enterprising abilities. Values artistic qualities and beauty. Is described as complicated, imaginative, intuitive, disorderly, impractical, non conforming, emotional, impulsive, open, expressive, independent, original, idealistic, introspective, and sensitive.

S: SOCIAL type prefers activities that involve work with people with the intent of informing, education, development, or healing. Dislikes ambiguous, systematic, and ordered activities, including work with machines, tools, and materials. These tendencies cause the development of competencies to regulate human relations, and to educate; connected with a deficit of manual and technical abilities. Values social and ethical values. Is ascendant, helpful, responsible, cooperative, idealistic, sociable, emphatic, kind, tactful, friendly, patient, understanding, generous, persuasive, and worm.

E:ENTERPRISING type prefers activities, involving work with people to achieve some organizational or economic goal. Values political and economic achievements - but dislikes detailed observation and symbolic or systematic activities. These-

tendencies lead to development of leadership, interpersonal and persuasive competencies, but a deficit in scientific competencies. Is acquisitive, energetic, flirtatious, adventurous, excitement-seeking, optimistic, agreeable, self-confident, ambitious, exhibitionistic, sociable, domineering, extroverted, and talkative.

C: CONVENTIONAL type (in older versions called Clerical also) prefers activities, involving unambiguous, ordered, and systematic work with data. Dislikes ambiguous, unordered, free, investigative, and unsystematic activities. Values business and economical achievements. These tendencies cause the development of clerical, computational and business competencies - but a deficit in artistic competencies. Is described as careful, inflexible, persistent, conforming, inhibited, practical, conscientious, methodical, prudish, defensive, obedient, thrifty, efficient, orderly, and unimaginative.

Holland recommends to describe a person or an occupation (environment) with three letters. The first letter in the Holland code means the highest score in the interest profile (S for Social, for example), the second means the second score etc. If we say for Mary, that her Holland code is CSI, then we consider her to be most similar to the conventional (C) type, then to social (S), and investigative type (I) in the third place. Holland's theory assumes Mary will be probably most satisfied in CSI occupational and other environments. Some suitable occupations for her are assumed to be abstractor, financial analyst, editorial assistant, medical-record clerk, or proofreader. The following leisure time activities are predicted for Mary: doll collecting, embroidery, or card playing.

APPLICATIONS

Using a pragmatic approach Holland managed to achieve that SDS is distinguished with some characteristics, well accepted both by clients and counselors. SDS is a result of more than two decades of developed and has been well tested in practical counseling. So far more than 400 published papers discussed theoretical assumptions, measurement characteristics of the questionnaire, effects and outcomes of testing to the user.

Most of the test administration and scoring is done by the client, saving much time and energy of the counselor.

SDS was constructed to be user-friendly. Most users well accept this instrument, since they quickly find out, that this is not testing »for somebody else«, but for themselves and that it really helps to make their own decisions.

SDS was constructed as a self-scoring device: the user takes the questionnaire, computes his or her own scores and makes some of the interpretation with the use of Occupations Finder. But self-scoring and interpretation should not be expected from all users. SDS is based on assumption, that an individual is able to manage his or her own career and to cope with the barriers on this way. This is possible only if some prerequisites regarding his or her personal maturity and certain abilities are fulfilled. The counselee will need additional help and interventions in his or her career decision-making when handicapped for either objective or subjective reasons. Self-scoring and interpretation can be hindered in cases of rare, inconsistent, or undifferentiated SDS profiles. The counselor or a therapist is still indispensable for some clients.

SDS was constructed to stimulate clients initiative and learning in decision-making. Quite common directive approach keeps the client in a passive role: the counselor selects the instruments, scores and interprets the test scores, proposes alternatives etc. From this approach SDS can be understood as a step toward higher levels of self-initiative and clients' own activity, both lacking badly in our country in times of depression.

SDS gives a sound compromise to solve the problem of access to counseling services. Not only in Slovenia, but also abroad, counseling services in enterprises, employment service and education are faced to the problem, how to enable good counseling to all who need it. SDS can be considered as a simulation of career guidance. Holland (1985a) quotes research findings that about one half of students and adults are satisfied with SDS and require no further help. SDS can offer satisfactory form of counseling for many for the small price of a copy. Those, who can not make a reasonable career-decision by themselves for various reasons, must be offered advice of a well trained counselor. SDS can be therefore considered as a screening device.

SDS can be used quite widely. Employment service can use SDS with unemployed, who are applying either for employment or for more or less formal education or training courses, self-employment etc. In companies or other organizations SDS can be used as a part of programs aimed at qualification improvement, staff development planning, solving different personnel problems, etc. It can be widely used in career counseling programs in education.

Holland (1985a) gives 15 years of age as an approximate lower limit. Some prerequisites as reading literacy and personal maturity should be checked in older persons before using SDS. Even some thirteen-year-olds can take SDS successfully in groups of three to five or as a part of a »career workshop«.

Changes in Slovene adaptation

The original test material consists of:

- The questionnaire Assessment Booklet (A Guide to Educational and Vocational Planning) includes instructions, test items, and a list of additional sources of information.
- The Occupations Finder is a list of occupations with educational level and a DOT code. Occupations are sorted by Holland codes. The 1985 version gives 1.346 occupations.
- The booklet You and Your Career explains the typology and deals with some common interpretative problems.
- The Leisure Activities Finder gives a list of 760 activities (hobbies, sports, entertainments, etc.), sorted both by Holland codes and alphabet order.
- The College Majors Finder gives fields of study and electives in American system of higher education, sorted by Holland codes.

In the first part of the project it was decided to adapt to Slovene only the Assessment Booklet and The Occupations Finder. The layout was mainly guided by the original, but the Assessment Booklet, which is used only once, was printed on environment-friendly paper. The Assessment Booklet was independently re-translated from Slovene to English and the publisher's comments to it were helpful before the approval of the slightly changed translation.

The test manual is ready for print; it combines information from the original manual (Holland, 1985a) and its supplement (Holland, 1987) with statistical data from 1992 Slovene sample.

The main differences between the original and the Slovene adaptation are:

1.The number of adapted devices (two from five).

2.Additional information materials, available to American client and counselor.

The SDS original is strongly influenced by American system of occupational classification with a DOT code in job descriptions. The client and his or her counselor can consult the Occupational outlook handbook, published by Department of Labor every second year. When The Occupations Finder is not adequate, they can use the Dictionary of Holland occupational codes (DHOC; Gottfredson, Holland, and Ogawa, 1982). The use of such publications is not so easy to Slovene users not only due to differences of language, but only due to differences in social structure and occupational system. A new occupational classification in now in preparation, but it will be based on International Labor Organization recommendations ISCO-88 (ILO, 1990), which is unfortunately quite different to DOT.

The team needed quite a lot of time to translate the first version of the questionnaire and The Occupations Finder for the try-out. Both originals from 1977 (Holland 1985, pp. 182-198) and 1985 (Holland 1985a) were used in translation and a few items added from our own. The comparison of the original texts and their Slovene translations shows no significant changes in the questionnaire except higher number of items in the try-out version. The Occupations Finder suffered more changes: it was enlarged from 500 occupations in 1977 to 1346 in 1985, but only about 1100 remained in the Slovene version.

The adaptation of this device required the following decisions to be taken by the members of the team:

- DOT codes and the educational level codes remained, but with an explanation for Slovene students. It is expected that the counselors will be able to use DOT and DHOC until similar publications are available based on ILO/Slovene classification.

- Translation of The Occupations Finder is at present limited to those occupations, for which the job descriptions could be found in 1977 DOT edition, provided they can be imagined in Slovene culture and economy. Occupations related to space research, to some (not all) high technologies not expected to develop in Slovene economy soon, some (not all) occupations dealing with stock exchange transactions, occupations typical to American legal, law-enforcement and government system, etc. were not translated. Inclusion of some Slovene traditional trades was considered (like lončar, svečar, medičar, pletar...), but some research on proper Holland codes is still required.

- The explanation on the p. 2 of The Occupations Finder gives a rough comparison of educational levels in both educational systems.

SAMPLE

Experimental form was applied to a representative sample of secondary school sophomores with Slovene teaching language in 1991/92 school year. The publisher's approval limited the sample to about 500 students. To minimize the testing costs a two stage sampling plan was used. Classes of students were selected systematically at the first stage, and the whole class was tested. The sampling frame was a list of secondary schools with official enrollment data by classes at the beginning of the school year from the Ministry of Education. The computer listing was sorted by regions, schools and program units. After estimation of average class size, every 57th class was chosen after a random starting class from this list. From a population

of 28,146 students 589 (2.09%) were in the planned sample, and 528 students (1.88% - 275 girls and 253 boys) actually took complete SDS (the return-rate of 89.6%). Students' drop-out since the time of enrollment in Autumn was the prevalent reason for the difference between the planned and actual sample; and illness at the time of testing was the second most frequent reason.

TESTING AND DATA PROCESSING

Employment service psychologists applied SDS at selected schools in February and March 1992 after an introductory course and written instructions. The authors of this paper wish to acknowledge their help with detailed comments and observations of students, noted during the application, leading to the improvement of the final Slovene version. The program for data entry to a PC with some quality checks was written by Andrej Žižmond from the State Employment Service, and data was entered by two workers of the same agency. According to Data Privacy Law the file used for this research does not include data to identify individual students.

ITEM ANALYSIS AND SCALE RELIABILITY ESTIMATES

The program RELIABILITY of SPSS-X statistical package was used to compute item means, standard deviations, and two indexes of discrimination (corrected item-total correlation and squared multiple correlation) with an assumption, that original item location to RIASEC scales was correct. Correlations of item scores were computed also with other scale scores, gender, parents' education, school grades and Slovene version of GATB scores. This analysis was used to discard the most improper items, mostly judged by the item-total correlation. A few items were placed to a different scale as Holland suggested, when they correlated significantly higher with this scale than with the original one. In one case the text of the C-item was shortened, since the translation of adding machine was so similar to the meaning of computer in Slovene, that a lot of I students were attracted. Item analysis and the computation of correlations was repeated with the items of shortened and rearranged questionnaire. Table 1 summarizes descriptive statistics, correlations between scales, and reliability estimates of the proposed final version. Holland (1985a) does not give statistical data for wholly age-comparable population; but a comparison with data for American High-School Students (p. 65, Table B-1) enables to estimate as a first approximation, that average profiles of Slovene boys and girls are quite similar to American. Among greater differences lower averages of both genders in Social scales, and lower average of girls in Conventional scale should be noticed. Slightly lower standard deviations in Slovene sample could be probably explained with more homogeneous Slovene sample by age. Reliability estimates (Cronbach's alpha) are similar to those published by Holland for boys and girls in the 14-18 year age group (p. 49, Table 32). There is no inter-scale correlations available to authors of this paper for the same age group; but the published correlations show considerable differences to those reported for the Slovene sample in Table 1.

Table 1: Pearson correlation coefficients between pruned scales in the sample of boys (left bottom triangular matrix) and girls (right upper triangular matrix) with reliability estimates for the whole sample (Cronbach's coefficient alpha)

	SCALE	R	I	A	S	E	C
R	Realistic	.904	.261	.162	.064	.206	.138
I	Investigative	-.033	.844	.279	.393	.268	.256
A	Artistic	.130	.356	.889	.433	.283	.073
S	Social	.009	.460	.506	.893	.383	.306
E	Enterprising	.268	.389	.197	.526	.883	.608
C	conventional	.269	.360	.098	.480	.682	.858
M	BOYS, N = 253	26.107	21.308	16.130	20.846	24.379	13.044
s		8.861	8.612	9.472	8.894	9.727	6.712
M	GIRLS, N = 275	11.742	18.553	21.309	28.560	21.482	15.466
s		5.220	7.334	9.925	8.951	8.646	8.630

A TEST OF HOLLAND'S THEORY WITH MULTIDIMENSIONAL SCALING

Textbooks in multidimensional scaling often quote Holland theory as an example how to use this method for analysis and graphical visualization of multivariate data (see Kruskal and Wish 1978, and especially Davison 1983, pp. 90-99, 198-200).

In this paper only a brief description of this method in interest research can be given together with a recommendation to an interested reader to find details in more technical references and in a handbook of some software package. The starting point is a matrix of distances (or similarities) between the six scales. Measures of distances (or similarities) can be numerous; for VPI or SDS data suitable transformed correlation coefficients and Euclidean distances, computed after standardization of variables were used. Assuming a certain number of dimensions k of space (for example k = 2 for the plane) such a configuration of six points is sought, that the distances among them will describe the measured distances as good as possible. In so called non metrical solutions (due to nature of data being the most prevalent in social sciences) we are satisfied with a solution of the problem, where the ordinal structure at least remained intact; any monotone transformation of estimated distances is therefore permitted. In some solutions (but not all) any rotation is permitted, making substantial interpretation of the results easier.

Davison (1983) used an example with six scales of an older Holland's questionnaire VPI, using correlations to estimate distances between scales. Holland (1985, p. 94-97) and his associates noticed hexagonal configuration in years 1969-71 (therefore in time, when multidimensional scaling techniques were still in development) using »configural analysis«, unknown to authors of this paper and probably developed for the specific problem. Program ALSCAL from SPSS-X (versions 3.1) was used in this study, originally developed by Young, Takane and Lewyckyj in years 1975-1983. Euclidean distancebetween scales, standardized across students in the total sample, was used since the authors of this paper are convinced, that this distance measure summarizes more information than the correlation coefficient. In contrast to Davison, ALSCAL warning, that the solution can be very unstable in case of only i = 6 points in space with k = 2 dimensions, when data about only i(i -

1)/2 = 15 distances is available, but ik = 12 unknown parameters are to be estimated. Therefore a number of distances was enlarged with a decision to analyze SDS subscales: activities (denoted with letter d in Figure 3 and in Table 2), competencies (z), occupations (p) and both self-estimates (1 and 2). Number of points in space was enlarged from 6 to 30, but number of non-trivial distances from 15 to 435! Program ALSCAL was run with an assumption, that Euclidean distances are measured with an ordinal scale and a non metrical solution was estimated. The problem was solved for k = 1, 2, ..., 6 dimensions. Figure 2 plots Kruskal's measure of stress S1 (Davison, 1983, p. 87, equation 5.13) between the measured distances and distances computed in the estimated model. The decision on number of dimensions in multidimensional scaling is rather subjective as it is in factor analysis. Table 2 gives point dimensions for a solution with three dimensions, since it still improves the measure of stress, is still possible to imagine, and since the authors were interested whether the third dimension could be given some psychologically meaningful interpretation. It must be noted, that the solution for k = 2 gives very similar graph as plotted in Figure 3 for the first two dimensions of a k = 3 solution.

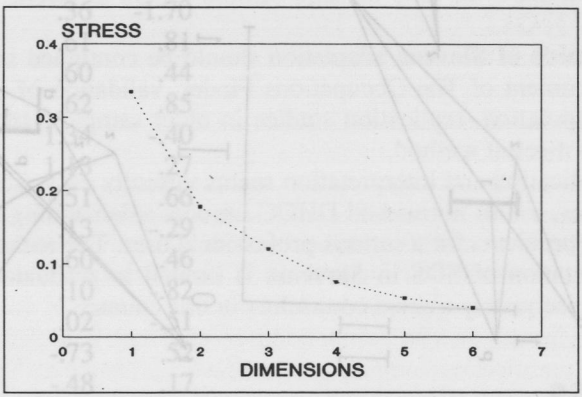

Figure 2: Kruskal's measure of stress and the number of dimensions

The Holland's hexagonal model is valid for Slovene data:

1.if points in Figure 3, denoting subscales of a supposed construct (R for example) are distributed separately from points of some other supposed construct (I for example) in the limits of measurement errors ;

2.if the two dimension solution reproduces the measured distances correctly;

3.if the two dimension solution is similar to the RIASEC hexagon.

A detailed look to Figure 3 tells, that the first assumption with some exceptions survives quite well the confrontation with data. The Social and Artistic scales are metrically nearly perfect in Slovene sample. Conventional competencies subscale (Cz point in Figure 3) is near to the Enterprising type, and two self-estimates are too far from the others in case of the Realistic and Investigative type. The first is the Manual skill item, surprisingly close to the Investigative type area, and the second is the Mathematical ability item, also surprisingly close to the Realistic type (R). Greater dispersion of self estimates from the type centroids (in Figure 3 denoted 1 and 2) is not a reason of serious concern, since they are based on singular student's

responses. The measurement with individual self-estimates is therefore less reliable than other subscale measurements, summing up responses to more than ten items.

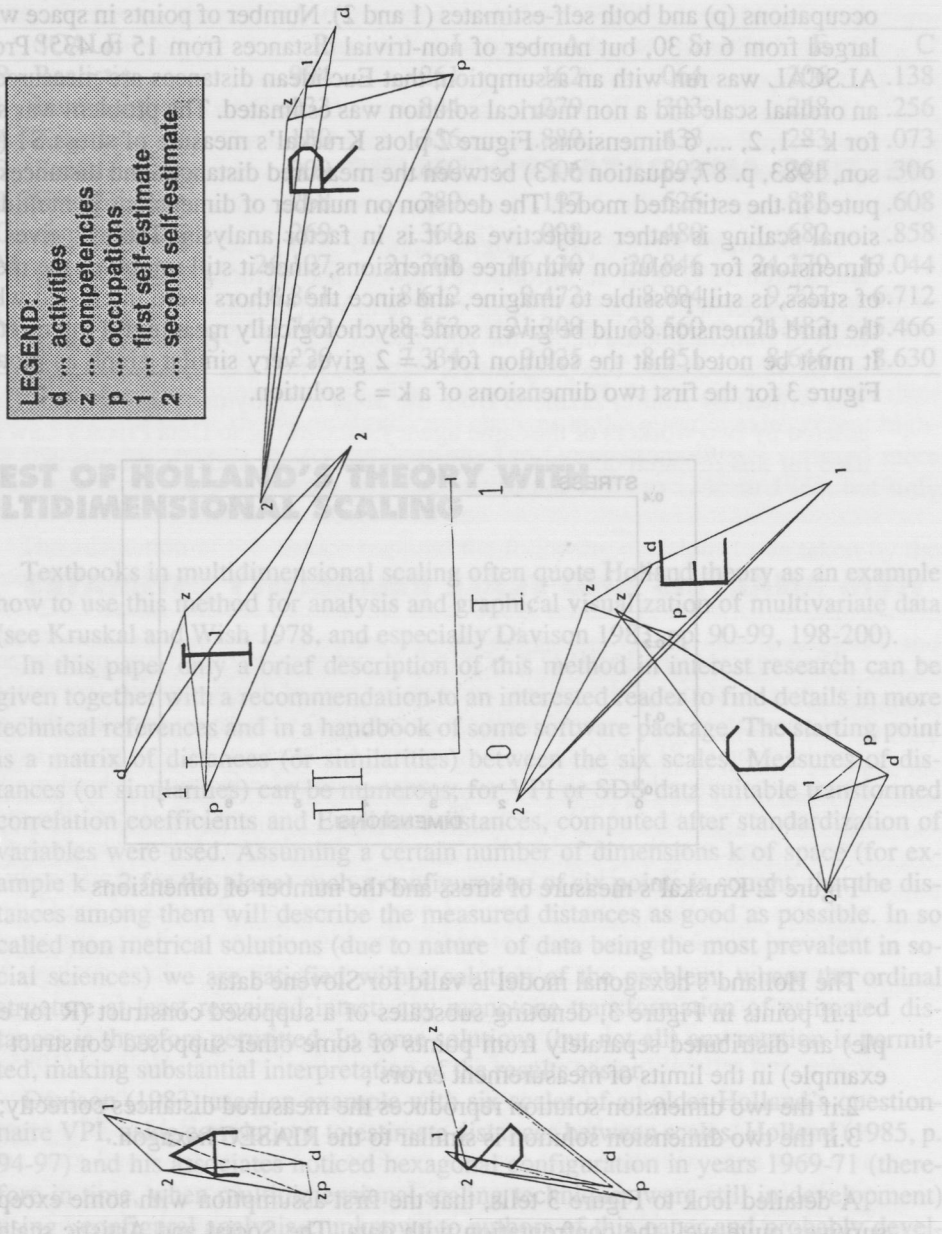

FIGURE 3: SDS subscales in the first two dimensions space

The second assumption is only partially valid, when tested with subscale distances. Introduction of the third dimension improves the solution substantially and lowers Kruskal's measure of stress closer to .1 - often considered to be satisfactory solution in social sciences. (Values very close to 0 often mean a degenerated solution like three points on a line for a supposed triangle!) In this data the third dimen-

sion is psychologically associated to the measurement procedure of the construct: the negative values are mostly noticed at self-estimate scales, but the positive for activities and occupations subscales. The third dimension at the level of subscales stricto sensu does not disprove Holland's two-dimensional model for only six scales, since the three-dimensional model cannot be estimated in this case at all!

Table 2: SDS subscales in space of three dimensions

Scale	I	II	III
Rd	2.68	.37	.75
Rz	2.34	.56	-.05
Rp	2.49	-.05	.74
R1	2.46	.49	-.46
R2	.94	.70	1.42
Id	-.04	1.23	.05
Iz	.55	.99	-.81
Ip	-.12	.93	.35
I1	.41	.90	-.07
I2	1.14	.36	-1.70
Ad	-1.49	.61	.81
Az	-1.60	.60	.44
Ap	-1.60	.62	.85
A1	-1.28	1.34	-.40
A2	-1.49	1.13	.27
Sd	-1.61	-.51	.66
Sz	-1.06	.13	-.29
Sp	-1.66	-.60	.46
S1	-1.46	.10	-.82
S2	-1.53	.02	-.51
Ed	.67	-.73	.52
Ez	.52	-.48	.17
Ep	.41	-.80	.42
E1	.95	-1.41	.01
E2	-.18	-.20	-1.04
Cd	-.13	-1.59	.69
Cz	.51	-.59	-.44
Cp	-.06	-1.49	.55
C1	-.22	-1.29	-.83
C2	-.56	-1.34	-.74

It should be mentioned testing the third assumption, that it is not disproved by the orientation of RIASEC in the opposite direction: the reader is invited to look the figure in the mirror instead. Taking this into account it can be said, that the third assumption is valid for the RIA part of the hexagon. The supposed configuration SEC is not supported by Slovene data: Figure 3 shows SCE instead. Conventional and Enterprising types are much closer than the other types and they even overlap in one subscale. The observed hexagon is wider in R - S direction than in I - E or A - C directions.

It can be summarized, that Holland's RIASEC hexagonal model was not completelyaccepted in the sample of Slovene secondary school sophomores, but the dis-

parities do not seem to be greater than in numerous model validations in American samples. The reader is invited to consult Holland's (1985, p. 41) response to his critics on this question. Slovene adolescents show slightly different understanding of items, supposed to measure Conventional and Enterprising type. The authors of this paper assume the Slovene hexagon will be more similar to American after the process of privatization in a decade or two. It is also possible, that older respondents have more experience with C and E activities than teenagers. Slovene sample is quite young and therefore it is recommended to test the model in older samples before the hexagonal RIASEC model transformed into RIASCE or even RIAS(C/E) for the Slovene population.

EVALUATION

Try-out of the SDS Slovene adaptation in a representative sample and the item analysis showed, that SDS can be used in Slovene population. Validation of Holland's hexagonal model showed that disparities from the model are not greater than in most American studies. Slovene teenage sample shows different behavior of E and C scales.

The research of Slovene adaptation should be continued in the following directions: enrichment of The Occupations Finder, validation of occupational codes in Slovene population, replication studies in older samples, and reliability estimates using the test-retest method.

SDS application and interpretation seems virtually easy, but the interpretation of SDS profiles, use of norms and DHOC introduce demanding psychodiagnostic and counseling problems for a serious professional user. The authors of this paper insist the interpretation of SDS in Slovenia is limited to graduated psychologist, since there is no adequately trained counselors in this country.

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